



**RESPONSE TO FREEDOM OF INFORMATION ACT (FOIA) REQUEST**

REQUESTER *Mr. Paul Gunter*

**PART I.—AGENCY RECORDS RELEASED OR NOT LOCATED (See checked boxes)**

No agency records subject to the request have been located.

No additional agency records subject to the request have been located.

Requested records are available through another public distribution program. See Comments section.

Agency records subject to the request that are identified in Appendix(es) \_\_\_\_\_ are already available for public inspection and copying at the NRC Public Document Room, 2120 L Street, N.W., Washington, DC.

Agency records subject to the request that are identified in Appendix(es) L are being made available for public inspection and copying at the NRC Public Document Room, 2120 L Street, N.W., Washington, DC, in a folder under this FOIA number.

The nonproprietary version of the proposal(s) that you agreed to accept in a telephone conversation with a member of my staff is now being made available for public inspection and copying at the NRC Public Document Room, 2120 L Street, N.W., Washington, DC, in a folder under this FOIA number.

Agency records subject to the request that are identified in Appendix(es) \_\_\_\_\_ may be inspected and copied at the NRC Local Public Document Room identified in the Comments section.

Enclosed is information on how you may obtain access to and the charges for copying records located at the NRC Public Document Room, 2120 L Street, N.W., Washington, DC.

Agency records subject to the request are enclosed.

Records subject to the request have been referred to another Federal agency(ies) for review and direct response to you.

**Fees**

You will be billed by the NRC for fees totaling \$ \_\_\_\_\_.

You will receive a refund from the NRC in the amount of \$ \_\_\_\_\_.

In view of NRC's response to this request, no further action is being taken on appeal letter dated \_\_\_\_\_, No. \_\_\_\_\_.

**PART II. A—INFORMATION WITHHELD FROM PUBLIC DISCLOSURE**

Certain information in the requested records is being withheld from public disclosure pursuant to the exemptions described in and for the reasons stated in Part II, B, C, and D. Any released portions of the documents for which only part of the record is being withheld are being made available for public inspection and copying in the NRC Public Document Room, 2120 L Street, N.W., Washington, DC in a folder under this FOIA number.

**COMMENTS**

The records listed on the enclosed Appendix L were forwarded to the Subcommittee on Oversight and Investigations of the House Committee on Energy and Commerce in August 1992.

For your information, it has been determined that record number two on the enclosed Appendix L was an actual piece of thermo-lag material. This record and records number 15, 109, 128, 193, 201, 224 and 233 on Appendix L cannot be located.

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SIGNATURE, DIRECTOR, DIVISION OF FREEDOM OF INFORMATION AND PUBLICATIONS SERVICES

*Samuel R. [Signature]*

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PDR FOIA  
GUNTER94-137 PDR

Page No. 1  
08/05/92

## APPENDIX L

## INDEX OF THERMO-LAG DOCUMENTS

DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
1. 04/11/77	Feldman	UL	Small-Scale Test Program to Evaluate the Fire Resistance Performance of a Mastic Coating when Subjected to Simulated Exterior and Interior Exposure Conditions	UL
2. 04/13/79	TSI	ITL	ITL: Final examination of 1 sample of fire-retardent material marked "330HM144, Batch 12279, 3/24/79" submitted	ITL
3. 07/01/79	Agents/Brokers etc	ANI	Bulletin to Agents/Brokers, Insurance Managers & Architect Engineers	ANI
4. 06/01/80		TSI	TSI Technical Note 71880	TSI
5. 08/21/81	Harrison	Feldman	2 Reports on 1-Hr ASTM E119 Fire Simulation Facil. Fire Test Followed by Short Term Hose Stream in Class 1E Cable Conduit Assembly and Cable Tray, Conduits & Air Drop Assembly	TSI
6. 09/01/81			TSI Technical Note 90181, Engineering Design Info. Thermo-Lag 330-1 Subliming Coating Envelope System For Fire Resistive Enhancement of Crit. Compon., Volume 2	TSI
7. 09/01/81			Technical Note 90181, Engineering Design Info. Thermo-lag 330-1 Subliming Coating Envelope System for Fire Resistive Enhancement of Critical Components, Volume 3	TSI
8. 09/01/81			TSI Technical Note 90181, Engineering Design Information Thermo-Lag 330-1 Subliming Coating Envelope System for Fire Resistive Enhancement of Critical Components, Vol. 4	TSI
9. 03/01/82	TSI		ITL Report 82-3-2, Witnessing of Fire Tests on 2/3-2/4/82.	ITL

INDEX OF THERMO-LAG DOCUMENTS

	DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
10.	05/17/82	TSI	ITL	ITL Report No. 82-5-355-A	ITL
11.	05/28/82	Madden	Feldman	Submit the Following Technical Support for Proposed use of Thermo-Lag 330-1 Subliming Coating Envelope System	TSI
12.	06/18/82	TSI	ITL	ITL Report No. 82-5-355B	ITL
13.	08/01/82	PPL&C	Beitel	Proprietary Qualification Fire Test of a Protective Envelope System	SWRI
14.	09/14/82	Feldman	Storment	ITL letter re: densities for 3 samples of Thermo-Lag 330-1 given to Storment by Ben Evans for density measurements	ITL
15.	09/20/82	Feldman	Storment	ITL letter re: densities for 3 samples of Thermo-Lag 330-1	ITL
16.	10/04/82	Kubicki	Feldman	I.T.L. Report 82-5-355A, Fire Simulation Facility Fire Tests, water hose stream impact tests and electrical circuitry continuity tests	TSI
17.	11/01/82		Siegel	I.T.L. Report 82-11-80, 1-Hour Fire Endurance Tests Conducted on Test Articles Containing "Generic" Cables Protected with Thermo-Lag 330-1 Subliming Envelope System	ITL
18.	11/01/82		Siegel	ITL Rpt 82-11-241, 1-Hour Fire Endurance Tests Conducted on the Thermo-Lag 330-1 Subliming Coating System Applied by the Direct Spray-on Design to 4-Inch Diameter Std. Elect	ITL
19.	11/01/82		Siegel	ITL Report 82-11-81, 3-Hr. Fire Endurance Tests Conducted on Test Articles Containing "Generic" Cables Protected with Thermo-Lag Subliming Coating Envelope System	ITL
20.	11/01/82	TSI	Siegel	ITL Report 82-11-240, 1-Hr. Fire Endurance Tests Conducted on	ITL

Thermo-Lag 330-1  
Subliming Coating System  
Applied by Direct  
Spray-onDesign to 4-Inch  
Diameter Std. Elect.  
Condui

INDEX OF THERMO-LAG DOCUMENTS

DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
21. 12/02/82	Feldman	Bornhoeft	TSI Tech Note 1130-83A, Selected Info. on Thermo-Lag 330-1 Subliming Fire Barrier Systems for Use as Protective Fire Barrier for the SafeHot Shutdown of Critical Components	TSI
22. 01/26/83	TSI	ITL	ITL - Calorimetric Determination of Potential Heat Release of Thermo-Lag 330-1 Subliming Material	ITL
23. 04/11/83	TSI	ITL	ITL - Report NO. 83-3-199 Examination of 1 "Thermo-Lag sample submitted marked, 330-1(N), 3/83/1"	ITL
24. 06/01/83		Feldman	TSI Technical Note 80181, Thermo-lag 330-1 Subliming Coating Fire Barrier Systems, Application Procedures, Revision IV	TSI
25. 06/01/83			I.T.L. Report 83-5-472A, 1-Hour Fire Endurance Test Conducted on TheThermo-Lag 330 Sublimit Fire Barrier System Applied by Direct Spraying	ITL
26. 08/12/83			ITL Report 83-5-472, 1-Hour Fire Endurance Test Conducted on Thermo-Lag 330 Subliming Fire Barrier System Applied by Direct Spraying	ITL
27. 08/30/83	TSI	ITL	ITL - Report No. 83-8-183	ITL
28. 10/11/83		Bechtel	Technical Specification for Furnishing and Installation of Fire Barrier Materials for the SNUPPS	Bechtel
29. 01/01/84		TSI	TSI Technical Note 20684, Thermo-Lag 330 Fire Barrier System Installation Procedures Manual Nuclear Plant Applications	TSI
30. 01/01/84	Union Elec	TSI	TSI Technical Note 10484A	TSI

INDEX OF THERMO-LAG DOCUMENTS

	DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
31.	02/03/84	Wagoner	Weber	Procurement of Fire Barrier Material - Purchase Order 7186-NS-87593	Callaway
32.	02/07/84	Stafford	Rippe	Specifications 10466-E-097, TS for Furnishing and Installation of Fire Barrier Materials for the Standardized Nuclear Power Plant System	TSI
33.	03/01/84	TSI	ITL	ITL Report No. 84-3-275	ITL
34.	03/21/84	Brooks	Stokes	Fire Wrap	Callaway
35.	10/22/84	Youngblood	Johnson	1) Fermi 2 NRC Docket 50-341 2) Detroit Edison to NRC Letter of 8/4/84 3) Detroit Edison to NRC Letter of 8/3/84	Detroit Ed
36.	12/01/84	TSI	ITL	ITL Report No. 84-12-181	ITL
37.	01/01/85		NFPA	NFPA 251 - Standard Methods of Fire Tests of Building Construction and Materials	NFPA
38.	02/01/85		TSI	TSI Technical Note 111781-Engineering Report on Ampacity Test for 600 Volt Power Cables	TSI
39.	07/29/85	Lainas	Johnston	Request for exemptions from the requirements of Appendix R to 10 CFR 50, Donald C. Cook Nuclear Power Plant Units 1 & 2, Tac No. 55809/10	NRC
40.	10/31/85			Final Report CTP 1092a, 3-Hour Qualification Test Flex Conduit Protected with Appendix R Insulation in Conjunction with Promatec LDSE	SWRI
41.	11/01/85		Lohman	Assist TSI Technical Note 20684, Thermo-Lag 330 Fire Barrier System Installation Procedures Manual Power Generating Plant Applications, Revision V	TSI
42.	03/21/86	Salkiewicz	Licht	Fire Test Report 86-42 and 86-43	3M
43.	06/05/86			Document Review/Approval and Distribution Form -	3M

Standard Project Plan.  
3M/TSI Interface  
Proposal: Installation  
Only.

