January 14, 1993

MEMORANDUM FOR: Ashok C. Thadani, Director
Division of Systems Safety and Analysis

FROM: Conrad E. McCracken, Chief
Plant Systems Branch
Division of Systems Safety and Analysis

SUBJECT: PUBLIC MEETING ON JANUARY 7, 1993
(FIRE BARRIER ACCEPTANCE CRITERIA)

On January 7, 1993, a public meeting was held with various industrial representatives who have sold fire barrier products to the commercial nuclear power industry. A list of the meeting attendees is attached. A copy of the meeting handouts is available through the public document room.

During the past 18 months, the NRC has been evaluating problems associated with Thermo-Lag fire barrier systems. The NRC has issued 5 information notices, a bulletin, and supplement and a generic letter which addresses Thermo-Lag.

The purpose of the meeting was to discuss the applicability of the issues that have been identified to other fire barrier systems. The staff stated that it is conducting a programatic review and has not completed its reassessment of other fire barrier systems. It is our intent to address other fire barrier products through a generic letter supplement in the September 1993 time frame. The fire barrier representatives were interested in receiving assurances that their products continue to be acceptable. The staff stated that we cannot draw that conclusion until our review is completed. However, if the staff had information that other fire barrier products had failure mechanisms similar to Thermo-Lag, we would have issued similar generic communications., If industry has specific product information that address the issues identified through our generic communications, they should submit it to aid in resolution of the issues.

Additional discussions focused on the regulatory process for the proposed staff acceptance criteria for fire barrier assemblies used to separate safe shutdown functions. The staff stated that it plans to follow the normal generic review process for implementation of the proposed criteria.

Original signed by

Conrad E. McCracken, Chief
Plant Systems Branch
Division of Systems Safety and Analysis

Enclosures:
1. List of Attendees
2. Meeting Handouts (Central File and PDR only)

cc: See next page

SPLB:DSSA
RArchitzel:cf
1/14/93

SPLB:DSSA
CMcCracken
1/14/93

280082

[G:\thermola\mtgl_7_93.rea]

MHS-3-1B

DF03

DISTRIBUTION
Central File
NRC PDR
SPLB TSI File
FMiraglia 12 G 18
WRussell 12 G 18
AThadani
GHolahan
CMcCracken
RArchitzel
SWest
PMadden
IMiller
JFouchard (OPA) 2 G 5
GMulley (OIG) EW-542
EPawlik RIII/OI
JLee 9 A 2
AMasciantonio 13 D 18
SHom (OGC) 15 B 18
MCallahan (OCA) 17 A 3
LPlisco 7 D 4
PGill 7 E 4
RJenkins 7 E 4
PGunter
MMarquardt

Enclosure 1

NRC MEETING WITH FIRE BARRIER VENDORS
JANUARY 7, 1993

Name	Organization	Phone No.
Ralph Architzel	NRC/NRR	301-504-2804
Ashok Thadani	NRC/NRR	301-504-2884
Ronaldo Jenkins	NRC/NRR	301-504-2985
Amarjit Singh	NRC/NRR	301-405-3731
Gene Pawlik	NRC/OI	708-790-5686
Richard C. Paul	NRC/OI	708-790-5686
George Mulley	NRC/OIG	301-492-4451
Leo Morton	NRC/OIG	301-402-7170
Loren R. Plisco	NRC	301-504-1725
Mike Callahan	NRC/CA	301-504-1776
Dave Gibbons	3M	612-733-0398
Merritt Marquardt	3M	612-733-1650
Donald Coy	3M	612-736-0341
Richard Licns	3M	612-733-7079
J. Dowdell	3M	612-733-4865
J. Frailing	3M	202-331-6927
J. Anthony English	Flammadur (FCA)	1-800-753-3526
P. Gunter	NIRS	202-328-0002
Robert Berhinig	UL	708-272-8800
Roger Huston	TVA	301-770-6790
Biff Bradley	NUMARC	202-872-1280
Morris Schreim	NUMARC	202-872-1280
Cleve Skinker	Bechtel	301-417-4225
Theresa Meisenheimer	Bechtel/SERCH	301-417-4868
Al Steinbach	Pyrotenax USA	410-997-5105
Lisa Kountoupes	Hse Energy Comm.	202-225-3147
Jim Pittrizzi	Energy Comm./Oversight Mgmt.	202-225-4441
Garry Garten	Winston & Strawn	202-371-5950
James J. Raleigh	Southern Technical Services	301-652-2500
Gerald Chernoff	Shaw Pittman	202-663-8032