INDEX OF THERMO-LAG DOCUMENTS

DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
44. 06/13/86			Preliminary Interface Fire Test of 3M 1-hr fire protection system interfaced to TSI 1-Hr. Perform Fire Protection System	3M
45. 07/16/86	TSI	3M	Receival Acknowledge and Disolete Document Return Procedure	3M
46. 08/19/86			3M and TSI Interface Test 2.5" CNDT 3-Hr.	3M
47. 08/19/86			3M and TSI Interface Test 2.5" CNDT 3-Hr. 3M Chem 66 Ft. 86-92	3M
48. 08/19/86			3M and TSI Interface Test 7C/12 Data	3M
49. 08/19/86			3M and TSI Interface Test 2.5" CNDT 3Hr	3M
50. 08/19/86	Light		3M Fire Test Request/Report	3M
51. 09/13/86	TSI	ITL	ITL - Report No. 335-9-140-86	ITL
52. 09/17/86			Interface Fire Test of 3M Interam 1-Hr Fire Protection System Joinedto TSI 1-Hr Perform Fire Protection System E-119 Test 5" Steel Conduit	3M
53. 10/01/86	3M Company	TCTC	Twin City Testing Corporation, Qualification Fire Tests of The 3-Hour 3M Interam E-50D Interface to a 3-Hour TSI Board on a 2 1/2 Dia. Steel Conduit	TCTC
54. 10/10/86		Peisert	Proposal for a Qualification Fire Test of a 3M/TSI Interface on a 1-Hr. System PJ-24, 86-112	3M
55. 10/23/86		Koza	3M Fire Test Request/Report 86-115	3M
56. 11/14/86		Koza	Proposal for a Qualification 3M/TSI Interface Fire Test at Construction Technology Laboratories 1-Hr. System	3M
57. 01/21/87	Feldman	Fava	Special Services Invest. of Ampacity Ratings for Power Cables in Steel	UL



Conduits and in  
Open-Ladder Cable trays  
with Field-Applied  
Enclosures

INDEX OF THERMO-LAG DOCUMENTS

	DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
58.	01/23/87	Rippe	Hall	Fire and Hose Stream Tests of Three Electrical Protective Envelope Interface Configurations	CTL
59.	02/10/87			Synopsis on the Thermo-Lag 330 Fire Barrier System for Power Generating Plant Applications	TSI
60.	03/02/87	NRC	Bradish	RIDS, LER 87-005-00: on 870302, While Unit in Mode 4, Hourly Fire Watch Patrol Not Performed in Accordance w/TS 3.7.12. Caused by Personnel Error	Palo Verde
61.	03/25/87	USNRC	Booker	River Bend Station - Unit 1 - Docket No. 50-458	River Bend
62.	03/31/87	Palo Verde Unit 1	Bradish	LER - Fire Watch Patrol Missed Due to Personnel Error	Palo Verde
63.	04/01/87			ITL Report 87-4-3, 1-Hour Fire Endurance Test Conducted on 4-Inch Diameter WPPS System "In-Situ" Steel Conduit Sections Protected with Thermo-Lag 330	ITL
64.	04/13/87		WHI	Fire Endurance Test for Protective Barrier with a Non-Contacting Penetrating Item	WHI
65.	04/26/87	Oyster Creek, Unit 1	Zimmerman	Failure to Post a Fire Watch for a Non-Functional Fire Barrier Due to Personnel Error in Failing to Follow Procedure	Oyster Crk
66.	06/01/87	TSI	ITL	ITL Report 87-5-76 - 3 hour	ITL
67.	06/25/87		ANI	"ANI/MARKP RA Guidelines for Fire Stop and Wrap Systems in Nuclear Power Plant Facilities"	ANI
68.	07/07/87	Garret	Bel	ITL Report 87-5-77	WPPS
69.	11/01/87		ANI	"ANI/MAKRP RA Guidelines for Fire Stop and Wrap Systems at Nuclear Facilities"	ANI
70.	06/16/88	Wash Nuclear Plant, U-2	Washington	Technical Specificaiton Violation of Cable Spreading Room Fire Barrier Caused by Missing	Wash Nucl

Thermo-Lag Insulation Due  
to Personnel Error

INDEX OF THERMO-LAG DOCUMENTS

DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
71. 12/12/88	Coones	Lyle	SwRI Porposal No. 01-8040 GSU RFP No. AXX 56951	SRI
72. 02/03/89	Rippe	Hamilton	File Code No 228.410 - Furnishing and Installation of Thermal Insulation Outside the Drywell - River Bend Unit 1	River Bend
73. 03/03/89	Gulf States	Feldman	Your Letter Dated 3 February 1989 - Gulf States Utilities "Draft"	TSI
74. 03/16/89	River Bend Station	England	LER - Inadequate Thermo Lag Coverings as Fire Barriers Per TS 7.7.7.a	River Bend
75. 03/31/89	Feldman	Hamilton	File Code No. 228.410 - Furnishing and Installation of Thermal Insulation Outside the Drywell - River Bend Station - Unit 1	River Bend
76. 04/07/89	Gulf States	Feldman	Letter confirming telephone conference regarding forthcoming test program	River Bend
77. 04/17/89	NRC	England	RIDS, LER 89-009-00: on 890316, Inadequate Thermo-Lag Coverings as Fire Barriers Per TS 7.7.7.a.W//890417 Letter.	River Bend
78. 09/01/89	TSI	CTL	"Fire test on Aluminum Ladder Back Cable Tray Protected by Thermo- Lag Prefabricated Panels in a Steel Bulkhead	CTL
79. 10/01/89	TSI	Const. Tech. Lab.	Fire Test on Stael Ladder Back Cable Tray Protected with Modified 3-Hour Design Using Thermo-Lag Prefabricated Panels and Stress Skin	CTL
80. 10/01/89		Const. Tech. Lab.	Fire Test on Aluminum Ladder Back Cable Tray Protected by Thermo-LagPrefabricated Panels in a Steel Bulkhead	CTL
81. 10/12/89	NRC	Cahill	RIDS, Final Deficiency Report CP-89-025 Regarding Site Fabricated Thermo-Lag Panels.	Comanche P

INDEX OF THERMO-LAG DOCUMENTS

DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
82.	10/23/89 Gulf States	Feldman	GSU's File No. ED-89-1078	River Bend
83.	10/31/89 Coones	Feldman	CTL Report No. 824-59 and 824-63	River Bend
84.	11/01/89 TSI	Const. Tech. Lab.	Fire Test on Aluminum Ladder Back Cable Tray Protected by Thermo-Lag Prefabricated Panels	CTL
85.	11/01/89 TSI	Const. Tech. Lab.	Fire Test on Aluminum Ladder Back Cable Tray Protected by Thermo-Lag Prefabricated Panels	CTL
86.	11/10/89 Crouse	Backen	Meeting with TSI Management Addressing the Thermolag Fire Test Failure in October	River Bend
87.	12/01/89 NRC	Warnick	RIDS, Forwards Inspection Reports 50-445/89-71 and 50-446/89-71 on 891004-1107 and Notice of Violation	NRC
88.	12/01/89 Cahill	Warnick	Inspection at Comanche Peak	NRC
89.	12/01/89 Cahill	Warnick	Dockets 50-445/89-71 and 446/89-71:	NRC/NRR
90.	12/18/89 Coones	Feldman	7 December 1989 Meeting Summary TSI's Comments	River Bend
91.	12/18/89 England	Hamilton	Condition Report 89-1144 Supplementary Information G9.25.1.3 10 CFR 50.73 License Event Report System	River Bend
92.	01/09/90 USNRC	Booker	River Bend Station - Unit 1 - Docket No. 50-458	Gulf State
93.	01/11/90 Feldman	Hamilton	TSI Comments on GSU Fire Test and Drawing Details	River Bend
94.	03/08/90 NRC	Odell	RIDS, LER 90-003-00: on 900206, Inadequate Thermo-Lag Fire Barrier Envelopes Surrounding Safe Shutdown Circuits per TS 3/4.7.7	River Bend
95.	05/30/90	ITL	ITL Test: Drying (Curing) Time - Procedure No. FED-STD-141 Method 4061	ITL
96.	05/31/90	ITL	ITL Test: Drying (Curing) Time - Procedure No. FED-STD-141 Method 4061	ITL

INDEX OF THERMO-LAG DOCUMENTS

	DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
97.	07/12/90	NRC	Odell	RIDS, LER 90-003-01: on 900206, Inadequate Thermo-Lag Fire Barrier Envelopes Surrounding Safe Shutdown Circuits Per TS 3/4.7.7	River Bend
98.	07/13/90	NRC	Cahill	RIDS, Submits Info. Re Revised Acceptance Criteria for Thermo-Lag Prefabricated panels.	Comanche P
99.	07/20/90	Cahill	Collins	Response to Telephone Request Regarding the Acceptability of Thermo-Lag Fire Barrier Material.	NRC/NRR
100.	08/29/90	Plant Manager	Hamilton	CR Extension Request	River Bend
101.	11/23/90		ASTM	1990 Annual Book of ASTM Standards - Section 4	ASTM
102.	11/23/90		ASTM	Designation E 84 - 89a 1990 Annual Book of ASTM Standards - Section 4	ASTM
103.	01/01/91			Designation E 119 - 8 Preliminary Engineering Test Report on 1-and 3-hour Fire Resistive Test Program Conducted on Test Articles Protected with GSU's Institu Fire Barrier Designs, Test #5	
104.	01/07/91	Perry Nuclear	Hegrat	Cable Tray Raceways Found to be Imported as a Fire Barrier, Adversely Affecting Safe Shutdown Requirements	Perry
105.	02/04/91	NRC	Odell	RIDS, LER 90-003-02: on 900206, Small Holes, Cracks & Unfilled Seams Found in Thermo-Lag Matl. of Fire Barrier Envelopes Around Redundant Safe Shutdown Circuits. Fire Watch Estab.	River Bend
106.	02/04/91	USNRC	Odell	River Bend Station - Unit 1 - Docket No. 50-458	River Bend
107.	05/11/91	Ulie	Lohman	Submit Information We Requested	TSI
108.	05/24/91	Hamilton	Beitel	3-Hour Test, Draft Final Report for 10/26/89 Test	SRI

INDEX OF THERMO-LAG DOCUMENTS

DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
109. 06/11/91	Norrholm	Petrosino	Visit to River Bend to review the Circumstances surrounding LER 90-03 regarding thermolag fire protection material	NRC
110. 06/28/91	NRC	Odell	RIDS, LER 91-003-03: on 900206, Found Deficiencies in Thermo-lag Fire Barrier Envelopes Around Redundant Safe Shutdown Circuits. Conducted Series of Fire Endur. Tests	River Bend
111. 06/29/91	McCracken	Notley	Request from Ruben Feldman, President of Thermal Science, Inc. (TSI) of St. Louis, Missouri	NRC
112. 07/23/91	Berlinger	McCracken	Proposed information notice on Thermo-Lag fire retardant material	NRC/NRR
113. 08/06/91		Rossi	NRC Information Notice No. 91-47: Failure of Thermo-Lag Fire Barrier Material to Pass Fire Endurance Test	NRC/NRR
114. 08/23/91	Garrett	Lohman	TSI's Response to NRC Information Notice 91-47, Failure of Thermo-Lag Fire Barrier Material to Pass Fire Endurance Test	TSI
115. 09/10/91	Feldman	Miraglia	Request for Information Regarding Fire Barrier System Materials and Design	NRC/NRR
116. 09/10/91	Feldman	Miraglia	RIDS, Informs of Reviewed Documents Provided by Plant and Other Information Concerning Thermo-Lag.	NRC/NRR
117. 09/18/91	Chatfield		Thermo-Lag Data Sheets and test Reports	TSI
118. 09/18/91	Feldman	Miraglia	Letter referring to written response of September 10, 1991	NRC/NRR
119. 09/18/91			ITL Report 87-5-76, 3-Hour Fire Endurance Test Conducted on a Two-inch Diameter Conduit Test Section Protected	ITL

with Thermo-Lag      Fire  
Barrier System



INDEX OF THERMO-LAG DOCUMENTS

	DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
120.	10/01/91	Paul	Wesson	NRC Investigations of Thermal Science, Inc. of St. Louis, MO	Consultant
121.	10/05/91	Miraglia	Feldman	Thermal Science's response to list of questions sent to them in 1Letter from NRC Dated 9/10/91	TSI
122.	10/07/91	NRC	Hegrat	LER Cable Tray Raceways Found to be Impaired as a Fire Barrier, Adversely Affecting Safe Shutdown Requirements.	Perry
123.	10/11/91	Feldman	Miraglia	Letter forwarding copy of official transcript of meeting held on October 17, 1991	NRC/NRR
124.	10/31/91	Miraglia	Plisco/Wes t	Fact Finding Visit River Bend Station	NRC/NRR
125.	10/31/91	Feldman	Miraglia	Letter of review of transcript of October 17, 1991	NRC/NRR
126.	11/12/91	Miraglia	Feldman	TSI, Partial Response to Questions Contained in NRC's Letter dated October 31, 1991	TSI
127.	11/19/91	Ishack	Novak	IRS Report "Failure of Thermo-Lag Fire Barrier Material to Pass FireEndurance Test"	NRC/AEOD
128.	11/29/91	Ishak	Novak	Failure of the Thermo-Lag Fire Barrier Material to Pass Fire Endurance Test	NRC/AEOD
129.	12/03/91	Miraglia	Feldman	Thermal Science, Inc.'s Supplemental Response to Remaining Questions Contained in NRC's Letter Dated 10/31/91	TSI
130.	12/06/91	All OL & CP licensees	Rossi	NRC Information Notice 91-79: Deficiencies in the Procedures for Installing Thermo-Lag Fire Barrier Materials	NRC/AEOD
131.	12/11/91	Miraglia	Plisco	Fact finding visit to Washington Nuclear Project, Unit 2	NRC
132.	12/18/91	Miraglia	Plisco	Fact Finding Visit to Perry Nuclear Power Plant	NRC

INDEX OF THERMO-LAG DOCUMENTS

DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
133. 12/24/91	Miraglia	Plisco	Fact Finding Visit to Comanche Peak, Unit 1	NRC
134. 12/27/91	USNRC	Odell	River Bend Station - Unit 1 - Docket No. 50-458	River Bend
135. 12/27/91	NRC	Odell	RIDS, LER 91-003-04: on 900296, Deficiencies in Thermo-Lag Fire Barrier Envelopes Noted. Caused by Vendor Discrep Const. Fire Water Estab. & Repair Meth. Developed w/911127	Gulf State
136. 12/31/91	Ishack	Novak	IRS Report, "Deficiencies in the Procedures for Installing Thermo-Lag Fire Barrier Materials"	NRC
137. 01/03/92	NRC	Lyster	Perry Nuclear Power Plant Docket No. 50-440 - LER 91-020-01	Centerior
138. 01/07/92	Miraglia	Plisco	Fact Finding Visit to Callaway Plant	NRC
139. 01/09/92	Martin	Miraglia	Washington Nuclear Project, Unit 2 - Fire Protection Program Concerns	NRC/NRR
140. 01/13/92	Wilson	Feldman	Additional Information Submitted in Accordance with our Telephone Conference with TSI on 01/10/92.	TSI
141. 01/15/92	Feldman	Miraglia	Thank You Letter for Use of Photograph of Gulf States Utilities TestArticle	NRC/NRR
142. 01/17/92	Thadani	Miraglia	Transfer of Thermo-Lag Technical Issues	NRC/NRR
143. 01/20/92	Wilson	Lohman	a)Qual Assur Reqrmts Contained in Nuclr Cust Purch Order b)BechtelPwr Crp Purch Order #8856-F-56718 for Susq Stm Elec Dated 15 Oct 81 c)Gibbs/Hill Spec 2323-MS-38H, Rev 1, 4/2/81	TSI
144. 02/03/92	Miraglia	Walker	Referral of potential health and safety issue to NRR	NRC/NRR
145. 02/06/92	Distributi on	Miraglia	Daily Highlight - Forthcoming Meeting with	NRC/NRR

NUMARC on Thermo-Lag  
FireBarrier Issues [to be  
held 02/12/92]

INDEX OF THERMO-LAG DOCUMENTS

	DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
146.	02/07/92		Harrell	Notice of Significant Licensee Technical Meeting [to be held 2/24/92]	NRC/RIV
147.	02/07/92	NRC	Harrell	Technical Meeting to Discuss Findings Associated with an Inspection of Licensee Actions Regarding Appl. of Thermo-Lag Fire Barrier & Compliance with App. R Requirements.	Gulf State
148.	02/07/92	Russell	Murley	Transfer of Thermo-Lag Technical Issues	NRC/NRR
149.	02/07/92	Davis	Miller	Perry Nuclear Power Plant - Fire Protection Program Concerns (AITS 92-0013)	NRC
150.	02/11/92	All holders of licenses	Partlow	Draft Generic Letter to all holders of operating licenses or construction permits for nuclear power reactors, thermo-lag fire barriers (generic letter 92-xx)	NRC
151.	02/11/92	Murley	Miraglia	Special Review Assignment of Potential Safety Concerns regarding Thermo-Lag Fire Barriers, ref. memo to Miraglia from Murley dated 8/15/91	NRC/NRR
152.	02/11/92	All holders of licenses	Partlow	Draft Generic Letter to all holders of operating licenses or construction permits for nuclear power reactors, thermo-lag fire barriers (Generic Letter 92-xx)	NRC
153.	02/13/92	Murley	Miraglia	Minutes - Meeting Between the Special Review Team for the Review of Thermo-Lag Fire Barrier Performance and NUMARC	NRC/NRR
154.	02/18/92	NRC	Odell	RIDS, LER 91-008-01: on 910415, Fire Hazards Analysis Deficiencies Including Lack of Fire Wrap/Inadequate Fire Barrier Caused by	River Bend

Errorsbeing Made in  
Original Develop. of FHA.

INDEX OF THERMO-LAG DOCUMENTS

	DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
155.	02/18/92	Files	Miraglia	Telephone conversation with Len Bickwit	NRC-NRR
156.	02/19/92	Regional Administrators	Miraglia	Meeting Between the NRR Special Review Team for the Review of Thermo-Lag Fire Barrier Performance and NUMARC Backfit discussion in Thermo-Lag generic Letter	NRC/NRR
157.	02/20/92	West	Mizuno	Referral of Potential Health and Safety Issue to NRR	NRC
158.	02/21/92	Miraglia	Walker	Transmittal of Requested Materials	NRC/OIG
159.	02/24/92	Rasin	Miraglia	NRC's Draft Generic Letter Dated 2/11/92, Thermo-Lag Fire Barriers	NRC/NRR
160.	02/28/92	Miraglia	Feldman	Draft Generic Letter on Thermo-Lag Fire Barriers Request for Comment	TSI
161.	03/03/92	Miraglia	Marion	Referral of Potential health and Safety Issues to NRR	NUMARC
162.	03/04/92	Miraglia	Walker	Thermo-Lag Fire Barrier Materials and Related Installation Training Services. NRC rpt. 99901226/91-01	NRC
163.	03/09/92	Feldman	Wilson	TU electric, design engineering organization, scope B, engineering report, evaluation of thermo-lag fire barrier systems, ER-ME-067, Rev. 0, preliminary, confirm. reqd 3/30/92	TU ELECTRI
164.	03/10/92			ITL Invoice Number 56119 - review of TSI test reports to verify accuracy	ITL
165.	03/11/92	TSI	ITL	TSI Comments on Draft Generic Letter on Thermo-Lag Fire Barriers	NRC/DST
166.	03/12/92	Feldman	Thadani	Trip Reports in Response to March 3, 1992 Request for Additional Technical Information re: Thermo-Lag	NRC/DST
167.	03/18/92	Marion	Thadani	Perry Nuclear Power Plant - fire protection program concerns	NRC/NRR
168.	03/20/92	Miraglia	Davis		

INDEX OF THERMO-LAG DOCUMENTS

	DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
169.	03/27/92	Deddens	Beach	Inspection Report No. 50-458/92-04	NRC/DRP
170.	03/30/92		TU	TU Electric Design Engineering Organization Scope B Engineering Rpt Callaway Plant -	TU
171.	04/03/92	Miraglia	Davis	Thermo-Lag Concerns	NRC
172.	04/03/92	Barkhurst, Entergy Oper.	Beach	Notice of Violation (NRC Inspection Report No. 50-382/92-03)	NRC/DRP
173.	04/03/92	Miraglia	Davis	Callaway Plant - Thermo-Lag Concerns	NRC-R:III
174.	04/08/92	TSI File	Madden	Summary of Rubin Feldman's Presentation Concerning Thermo-Lag Fire Barriers at EEI Fire Protection Committee Meeting, Phoenix, AZ	NRC/DST
175.	04/09/92	NRC	Beach	Meeting Notice on Application of Thermo-Lag Fire Barrier and Compliance with Requirements of Appendix R to 10 CFR part 50.	NRC
176.	04/13/92	WMcPhail	MKQuick	Thermo-Lag Fire Test Details	Comanche P
177.	04/16/92	Miraglia	Zimmerman	WNP-2 Fire Protection Program Concerns	NRC/NRR
178.	04/20/92	Murley	Miraglia	Special Review Assignment Regarding Thermo-Lag Fire Barrier Performance - Final Technical Report	NRC/NRR
179.	04/20/92	NRC	Feldman	Resp. to Notice of Nonconformance Issued by NRC to TSI	TSI
180.	04/21/92	Russell	Murley	Final Report - Special Review Team for the Review of Thermo-Lag Fire Barrier Performance	NRC/NRR
181.	04/29/92			One Hour - Three Hour Fire Barrier Installation Report of Test, NIST FR 3987	WNP-2 NIST
182.	04/29/92		Levin		
183.	05/01/92	NRC	Cahill	RIDS, Discuss Confirm. Testing of Thermo-Lag Fire Sys. Comprehensive Confirmatory Testing Program Initiated to Envelope Full Range of Protected Conduit & Cable Tray Co	Comanche P

INDEX OF THERMO-LAG DOCUMENTS

	DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
184.	05/06/92	NRC	Cahill	RIDS, Submits Results of Evaluation of Thermo-Lag 330-1 Fire Barrier Sys, Per NRC Concerns Raised at 2/12/92 Meeting.	Comanche P
185.	05/06/92	NRC	Odell	RIDS, LER 91-008-02: on 910415, Deficiencies Noted in Fire Hazards Analysis Requirements (FHA). Review & Verification of FHA by Indepnt Contractor Initiated. W/920506 Ltr CPSES - Docket No. 50-445 and 50-446 - Evaluation of Thermo-Lag 330-1 Fire Barrier System	Gulf State TU Elec
186.	05/06/92	USNRC	Cahill	River Bend Station - Unit 1 - Docket No 50-458/Report 92-04	
187.	05/06/92	USNRC	Odell	Additional Information on TSI's Current Activities	River Bend
188.	05/08/92	Thadani	Feldman	Transmittal of Technical Report	TSI
189.	05/13/92	Marion	Thadani	Technical Report Completed by NRC for Review by TSI.	NRC/DST
190.	05/13/92	Feldman	Thadani	Referral of Potential Health and Safety Issues to NRR	NRC/DST
191.	05/19/92	Miraglia	Walker	Report of Analysis, NIST 835-92-046A	NRC/NRR
192.	05/19/92	Babrauskas	Welch	Referral of technical information - ITL test reports	NIST
193.	05/19/92	Architzel	Walker	Interactions with Thermal Science Inc. Personnel during May 1992 visit to Omega Point Labs, San Antonio, TX	NRC
194.	05/21/92	Walker	West	Report of Analysis, NIST, Qualitative Survey of Fire Resistant Materials	NRC/NRR
195.	05/22/92	Babrauskas	Watters	Final Report - Special Review Team	NIST
196.	05/26/92	Thadani	Marion	Final Report-Special Review Team for the Review of Thermo-Lag Fire Barrier Performance dated April 17, 1992	NUMARC
197.	05/26/92	Thadani	Marion	Request Pertinent Information on Gap Widths	NUMARC
198.	06/01/92	Feldman	Thadani		NRC/DST



in Seams During  
Installation of  
Thermo-Lag Fire Barrier.

INDEX OF THERMO-LAG DOCUMENTS

	DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
199.	06/04/92	Walker	Architzel	Receipt of Technical Information and Transcripts	NRC
200.	06/05/92	Martin	Thadani	Request for Inspection of 10 CFR 50 Appendix R, Thermo-Lag Fire Barriers at Susquehanna Steam Electric Station, Unit 1.	NRC/DST
201.	06/05/92	Russell	McCracken	Forthcoming Meeting with Thermal Science, Incorporated, Friday, June 12, 1992, 8:00am-11:00am, USNRC, Room 1F19	NRC/NRR
202.	06/05/92	Russell	McCracken	Forthcoming Meeting With Thermal Science, Inc. [to be held June 12, 1992]	NRC/NRR
203.	06/05/92	Feldman	Thadani	Letter regarding invitation for NRC to observe fire endurance tests	NRC/DST
204.	06/08/92	Walker	Thadani	Potential Health and Safety Issues Regarding Thermo-Lag Fire Barriers	NRC/DST
205.	06/08/92	McCracken	Widmann/West	Trip to Omega Point Labs, San Antonio, TX, regarding Thermo-Lag FireBarrier Test Program, Comanche Peak, Unit 2	NRC/SPLB
206.	06/09/92	Miller	McCracken	Request for Additional Information (RAI) regarding Testing and Installation of Thermo-Lag Fire Barriers (TAC Nos. M75910 and M75911)	NRC
207.	06/10/92	Russell	Widmann	Background Information for Overview and Near Term Actions ConcerningThermo-Lag Fire Barrier Systems	NRC/DST
208.	06/16/92	Architzel	Walker	Referral of Potential Safety Significant Issue Regarding Thermo-Lag 330-1 Ampacity Derating	NRC
209.	06/16/92	Berlinger	McCracken	Thermo-Lag fire barrier information notice (TAC No. M82809)	NRC/NRR

INDEX OF THERMO-LAG DOCUMENTS

DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
210.	06/17/92 Walker	Thadani	Review of NIST'S Toxilogical Evaluation of the Combustion Products from a Thermo-Lag Fire Barrier Material Decomposed Under Flaming and Non-Flaming Conditions	NRC/NRR
211.	06/19/92	CPSES	CPSES Thermo-Lag Barrier Applications - Thermo-Lag Fire Test Conduit and J-Box Test Assemblies	CPSES
212.	06/20/92 Directors	Holian	Daily Highlight - Comanche Peak Steam Electric Station	NRC/NRR
213.	06/22/92 Thadani	Feldman	Update NRC on Preliminary Results of Recent Fire Resistive Tests Performed by Texas Utilities	TSI
214.	06/22/92 NRC	Beach	Preliminary Notification of Event or Unusual Occurrence - PNO-IV-92-29, "Thermo-Lag Initial Test Results."	NRC
215.	06/24/92 Thadani	McCracken	Forthcoming Meeting with Nuclear Management and Resources Counsel (NUMARC)	NRC/DST
216.	06/24/92 Commission ers	Taylor	SECY 92-227, Failure of the Thermo-Lag Fire Barrier System to Maintain Cabling in Wide Trays and Small Conduits Free from Fire Damage.	NRC/EDO
217.	06/26/92 NRR Project Managers	Partlow	MPA X-201, NRC Bulletin 92-01, Failure of Thermo-Lag 330 Fire Barrier Sys. to Maintain Cabling in Wide Cable Trays and Small Conduits Free From Fire Damage.	NRC/NRR
218.	06/29/92 Architzel	Walker	Referral of Information Indicating Potential Discrepancies Between Current Qualification Test Data and Comanche Peak Acceptance Criteria at Units 1 and 2	NRC
219.	06/30/92 Thadani	McCracken	Forthcoming Meeting with Nuclear Management and Resources Council	NRC/NRR

(NUMARC) [to be held July  
7, 1992]

INDEX OF THERMO-LAG DOCUMENTS

	DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
220.	07/01/92	Madden	Nowlen	Letter - Sandia's comments on circuit integrity tests performed in conjunction with the Texas Utilities (TU) sponsored testing at Omega Point Lab	SANDIA
221.	07/01/92	Gill	McCracken/ Architzel	Referral of Potential Safety Significant Issue Regarding Thermo-Lag 330-1 Ampacity Derating	NRC/SPLB
222.	07/02/92	NRC	Cahill	RIDS, LER 92-011-00: on 920618, Failure of Thermo-Lag Fire Barrier Endurance Tests Results in Some Raceways Declared Inoperable. Caused by Inadequate Vendor Install. Specs.	Comanche P
223.	07/08/92	NUMARC Admin. Contacts	Rasin	NRC Meeting with NUMARC on Thermo-Lag Fire Barrier Issues	NUMARC
224.	07/08/92	Walker	Thadani	Small Scale Thermo-Lag Fire Test Being Conducted at NIST	NRC/DST
225.	07/09/92	NRC	Cahill	RIDS, Provides Requested Actions Specified in NRC Bulletin 92-001. Failure of Thermo-Lag 330 Fire Barrier Sys. to Maintain Cabling in Wide Cable Trays	Comanche P
226.	07/10/92	NRC	Madsen	RIDS, LER 92-012-00: on 920611, Thermo-Lag Fire Rated Barriers Found Inoperable Resulting in TS Violation & Condition Outside Plant Design Basis	Limerick
227.	07/16/92	NRC internal		DST Highlights - 1-hr Thermo-Lag Panel Test Conducted at NIST on 7/15/92	NRR/DST
228.	07/20/92	Reg Admin	Murley	NRC bulletin 92-01 - failure of thermo-lag 330 fire barrier system	NRC/NRR
229.	07/20/92	Russell	Thadani	Action Plan for Resolution of Technical Issues on Thermo-Lag Fire Barrier Systems	NRC/DST
230.	07/21/92	NRC	Marjette	News Release and 2.206 Petition against the	NIRS

river bend station for  
operating in violation of  
NRC safety fire  
protection requirements.

INDEX OF THERMO-LAG DOCUMENTS

	DATE	ADDRESSEE	AUTHOR	TITLE	ORGANIZATION
231.	07/21/92	Madden	Steckler	Preliminary Rpt on Fire-Endurance Tests of Subliming Fire-Barrier Panels	NIST
232.	07/21/92	Chairman & Commission ers	Taylor	Information on Thermo-Lag	NRC/EJO
233.	07/21/92	Thadani	Madden	Fire Barrier Testing	NRC/DST
234.	07/22/92	Marsh	Mascianton io	Meeting with Nuclear Utility Management and Resource Council (NUMARC)	NRC
235.	07/30/92	Madden	Babrauskas	Inadequate Fire Endurance Design Practices	NIST

## INDEX OF THERMO-LAG DOCUMENTS

	DATE	ADDRESSEE	AUTHOR	TITLE
236.	Undated			Appendix R Questions & Answers, Generic Ltr 86-10
237.	Undated			Waterford SSER 5, page 9-4
238.	07/01/82			ITL Report No. 82-5-355F, Ampacity Derating Test for 1000 Volt Power Cables in a Ladder Cable Tray
239.	10/05/82	Distribution	Evans	ITL, Inc. Test Report No. 82-5-355B, Entitled: Three-Hour Fire Endurance Tests on Thermo-Lag 330-1 Subliming Coating Envelope System for Washington Public Power Supply System Nuclear Projects
240.	08/27/86			3M/TSI Interface Test Proposal, Installation Only, 3M Ceramic Materials Department, Project Plan PJ-21
241.	8/27/86			3M Ceramic Materials Department Project Plan PJ-21
242.	12/22/90	Hamilton	Siegle	Letter report summarizing results of test program
243.	9/18/91			APS Log No. 13-MM-301-58-1, Report of the Pilot Scale Vertical Fire Endurance Test of an Insulation System for Rigid Conduits
244.	04/09/92	Walker	Ulie	Thermo-Lag Fire Barrier System Presentations Given During Edison Electric Institute Fire Protection Committee Meeting - March 30-April 1, 1992 w/o attachments
245.	04/09/92	Walker	Ulie	Thermo-Lag Fire Barrier System Presentations Given During Edison Electric Institute Fire Protection Committee Meeting - March 30-April 1, 1992 w/attachments





# Nuclear Information and Resource Service

1424 16th Street NW, Suite 601, Washington, DC 20036 202-328-0002; fax: 202-462-2183; e-mail: nirsnet@aol.com

March 11, 1994

Mr. Donnie H. Grimsley  
Division of Rules and Records  
Office of Administration and Resources Management  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

FREEDOM OF INFORMATION  
ACT REQUEST

FOIA-94-137  
Rec'd 3-15-94

## FREEDOM OF INFORMATION ACT REQUEST

Mr. Grimsley:

Pursuant to the Freedom of Information Act, 5 U.S.C. 522, as amended, and 10 CFR 9.8 of the Commission's regulations, Nuclear Information and Resource Service, herein after referred to as NIRS, requests the following documents regarding Nuclear Regulatory Commission documents pertaining to documents and communications between the NRC and licensees on the fire barrier manufacturer, Thermal Sciences Incorporated (TSI), and its product Thermo-Lag-330-1.

Specifically, NIRS requests the following documents;

- 1.) All NRC communications with all commercial nuclear power licensees referencing TSI or Thermo-Lag 330-1 for the years 1981 through 1991;
- 2.) All documents to and from the NRC offices of Dr. Thomas E. Murley and Frank J. Miraglia Jr. referencing TSI or Thermo-Lag for the years 1981 through 1993;
- 3.) All documents between the NRC Office of the Inspector General and the NRC staff for the years 1990 through 1993 that reference TSI or Thermo-Lag 330-1;
- 4.) All documents to and from NRC staff members Dennis Kapecki and David Knotely referencing TSI or Thermo-Lag for the years 1981 through 1991;
- 5.) All documents to and from the NRC office of Bill Russell and TSI for the years 1981 through 1991;
- 6.) All documents between the NRC and the Chair of the House Oversight and Investigations Subcommittee of the House Energy and Commerce Committee between the years 1989-1994 that reference TSI or Thermo-Lag-330-1;

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7.) All documents to and from the NRC office of Conrad McCracken and TSI for the years 1981 and 1993.

Please consider documents and communications to include reports, studies, test results, correspondence, memoranda, meeting notes, meeting minutes, working papers, graphs, charts, diagrams, notes and summaries of conversations and interviews, computer records and any other form of written communications including NRC internal documents.

Pursuant to this request, please provide all documents and communications prepared or utilized by, in the possession of, or routed through the NRC related to items 1- 7.

Pursuant to and in compliance with 10 CFR 9.41 of the Commission's regulation governing request for waiver of fees, NIRS put forth the following information.

NIRS seeks the requested information solely to contribute to and help shape the public debate on adequate fire protection and public and worker safety.

NIRS intends to use the information in order to advance the concerns for public understanding and safety.

NIRS is qualified to make use of the requested information. The staff has demonstrated the ability to interpret information and communicate that information in a form comprehensible to the general public. Members of the NIRS staff have published articles in such national journals as The Progressive, Nuclear Times, Newsday and Bulletin of Atomic Scientists. NIRS is quoted as a reliable source of information on nuclear issues in newspapers across the country, including the New York Times, The Washington Post, and The San Francisco Chronicle.

NIRS has a working relationship with fire protection consultants, physicists, engineers, and other respected professionals who contribute to the full understanding of technical records.

The information sought by NIRS is not, to the best of our knowledge, in the public domain.

The general public has displayed a great interest in nuclear issues and fire safety at nuclear power plants and the requested information will certainly increase the public's understanding of this matter and the role of government in regulating fire protection at nuclear power plants and public safety.

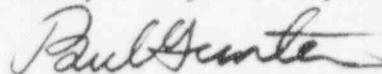
NIRS has demonstrated its ability and commitment to inform the public on all important nuclear issues. NIRS regularly publishes a trade journal, The Nuclear Monitor, for which this information will be of use. Since 1978, NIRS has provided information on nuclear issues to the public, the press, members of Congress, state and local government officials as well as hundreds of citizen groups across the country. NIRS provides this information free of charge and has neither a commercial nor a private interest in the agency records sought.

Under the amended fee waiver standard, NIRS is clearly entitled to a full waiver of all search, review and duplication fees. This standard calls for such a waiver, "if disclosure of the information is in the public interest because it is likely to contribute significantly to the public understanding of the operation or activities of the government and is not primarily in the commercial interest of the requester." 5 U.S.C. 552 (a) (4) (A) (iii)

In light of the foregoing, the NIRS request meets this standard on its face. NIRS has no commercial interest in this matter, but rather seeks this information to help the general public better understand the role of government in regulating the nuclear industry.

For all the reasons stated above, the NIRS request falls squarely within the Congressional intent in enacting the Freedom of Information Act and the fee waiver provision. We, therefore, ask that the Agency grant a full waiver for this FOIA request.

Thank you for your anticipated cooperation



Paul Gunter, Director  
Reactor Watchdog Project



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

February 11, 1992

Madden

LIMITED DISTRIBUTION

MEMORANDUM FOR: Thomas E. Murley, Director  
Office of Nuclear Reactor Regulation

FROM: Frank J. Miraglia, Deputy Director  
Office of Nuclear Reactor Regulation

SUBJECT: SPECIAL REVIEW ASSIGNMENT OF POTENTIAL SAFETY  
CONCERNS REGARDING THERMO-LAG FIRE BARRIERS

REFERENCE: Memorandum from T. Murley to F. Miraglia, "Special  
Review Assignment and Plan for Response to Allegations of  
Potential Safety Concerns Regarding Thermal Science, Inc,"  
dated August 15, 1991

Attached is the NRR Special Review Team final report that documents the findings and recommendations regarding the Thermo-Lag fire barrier technical issues. A large volume of documents have been reviewed and five site visits were conducted to understand the safety issues and to review the allegations. The primary objective of the review team, to identify any issues of safety significance that could affect the continued safe operation of those plants using Thermo-Lag, has been completed using the guidelines provided in the referenced memorandum.

The review team found sufficient technical information to justify issuance of a generic letter requiring licensees to confirm the adequacy of the Thermo-Lag fire barriers installed to meet 10 CFR Section 50.48. The proposed generic letter is enclosed with the final report. Although the technical issues identified were not judged to be of an immediate safety concern, NRC action is necessary to assure compliance with NRC regulations. In addition, site-specific safety concerns may exist regarding the technical issues identified.

The majority of the technical issues regarding the adequacy of the previous fire endurance and ampacity derating testing can be resolved by conducting testing. Therefore, the review team recommends that the industry conduct fire endurance and ampacity testing to confirm the adequacy of Thermo-Lag. Other testing options are also discussed in the final report.

Several programmatic issues were identified during the course of the review and are discussed in the final report. We recommend these issues be assigned to the cognizant NRR division for further review and corrective action, if necessary.

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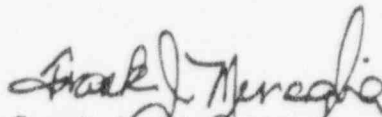
L/151

Since the Special Review Team has completed their primary task, I recommend that the responsibility for followup review activities of the technical concerns be transferred to the Division of Systems Technology following your review of the attached report. In preparation for the transfer, a meeting was held on January 21, 1992, between the NRR technical staff and the Office of the Inspector General.

The line organization that will be responsible for pursuing the Thermo-Lag issues is as follows:

Frank J. Miraglia, Deputy Director, NRR  
William T. Russell, Associate Director  
for Inspection and Technical Assessment  
Ashok Thadani, Director, Division of Systems Technology  
Conrad McCracken, Chief, Plant Systems Branch  
Ralph Architzel, Chief, Plant Systems Section  
Pat Madden, Senior Fire Protection Engineer

The review team is prepared to discuss any specific issues discussed in the report, if necessary.



Frank J. Miraglia, Deputy Director  
Office of Nuclear Reactor Regulation

Enclosure:  
As stated

cc w/enclosure:  
R. Architzel  
P. Madden  
K. Walker  
E. Pawlik  
B. Grimes

cc w/o enclosure:  
W. Russell  
A. Thadani  
C. McCracken  
B. Hayes



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

*Architzel*

February 13, 1992

MEMORANDUM FOR: Thomas E. Murley, Director  
Office of Nuclear Reactor Regulation

FROM: Frank J. Miraglia, Jr., Deputy Director  
Office of Nuclear Reactor Regulation

SUBJECT: MINUTES - MEETING BETWEEN THE SPECIAL REVIEW TEAM  
FOR THE REVIEW OF THERMO-LAG FIRE BARRIER  
PERFORMANCE AND NUMARC

The Special Review Team for the review of Thermo-Lag fire barrier performance met with representatives of the Nuclear Utilities Management and Resources Council (NUMARC) on February 12, 1992, to discuss the results of our review and to obtain a commitment for a coordinated industry response to our concerns. Enclosure 1 is a list of attendees.

During the meeting, we gave the meeting attendees the proposed generic letter on Thermo-Lag fire barriers (Enclosure 2) and presented the information included in Enclosure 3.

NUMARC agreed to inform industry of our concerns regarding Thermo-Lag fire barriers. NUMARC also agreed to comment on the proposed generic letter and provide a preliminary schedule of actions to resolve the issues by February 28, 1992.

NUMARC requested a list of all of the test reports we identified during our review, a copy of TSI's October 2, 1986 Mailgram regarding ampacity derating, and a copy of the TSI vendor inspection report. We will provide the list of tests and the Mailgram to NUMARC with a copy of these meeting minutes. We will provide the inspection report when it is issued.

*Frank J. Miraglia, Jr.*

Frank J. Miraglia, Jr., Deputy Director  
Office of Nuclear Reactor Regulation

Enclosures:  
(3) as stated

cc w/enclosures:  
J. Sniezek

9203020329 2088

*L/S*

Meeting Attendees

<u>Name</u>	<u>Organization</u>	<u>Title</u>
F. Miraglia	USNRC/NRR	Deputy Director, NRR
G. Holahan	USNRC/NRR	Deputy Director, DST
L. Plisco	USNRC/NRR	Section Chief, DLPQ
K. S. West	USNRC/NRR	Allegation Program Manager
P. Madden	USNRC/NRR	Sr. Fire Protection Engineer
C. McCracken	USNRC/NRR	Branch Chief, SPLB
R. Kiessel	USNRC/NRR	Staffer, OGCB
A. Thadani	USNRC/NRR	Director, DST
C. Berlinger	USNRC/NRR	Branch Chief, OGCB
R. Architzel	USNRC/NRR	Section Chief, SPLB
T. Bergman	USNRC/NRR	Project Manager, Comanche Peak
G. Mulley	USNRC/OIG	Sr. Special Agent
H. Fossett	USNRC/OIG	Inspector
R. Fields	USNRC/OIG	Special Agent
K. Walker	USNRC/OIG	Special Agent
S. Gagner	USNRC/OPA	Public Affairs Officer
B. Rasin	NUMARC	Vice President
A. Marion	NUMARC	Manager
G. Rombold	NUMARC	Sr. Project Manager
J. P. Sursock	EPRI	Program Manager
J. MacGregor	Winston & Strawn	Associate
M. Philips	Winston & Strawn	Attorney
J. Clarke	Energy Daily	Reporter
C. Beckett	TU Electric	Principal Engineer
D. Snell	TU Electric	EEI Fire Protection Committee
D. Woodlan	TU Electric	Docket Licensing Manager
E. Dorbeck	Consumers Power Co.	EEIFPC Secretary
R. Lohman	Thermal Science, Inc.	Manager, QA

DRAFT GENERIC LETTER

February 11, 1992

TO: ALL HOLDERS OF OPERATING LICENSES OR CONSTRUCTION PERMITS  
FOR NUCLEAR POWER REACTORS.

SUBJECT: THERMO-LAG FIRE BARRIERS (GENERIC LETTER 92-XX)

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this generic letter to require licensees to provide information to verify that Thermo-Lag 330-1 fire barrier systems manufactured by Thermal Science, Incorporated (TSI, the vendor), St. Louis, Missouri, comply with the NRC's requirements.

The NRC reviewed Thermo-Lag 330-1 fire barrier systems after receiving reports from Gulf States Utilities (GSU) that these systems had failed qualification fire tests and had installation problems. The NRC reviewed fire endurance and ampacity derating test reports, installation procedures, and as-built configurations and identified the following concerns regarding Thermo-Lag fire barriers: test results that are incomplete or indeterminate, installations that are not constructed in accordance with the vendor's installation procedures, incomplete installation procedures, and as-built fire barrier configurations that may not be qualified by a valid fire endurance test or justified by an engineering analysis. The NRC is concerned that licensees may not be meeting the requirements of Section 50.48, "Fire protection," and General Design Criterion (GDC) 17,

Enclosure 2



"Electric power systems," of Appendix A, "General Design Criteria for Nuclear Power Plants," to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR Part 50). The NRC is requiring information on compliance with 10 CFR 50.48, GDC 17, and associated license conditions under the provisions of 10 CFR 50.54(f).

#### Qualification Requirements for Fire Barriers

Section 50.48 requires that each operating nuclear power plant have a fire protection plan that satisfies GDC 3, "Fire protection." GDC 3 requires that structures, systems, and components important to safety be designed and located to minimize, in a manner consistent with other safety requirements, the probability and effects of fires and explosions. Systems associated with achieving and maintaining safe shutdown conditions are of major importance to safety because damage to these systems can lead to core damage.

Fire protection features required to satisfy GDC 3 include features to ensure that one train of those systems necessary to achieve and maintain hot shutdown conditions be maintained free of fire damage.<sup>1</sup> One means of complying with this requirement is to separate one safe shutdown train from its

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<sup>1</sup>See Appendix R to 10 CFR Part 50, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979."

redundant train with fire-rated barriers. The level of fire resistance required of the barriers depends on the other fire protection features provided in the fire area.

The NRC provided guidance on acceptable methods of satisfying the regulatory requirements of GDC 3 in Branch Technical Position (BTP) Auxiliary and Power Conversion Systems Branch (APCSB) 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants;" Appendix A to BTP APCS 9.5-1; BTP Chemical Engineering Branch (CMEB) 9.5-1, "Fire Protection For Nuclear Power Plants," July 1981; and Generic Letter (GL) 86-10, "Implementation of Fire Protection Requirements," April 24, 1986. In the BTPs and GL 86-10, the staff stated that the fire resistance ratings of fire barriers should be established in accordance with National Fire Protection Association (NFPA) Standard 251, "Standard Methods of Fire Tests of Building Construction and Materials," by subjecting a test specimen that represents the materials, workmanship, method of assembly, dimensions, and configuration for which a fire rating is desired to a "standard fire exposure" at a nationally recognized laboratory<sup>2</sup>. In GL 86-10, the staff also provided guidance on the acceptance criteria for fire tests and on evaluations of deviations from tested configurations.

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<sup>2</sup> American Society for Testing and Materials (ASTM) Standard E119 was adopted by the National Fire Protection Association (NFPA) as NFPA Standard 251.

GDC 17 requires that onsite electric power systems be provided to permit functioning of structures, systems and components important to safety. The onsite electrical power system is required to provide sufficient capacity and capability to ensure that vital functions are maintained. The Institute of Electrical and Electronics Engineers (IEEE) Standard 279, "Criteria for Protection Systems for Nuclear Power Generating Stations," provides guidance regarding acceptable methods of satisfying GDC 17. IEEE 279 states that the quality of the protection system components shall be achieved by specifying requirements, such as for the derating of components.

#### Areas of Concern

##### Fire Endurance Testing and Application of Test Results

Many fire endurance tests have been conducted on electrical raceways protected with Thermo-Lag 330-1 fire barrier systems. Although many of the test reports document results that meet the NRC's temperature acceptance criterion discussed in GL 86-10, some test assemblies have failed, such as the assembly tested in October 1989 at the Southwest Research Institute (SWRI) and discussed in NRC Information Notice (IN) 91-47, "Failure of Thermo-Lag Fire Barrier Material to Pass Fire Endurance Test."

The NRC has reviewed approximately 40 1-hour and 3-hour fire

endurance test reports involving Thermo-Lag 330-1 fire barrier systems and has found that the test assemblies met the NRC's temperature acceptance criteria when the test article protective envelope was constructed by TSI personnel using TSI's installation procedures. However, the NRC has found other Thermo-Lag 330-1 fire barrier test assemblies that failed to meet the NRC's temperature acceptance criterion. In most cases, the test assemblies that failed were either constructed by the licensee's or contractor's qualified installers, or did not follow TSI's installation procedures. In the fire endurance test conducted in October 1989 at SWRI, the test article that failed was constructed by TSI-certified licensee personnel using TSI's installation procedures.

The NRC reviewed fire test reports from various testing facilities and found that testing methods and procedures used during some of the qualification tests did not meet the NRC's guidance. NFPA 251 advises that the test conditions should be evaluated carefully because variations from the construction or conditions that are tested may substantially change the performance characteristics of the assembly. The test reports reviewed did not contain sufficient details of the construction methods used for the test article, did not contain details of the materials used, did not contain dimensioned drawings, and documented test configurations that were atypical of as-built configurations.

In GL 86-10, the NRC provided guidance on deviations from tested fire barrier configurations. While reviewing the Thermo-Lag fire barriers, the NRC staff found several instances in which licensees installed fire barrier configurations that may not have been qualified by fire endurance testing or justified by engineering analysis. For example, when the NRC conducted its review, some licensees could not justify their practice of extrapolating test results from small barrier enclosures to significantly larger enclosures, or installing barriers using procedures and materials that were different from those tested. The NRC visited site after issuing IN 91-47, and also found several licensees that had constructed fire walls, partitions, and vaults using Thermo-Lag as a component. These licensees could not provide qualification tests or engineering analyses of deviations from tested configurations to demonstrate the acceptability of these fire barriers.

#### Ampacity Derating Design Basis

Cables enclosed in electrical raceways protected with fire barrier materials are derated because of the insulating effect of the fire barrier material. Other factors that affect ampacity derating include cable fill, cable loading, cable type, raceway construction, and ambient temperature. The National Electrical Code, Insulated Cable Engineers Association publications, and other industry standards provide general ampacity derating

factors, but do not consider the effects of passive fire barrier systems. Although a national standard ampacity derating test method has not been established, ampacity derating factors for raceways enclosed with fire barrier material have been determined by testing.

TSI has documented a wide range of ampacity derating factors that were determined by testing. For example, TSI provided test reports to licensees that document ampacity derating factors for cable trays that range from 7 percent to 28 percent for 1-hour barriers and from 16 percent to 31 percent for 3-hour barriers. On October 2, 1986, TSI informed its customers by Mailgram that, while conducting tests in September 1986, at the Underwriter Laboratories (UL) facilities, TSI found that the ampacity derating factors for Thermo-Lag barriers were greater than previous tests indicated. However, the test procedure and test configuration differed from previous tests, and the results from the different tests may not be comparable to each other. The NRC is concerned that licensees may be using nonconservative ampacity derating factors since the tested configurations may not represent as-built configurations. The NRC learned during its review that testing conducted at SwRI found the ampacity derating as 37 percent for a 1-hour barrier.

Deficiencies in the Installation and Inspection Procedures

While conducting site visits after issuing IN 91-47, the NRC staff observed a number of installations that were not in accordance with TSI's installation procedures and some installations that did not appear to be qualified by fire endurance testing or an engineering analysis. In IN 91-79, "Deficiencies in the Procedures for Installing Thermo-Lag Fire Barrier Materials," the NRC staff discussed installation problems resulting from TSI's incomplete installation procedures, licensees' inadequate installation procedures, installer errors, incomplete or incorrect design documents, and inadequate quality control oversight. In IN 91-79, the staff listed the installation details in which it found differences.

#### Actions Covered by this Generic Letter

The NRC's regulations require that safe shutdown equipment be protected from fire. The NRC has found qualification test failures, test results that are indeterminate, installation problems, and differences between reported ampacity derating factors. Therefore, the licensees should confirm that Thermo-Lag 330-1 fire barrier systems have been qualified by representative fire endurance and ampacity derating testing and that these qualified barriers have been installed with appropriate quality controls to ensure that they comply with the NRC's requirements.

#### Reporting Requirements

All addressees are required, pursuant to Section 182a of the Atomic Energy Act of 1954, as amended, and 10 CFR Section 50.54(f), to provide a written report within 120 days from the date of this generic letter. In this written report, the licensee shall:

- (1) State that it has identified all fire barriers using TSI's Thermo-Lag 330-1 to meet 10 CFR 50.48 or that it does not use Thermo-Lag 330-1 at the facility to meet this requirement.
- (2) State that it has qualified the Thermo-Lag 330-1 fire barriers by conducting a fire endurance test in accordance with NFPA 251 or in accordance with previous licensing commitments.
- (3) State that it has constructed the as-built Thermo-Lag 330-1 fire barriers in accordance with the procedures used to assemble the qualification test article and that the as-built fire barrier configuration represents the materials, workmanship, method of assembly, dimensions, and configuration of the qualification test assembly configuration or that the licensee has analyzed the deviations from the tested configuration.
- (4) State that the design basis for the ampacity derating



factors used for all raceways protected by Thermo-Lag 330-1 is consistent with the as-built configuration and that representative ampacity derating test results have been reviewed for applicability.

- (5) List any necessary corrective actions and a schedule for any deficiencies identified while conducting the actions described above and describe any compensatory measures taken in accordance with technical specifications or administrative controls.
- (6) List any Thermo-Lag 330-1 fire barriers that cannot be verified in accordance with reporting requirements (1) through (5), provide a justification for continued operation until such time as the identified barriers can be verified, and provide a schedule for completing the verifications.

The licensee should retain all documentation of any reviews performed to satisfy the reporting requirements for any future NRC audit.

If the addressee cannot provide the information required or meet the reporting deadlines, it shall include in the response a justification for alternative approaches and schedules. The NRC encourages licensees to work together to develop acceptable generic solutions to the problems addressed in this generic

letter.

The written reports required shall be addressed to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555 under oath or affirmation. A copy of the report shall also be submitted to the appropriate regional administrator.

#### Backfit Discussion

The NRC is requiring information that will enable the NRC staff to determine if licensees are complying with 10 CFR Section 50.48. The staff is not establishing a new position regarding compliance in this generic letter. Accordingly, this generic letter does not constitute a backfit. Thus, 10 CFR 50.109 does not apply, and no backfit analysis need be prepared.

#### Request for Voluntary Submittal of Impact Data

This request is covered by Office of Management and Budget Clearance Number 3150-0011, which expires May 31, 1994. The estimated average number of burden hours is 200 person-hours for each addressee's response, including the time required to assess the requirements for information, search data sources, gather and analyze the data, and prepare the required letters. This estimated average number of burden hours pertains only to the

identified response-related matters and does not include the time to implement the actions required to comply with the applicable regulations, license conditions, or commitments. Comments on the accuracy of this estimate and suggestions to reduce the burden may be directed to Ronald Minsk, Office of Information and Regulatory Affairs (3150-0011), NEOB-3019, Office of Management and Budget, Washington, D.C. 20503, and to the U.S. Nuclear Regulatory Commission, Information and Records Management Branch, Division of Information Support Services, Office of Information and Resources Management, Washington, D.C. 20555.

Although not required, the following information would assist the NRC in evaluating the cost of complying with this generic letter:

- (1) the licensee staff's time and costs to perform requested inspections, corrective actions, and associated testing
- (2) the licensee staff's time and costs to prepare the required reports and documentation
- (3) the additional short-term costs incurred as a result of the inspection findings such as the costs of the corrective actions or the costs of down time
- (4) an estimate of the additional long-term costs that will be

incurred in the future to implement commitments such as the estimated costs of conducting future inspections or increased maintenance

If you have any questions about this matter, please contact one of the technical contacts or the lead project manager listed below.

Sincerely,

James G. Partlow

Associate Director for Projects

Office of Nuclear Reactor Regulation

Enclosure:

List of Recently Issued Generic Letters

Technical Contacts:

Pat Madden, NRR

301-504-2854

Ralph Architzel, NRR

301-504-2804

Lead Project Manager:

## MEETING MINUTES

### INTRODUCTION (Frank Miraglia)

- A special review team (F. Miraglia, L. Plisco, and S. West), which was established by Dr. Murley, has been reviewing concerns regarding Thermo-Lag fire barriers since July 1991. The purpose of the meeting is to advise industry, through NUMARC, of the results of the team's review.
- NRR plans to issue a generic letter that discusses the concerns. The letter will ask the licensees to provide information needed by the staff to verify licensee compliance with the NRC's fire protection requirements.
- NUMARC is requested to inform industry of the concerns and to coordinate an industry response to the concerns.

### BACKGROUND (Frank Miraglia)

- As many as 50 stations use Thermo-Lag barriers to satisfy the NRC's requirements for protecting safe shutdown capability from fire (10 CFR 50.48 and Appendix R). The installation of Thermo-Lag on raceways also impacts ampacity derating (GDC 17).
- Gulf States Utilities reported fire barrier problems at River Bend Station:
  - 1987 - GSU started finding Thermo-Lag fire barrier installation problems at River Bend - removal of stress skin and ribs (LER 87-005).
  - April 1989 - GSU reported additional fire barrier installation problems (LER 89-009).
  - October 1989 - "as-designed" 3-hour Thermo-Lag fire barrier failed fire endurance test conducted at Southwest Research Institute (GSU "Informational reports," December 20, 1989 and January 9, 1990).
  - March 1990 through May 1991 - GSU found additional installation problems at RBS (LER 90-003, Rev. 1, 2, and 3; and LER 91-008).
  - February 1991 - the staff received allegations that raised questions as to the ability of Thermo-Lag to meet NRC requirements for fire barriers.

Enclosure 3

May 1991 - the staff visited RBS to review the circumstances surrounding the failed fire test and the installation discrepancies. The staff found that the results of the fire test raised questions regarding the ability of Thermo-Lag to provide a fire rated barrier.

- June 1991 - In response to the River Bend operating experience and the allegations, NRR established the special review team to review the safety significance and generic applicability of the technical issues regarding the use of Thermo-Lag.

SCOPE OF REVIEW - REVIEW ACTIVITIES (Loren Plisco)

- The review team's activities included:

Reviewed docket information for River Bend, Comanche Peak, WNP2, Perry, Fermi, and Susquehanna.

Reviewed information provided voluntarily by the licensees for Palo Verde, Callaway, and D.C. Cook.

Reviewed vendor technical documentation, 40 fire endurance test reports, and 9 ampacity derating test reports.

Visited River Bend, Comanche Peak, WNP2, Perry and Callaway to obtain information on the use of Thermo-Lag by the industry.

Met with the vendor and conducted a vendor inspection at the vendor's site.

- During the course of its review, the review team:

Issued IN 91-47, "Failure of Thermo-Lag Fire Barrier Material To Pass Fire Endurance Test," August 6, 1991. This IN informed the licensees of installation problems found by GSU at River Bend Station and of the results of a 3-hour fire endurance test of a 30-inch wide aluminum cable tray in October 1989 at the Southwest Research Institute (October 1989). In this test, the Thermo-Lag fire barrier failed resulting in high temperatures inside the cable tray envelope and loss of circuit integrity within about 60 minutes. Catastrophic failure and collapse of the tray occurred within 90 minutes.

Issued IN 91-79, "Deficiencies in the Procedures for Installing Thermo-Lag Fire Barrier Materials," December 6, 1991, which informed the licensees of installation problems that the team had found during visits to River Bend, Comanche Peak, WNP2, and Perry. Examples included: joint sealing, configuration and orientation of ribs, banding materials and methods, scoring and grooving of panels, and thickness acceptance criteria.

Prepared a proposed generic letter that presents its technical findings and concerns and requires the licensees to provide information needed by the staff to verify compliance with NRC requirements.

FINDINGS (Steve West - Walk through proposed Generic Letter and provide details.)

The special review team found:

- The NRC and the licensees have addressed similar concerns regarding fire barrier testing and installation in the past.
- The fire resistance ratings for the Thermo-Lag 330-1 fire barrier system are indeterminate.

The review team reviewed about 40 fire endurance test reports and found that the validity of the tests and the acceptability of the test results as technical bases for establishing the fire resistance ratings of Thermo-Lag fire barriers are indeterminate. The problems identified by the review team included inadequate documentation of test procedures and results, incomplete or inadequate test procedures, unqualified test personnel, inadequate test equipment, questionable methods of assembly and quality assurance, and failure to meet NRC acceptance criteria. The team also found that the configurations of the test specimens for many of the previously performed tests are atypical of the field installations observed during the plant site visits.

- The ampacity derating factors for the Thermo-Lag 330-1 fire barrier system are indeterminate.

The special review team also reviewed nine ampacity derating test reports and found conflicting test results. For example, the vendor has reported derating factors for cable

trays that range from 7 percent to 28 percent for 1-hour fire barriers and from 16 percent to 31 percent for 3-hour barriers. In addition, ampacity derating tests of Thermo-Lag materials conducted for 3M found the ampacity derating to be 37 percent for a 1-hour barrier. There are similar inconsistencies for conduit barriers.

- Some licensees have not adequately reviewed and evaluated fire endurance test results and ampacity derating test results to determine the validity of the tests and the applicability of the test results to their plant designs (reference Generic Letter 86-10).
- Some licensees have not adequately reviewed installed fire barrier configurations to ensure that they either replicate the tested configurations or provide an equivalent level of protection (reference Generic Letter 86-10).
- Some licensees used inadequate or incomplete installation procedures during the construction of their Thermo-Lag barriers (Information Notice 91-79).

#### PROPOSED ACTIONS (Frank Miraglia)

The issues potentially affect a large number of licensees. Therefore, the NRC recommends that NUMARC coordinate an industry response to the concerns.

NRC plans to work closely with the industry to achieve resolution of the identified concerns, and to be involved with any new qualification testing, if needed.

The special review team is being phased out and the remaining review and follow-up activities are being transferred to NRR's Division of Systems Technology (A. Thadani). The Plant Systems Branch will be the primary review branch (C. McCracken, R. Architzel, and P. Madden).

#### NUMARC RESPONSE

NUMARC agreed to inform industry of the concerns regarding Thermo-Lag fire barriers. NUMARC also agreed to comment on the proposed generic letter and provide a preliminary schedule of actions to resolve the issues by February 28, 1992.



NUMARC requested a list of all of the test reports identified by the review team, a copy of TSI's October 2, 1986 Mailgram regarding ampacity derating, and a copy of the TSI vendor inspection report. The list of tests and the Mailgram will be sent to NUMARC with a copy of these meeting minutes. The inspection report will be provided after it is issued.



GULF STATES UTILITIES COMPANY

SPRINGFIELD, MISSOURI POST OFFICE BOX 501 FRANCISVILLE, LOUISIANA 70731

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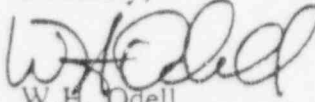
February 18, 1992  
RBG- 36516  
File Nos. G9.5, G9.25.1.3

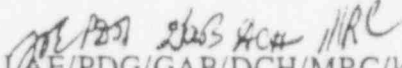
U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555

Gentlemen:

River Bend Station - Unit 1  
Docket No. 50-458

Please find enclosed Supplement 1 to Licensee Event Report No. 91-008 for River Bend Station - Unit 1. This report is submitted to document additional reportable conditions identified in GSU's review of the Fire Hazards Analysis and to provide a status of Fire Hazards Analysis issues. This report is submitted pursuant 10CFR50.73.

Sincerely,  
  
W.H. Odell  
Manager - Oversight  
River Bend Nuclear Group

  
LAE/PDG/GAB/DCH/MRC/kvm

cc: U.S. Nuclear Regulatory Commission  
611 Ryan Plaza Drive, Suite 400  
Arlington, TX 76011

NRC Resident Inspector  
P.O. Box 1051  
St. Francisville, LA 70775

INPO Records Center  
1100 Circle Parkway  
Atlanta, GA 30339-3064

Mr. C.R. Oberg  
Public Utility Commission of Texas  
7800 Shoal Creek Blvd., Suite 400 North  
Austin, TX 78757

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PDR  
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JEW

LICENSEE: EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P 530) U.S. NUCLEAR REGULATORY COMMISSION WASHINGTON, DC 20555 AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104) OFFICE OF MANAGEMENT AND BUDGET WASHINGTON, DC 20503

FACILITY NAME (1): RIVER BEND STATION  
DOCKET NUMBER (2): 05100004518  
PAGE (3): 1 OF 06

TITLE (4): FIRE HAZARDS ANALYSIS DEFICIENCIES INCLUDING LACK OF FIRE WRAP/INADEQUATE FIRE BARRIER

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES		DOCKET NUMBER(S)
04	15	91	91	008	01	02	18	92			0510000
<p>THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)</p>											

OPERATING MODE (9): 1	20 402(b)	20 406(c)	90 731e(2)(i)	73 711(b)
POWER LEVEL (10): 1, 0, 0	20 406(a)(1)(i)	90 36(a)(1)	90 731e(2)(v)	73 711(c)
	20 406(a)(1)(ii)	50 36(c)(2)	90 731e(2)(w)	OTHER (Specify in Abstract forwarded in Text NRC Form 386A)
	20 406(a)(1)(iii)	X 90 731e(2)(i)	90 731e(2)(w)(A)	
	20 407(a)(1)(i)	90 731e(2)(ii)	90 731e(2)(w)(B)	
	20 408(a)(1)(i)	90 731e(2)(iii)	90 731e(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME: L.A. ENGLAND, DIRECTOR - NUCLEAR LICENSING  
TELEPHONE NUMBER: AREA CODE 5104, 381-4145

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFAC TURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFAC TURER	REPORTABLE TO NPROS

SUPPLEMENTAL REPORT EXPECTED (14):  YES (If yes, complete EXPECTED SUBMISSION DATE)  NO

EXPECTED SUBMISSION DATE (15): MONTH 05, DAY 01, YEAR 92

ABSTRACT (Limit to 1400 spaces - i.e. approximately fifteen single space typewritten lines) (16)

At 1345 hours on 4/15/91, with the reactor at full power in Operational Condition 1, it was discovered that electrical cables located in fire area ET-2, which may cause spurious operation of valves 1E51\*MOVFO63 (RCIC inboard steam isolation valve) and 1E51\*MOVFO78 (RCIC vacuum breaker valve), did not have fire wrap contrary to Fire Hazards Analysis (FHA) requirements. At 1300 on 4/23/91, additional cables, which could cause the same problem were found in fire areas AB-2, C-2 and C-6. RCIC is required by the FHA for safe shutdown in these fire areas. Since these valves are required not to change position for operation of RCIC and fire damage to these cables may cause loss of RCIC, the cables would require wrapping in these fire areas.

Upon discovery of this condition, the affected cables were treated as having missing fire barriers and the action statement prescribed in Technical Specification 3/4.7.7, "Fire Rated Assemblies", was implemented for areas containing these cables. Errors made during the original development of the FHA were the cause for the identified cables not being wrapped in the identified fire areas. Additional deficiencies have been discovered during the FHA review. These recently discovered deficiencies concern Appendix R separation and a fire area that was not previously identified. GSU has implemented corrective actions to address each of these conditions. Permanent corrective actions for the Appendix R separation deficiencies will be provided in a supplemental report by May 1, 1992.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 500 HRS FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P 530) U.S. NUCLEAR REGULATORY COMMISSION WASHINGTON DC 20555 AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104) OFFICE OF MANAGEMENT AND BUDGET WASHINGTON DC 20503

FACILITY NAME (1)  RIVER BEND STATION	DOCKET NUMBER (2)  0 5   0   0   0   4   5   8	LER NUMBER (8)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		9   1	—   0   0   8	—   0   1	0   2	OF 0   6

TEXT (If more space is required, use additional NRC Form 396A (1) (17))

REPORTED CONDITION

At 1345 hours on 4/15/91, with the reactor at full power in Operational Condition 1, it was reported to the shift supervisor that certain electrical cables associated with valves 1E51\*MOVFO63 (\*ISV\*) (RCIC inboard steam isolation valve) and 1E51\*MOVFO78 (\*VTV\*) (RCIC vacuum breaker valve) located in fire area ET-2 (Electrical Tunnel "B" West), did not have fire wrap. This discovered condition is contrary to requirements contained in the FHA. While working on resolution of this issue, additional cables which could cause the same problem were found in fire areas AB-2, C-2 and C-6. At 1300 hours on 4/23/91, these additional areas of concern were reported to the shift supervisor. The FHA lists Method 1 as the analyzed method of shutdown for fire areas AB-2, C-2, C-6 and ET-2. Method 1 shutdown is identified as using 3 safety relief valves (SRVs) (\*RV\*) for reactor pressure vessel (RPV) (\*JE\*) pressure control, RCIC for RPV level control, and RHR-A for suppression pool cooling and shutdown cooling. The FHA lists these valves as "Passive Valves" required for Method 1 shutdown which means the valves must not change position due to fire damage on their cables. The FHA states the identified cables for these valves should be wrapped in these fire areas.

The affected cables did not have the required fire wrap (fire barrier) since plant startup; therefore, the fire barrier is considered inoperable per Technical Specification 3/4.7.7 and this report is submitted pursuant to 10CFR50.73(a)(2)(i)(B) as operation prohibited by the Technical Specification.

Additional reportable conditions have been discovered as a result of the FHA review. These conditions concern Appendix R separation and the discovery of a previously unidentified fire area. These conditions are described in the Investigation section below.

INVESTIGATION

The River Bend Station - Unit 1 Appendix R Data Management System lists equipment, raceways, and cables by fire area. A review of this data base found inconsistencies between the data base and the FHA for the identified cables which may cause spurious operation of valves 1E51\*MOVFO63 and 1E51\*MOVFO78. The FHA indicates the cables should be wrapped in these fire areas but the data base indicates the cables do not require wrap.

FHA Section V "Fire Hazards Evaluation Conclusions" states that for fire areas AB-2, C-2, C-6 and ET-2 shutdown can be achieved by Method 1. FHA Section I and Tables 1, 2 and 6 identify Method 1 shutdown equipment. Reactor core isolation cooling (RCIC) (\*BN\*) is used for

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 500 HRS FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH IP 9301 U.S. NUCLEAR REGULATORY COMMISSION WASHINGTON DC 20555 AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104) OFFICE OF MANAGEMENT AND BUDGET WASHINGTON DC 20503

ACTIVITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
RIVER BEND STATION	0 5 0 0 0 4 5 8 9 1	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	-	0 1	0 3 OF 0 6

TEXT (if more space is required, use additional NRC Form 388A's) (17)

reactor pressure vessel (RPV) level control in Method 1 shutdown. The RCIC inboard steam isolation valve 1E51\*MOVFO63 and the RCIC vacuum breaker valve 1E51\*MOVFO78 are passive valves for Method 1 shutdown which means they must not change position due to fire damage. FHA Table 2 states that cables for these two valves, which may result in spurious signals, are wrapped in these fire areas. Circuit analysis on cables 1ICSABC001 and 1ICSABC004 (\*CBL2\*) found that fire damage can cause spurious closure of valve 1E51\*MOVFO63 which would prevent steam from reaching the RCIC turbine (\*TBR\*). Circuit analysis on cables 1ICSEBC001 and 1ICSEBC003 found that fire damage can cause spurious opening of valve 1E51\*MOVFO78 which would adversely affect RCIC vacuum breaker capabilities.

Since these valves are required not to change position for operation of RCIC and RCIC is required for safe shutdown in the affected fire areas, the valves are correctly classified in the FHA as "Passive - Method 1 Components". Therefore, to comply with the USAR, FHA, and 10CFR50 Appendix R Section III.G, the cables would require wrapping in fire areas AB-2, C-2, C-6 and ET-2. With the exception of FHA Table 8 with regards to fire area AB-2, the FHA correctly indicates these cables require wrapping in these fire areas. The Appendix R data base is incorrect as it indicates the cables are not required to be wrapped.

Additional reportable conditions have been discovered as a result of the FHA review. These conditions concerned Appendix R separation and the discovery of a previously unidentified fire area.

Three areas were identified where compliance with Appendix R separation criteria, as identified in the FHA and/or USAR, was not provided. Two of the areas, the main control room and a fire area in the fuel building, involved equipment required for spent fuel pool cooling only and not equipment required for safe shutdown of the reactor vessel. In both cases immediate actions were taken and administrative controls implemented to address the concerns with spent fuel pool cooling until permanent corrective actions can be identified and implemented. The third area is in the reactor containment building. Containment cooling could be lost due to potential fire damage in this fire area since separation in accordance with Appendix R, Section G requirements is not provided. The affected raceways were treated as having missing fire barriers and fire watch requirements specified in Technical Specification 3/4.7.7, "Fire Rated Assemblies" were implemented. Permanent corrective action for these three areas will be identified in a supplemental report by May 1, 1992.

During the final FHA review, all fire areas except one were found to have a fire hazards analysis and 58 of 62 fire areas were found to have administrative controls identified in the FHA included in their pre-fire strategies. A preliminary fire hazards analysis for the new

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FACILITY NAME (1)  RIVER BEND STATION	DOCKET NUMBER (2)  0 5   0   0   0   4   5   8 9   1	LER NUMBER (6)			PAGE (3)	
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TEXT (if more space is required, use additional NRC Form 305A (6-89))

fire area, not previously identified in the FHA, was performed to determine potential impact on safe shutdown capability. The preliminary analysis indicated that safe shutdown for this new fire area is provided utilizing Method 1 shutdown equipment and by initiating high pressure core spray (HPCS) in lieu of reactor core isolation cooling (RCIC) for level control during a fire. Also, administrative controls to align valve 1SFC\*MOV120 to supply cooling to the upper fuel pools were necessary. Modification request (MR) 92-0013 was initiated on January 27, 1992, to make necessary document changes to the FHA and USAR for the new fire area. A new pre-fire strategy was prepared to identify this information to reactor operators and the fire brigade. Pre-fire strategies for the four fire areas were revised to include the omitted administrative controls identified in the FHA.

CORRECTIVE ACTIONS

A detailed review and verification of the FHA by an independent contractor was initiated as a result of NRC Inspection Report No. 50-458/90-02. The conditions as described in this report were identified by the independent contractor during resolution of questions identified in the review and verification process. Evaluations of all questions arising from the final review of the FHA by the independent contractor were completed in January 1992.

Upon discovery of the condition identified on 4/15/91, the affected cables were treated as having missing fire barriers and the action statement prescribed in Technical Specification 3/4.7.7, "Fire Rated Assemblies", was implemented for areas containing these cables. With the exception of the Division II electrical room located in the northeast corner of "D" tunnel on elevation 70', fire watches had been previously in place for the affected areas due to operability questions associated with penetration seals. However, there is no assurance that fire watches had been in place for the entire time period since startup.

For the affected fire areas, an analysis has been performed to determine what alternate system for RCIC is available (free of fire damage). The analysis determined that low pressure core spray (LPCS) (\*BM\*) is free of fire damage in Fire Areas AB-2, C-2, & C-6 and high pressure core spray (HPCS) (\*BJ\*) is free of fire damage in Fire Area ET-2.

Errors made during the original development of the FHA were the cause of inconsistencies found within the FHA and between the FHA and the Appendix R data base. These inconsistencies resulted in the identified circuits not being protected in accordance with 10CFR50, Appendix R, Section III.G. A contributing factor involving these

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-9301) U.S. NUCLEAR REGULATORY COMMISSION WASHINGTON, DC 20545 AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104) OFFICE OF MANAGEMENT AND BUDGET WASHINGTON, DC 20503

FACILITY NAME (1)  RIVER BEND STATION	DOCKET NUMBER (2)  0 5 0 0 0 4 5 8	LER NUMBER (8)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		9 1	0 0 8	0 1	0 5	OF 0 6

TEXT (If more space is required, use additional NRC Form 386A (1))

errors appears to be the fact that the affected components are Division II and are required for Method 1 shutdown, which primarily uses Division I and III components. Review of this condition has determined there are also Division I cables/equipment which are required for Method 2 shutdown, which primarily uses Division II components. The cables for this type of equipment are considered "Appendix R Crossover Cables". Analysis has determined that there are approximately 80 of these crossover cables. A review of these crossover cables was performed and with one exception no similar deficiencies exist. The exception is the Division II cable chase area located in the northeast corner of D-Tunnel. In this area, RCIC may be lost due to fire damage on crossover cables. As previously stated in the investigation, it was found that this area had not been previously identified or evaluated in the FHA. Analysis for this new fire area (AB-18) demonstrates safe shutdown capability is provided. Since the area contains only Division II cabling, safe shutdown can be achieved utilizing Method 1 shutdown methodology and substituting HPCS for RCIC for RPV level control.

As previously stated, permanent corrective actions for the Appendix R separation issues identified in the FHA review will be identified in a supplemental report by May 1, 1992. The corrective actions to address the new fire area included the identification of the proper safe shutdown method, implementation of administrative controls to align valve 1SFC\*MOV120 to provide cooling to the upper fuel pools, documentation changes to the FHA and USAR, and the preparation of a pre-fire strategy for this area.

Similar events have been reported in LERs 87-005, 89-009, 89-036, and 90-003. LERs 87-005, 89-009 and 90-003 reported installation-related deficiencies in Thermo-Lag fire barriers. LER 89-036 reported an event in which the fire hazards analysis specified that certain motor-operated valves (MOVs) should be normally de-energized. The actual condition of the valves was that they were energized. New issues identified during the FHA review have revealed FHA deficiencies concerning spent fuel pool cooling and a previously unidentified fire area.

SAFETY ASSESSMENT

The FHA states safe shutdown can be achieved in fire areas AB-2, C-2, C-6 and ET-2 using Method 1 shutdown. Method 1 is identified as using 3 SRVs for RPV pressure control, RCIC for RPV level control, and RHR-A for suppression pool cooling and shutdown cooling. Since the affected cables were not wrapped in these fire areas, fire damage could cause loss of RCIC. With the loss of RCIC, a review was made to determine what alternate method of RPV level control was available in these fire areas. Analysis has demonstrated that for Fire Areas AB-2, C-2 & C-6, LPCS is free of fire damage and for ET-2 & the new fire area (AB-18),

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TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 500 HRS FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P.530) U.S. NUCLEAR REGULATORY COMMISSION WASHINGTON, DC 20555 AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104) OFFICE OF MANAGEMENT AND BUDGET WASHINGTON, DC 20503.

FACILITY NAME (1)  RIVER HEAD STATION	DOCKET NUMBER (2)  0   5   0   0   0   4   5   8	LER NUMBER (5)		PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
		9   1	-   0   0   8	-   0   1	0   6   OF   0   6

TEXT (if more space is required, use additional NRC Form 386A's) (17)

HPCS is free of fire damage. This demonstrates that with a fire in any of these fire areas, at least one method of safe shutdown is unaffected.

Fire Areas C-25 (main control room) and FB-1 (fuel bldg.) were identified as areas where potential fire damage could cause a loss of spent fuel pool cooling. Calculation No. G13.18.14.0\*46-0 was developed which demonstrates the time required for the spent fuel pool temperature to reach the design limit of 155.6 degrees F with the present fuel load is approximately 5.3 days. Abnormal Operating Procedure (AOP)-0031 "Shutdown From Outside Main Control Room" and pre-fire strategies for fire area FB-1 have been revised to address manual actions which may be required to restore spent fuel pool cooling with a fire in these areas. These corrective actions and administrative controls have been implemented to address these concerns under present fuel pool load conditions until permanent corrective actions are identified and implemented.

The FHA indicates safe shutdown can be achieved in Fire Area RC-5/Z-13 (reactor containment bldg.) using Method 1 or 2 depending on the location of the fire. The FHA states containment unit cooler 1HVR\*UC1B is separated from its alternate counterpart by 24 ft. and a 10 ft. radiant energy shield and is being protected from intervening combustibles by wrapping the intervening combustibles with a 3-hour rated barrier. Since the cables for this unit cooler were not wrapped in accordance with Appendix R, Section III.G requirements, fire damage could cause a loss of containment cooling. The affected cables were treated as having missing fire barriers and fire watch requirements specified in Technical Specification 3/4.7.7, "Fire Rated Assemblies" have been implemented.

NOTE: Energy Industry Identification System Codes are identified in the text as (\*XX\*).