NRC MEETING WITH VENDORS
JANUARY 7, 1993

Name	Organization	Phone No.
Steve West	NRC/NRR	301-504-1220
Steve Hom	NRC/OGC	301-504-1537
Amar N. Pal	NRC/NRR/DE	301-504-2760
Conrad McCracken	NRC/NRR/DSSA	301-504-2873
Jeff Holmes	NRC/NRR/DSSA	301-504-2280
Toussaint Dolmans	Eternit	215-926-0100
David A. Haines	Eternit	215-926-0100
L. Charles Spriggs	Promatec	713-373-4040
Randal Brown	Peak Seals, Inc.	800-835-4741
Clifton Philpott	Dorchem Engineering	818-449-3222
Clifford Hall	Dorchem Engineering	818-449-3222
Kevin Hawks	Transco	312-427-2818
Daniel Roberts	Commonwealth Edison	708-515-7227
Rita Braddick	Public Service Elect. & Gas	609-339-5030
Thirh Dinh	NUS Corp.	301-258-5826
Sherman A. Spear	Textron S.M.	508-454-5693
James Sherman	New York Power Authority	914-287-3293
R. A. Schimpe	New York Power Authority	914-681-6461
Elizabeth Kleinsorg	ABB Impell	510-275-4535
Cal Banning	ABB Impell	817-737-1145
Douglas Kunze	Flammadur	703-934-4038
David Stellfox	MaGraw-Hill	202-383-2162
Acan Cohlmeyor	Pacific Nuclear	301-990-2504
Thomas Whitaker	Pabco	303-858-7554

ENCLOSURE 2

FIRE BARRIER ASSEMBLIES USED TO SEPARATE SAFE SHUTDOWN FUNCTIONS WITHIN THE SAME FIRE AREA

TECHNICAL ISSUES AND NRC ACTIONS

JANUARY 7, 1993

NRC COMMUNICATIONS WITH THE INDUSTRY

INFORMATION NOTICES (INs)

- AUGUST 6, 1991, IN 91-47, "FAILURE OF THERMO-LAG FIRE BARRIER MATERIAL TO PASS FIRE ENDURANCE TEST."

- DECEMBER 6, 1991, IN 91-79, "DEFICIENCIES IN THE PROCEDURES FOR INSTALLING THERMO-LAG FIRE BARRIER MATERIAL."

- JUNE 23, 1992, IN 92-46, "THERMO-LAG FIRE BARRIER MATERIAL SPECIAL REVIEW TEAM FINAL FINDINGS, CURRENT FIRE ENDURANCE TESTS, AND AMPACITY CALCULATION ERRORS."

- JULY 27, 1992, IN 92-55, "CURRENT FIRE ENDURANCE TEST RESULTS FOR THERMO-LAG FIRE BARRIER MATERIAL."

- DECEMBER 15, 1992, IN 92-82, "RESULTS OF THERMO-LAG 330-1 COMBUSTIBILITY TESTING."

NRC COMMUNICATIONS WITH THE INDUSTRY

BULLETINS

- JUNE 24, 1992, BULLETIN 92-01, "FAILURE OF THERMO-LAG 330 FIRE BARRIER SYSTEM TO MAINTAIN CABLING IN WIDE CABLE TRAYS AND SMALL CONDUITS FREE FROM FIRE DAMAGE."

- AUGUST 28, 1992, BULLETIN 92-01, SUPPLEMENT 1, "FAILURE OF THERMO-LAG 330 FIRE BARRIER SYSTEM TO PERFORM ITS SPECIFIED FIRE ENDURANCE FUNCTION."

GENERIC LETTER (GL)

- DECEMBER 17, 1992, GL 92-08, "THERMO-LAG 330-1 FIRE BARRIERS."

MAJOR TECHNICAL ISSUES

- FIRE ENDURANCE TESTING AND APPLICATION OF THE TEST RESULTS
- DEFICIENCIES IN THE INSTALLATION AND INSPECTION PROCEDURES
- COMBUSTIBILITY OF FIRE BARRIER MATERIAL
- AMPACITY DERATING
- SEISMIC CONSIDERATIONS

NRC PROPOSED POSITION
FIRE ENDURANCE TEST ACCEPTANCE CRITERIA
"RACEWAY FIRE BARRIERS"

TEMPERATURE

- MEASURED ON THE EXTERNAL SURFACE OF THE RACEWAY, NOT TO EXCEED 325°F.

BARRIER CONDITION

- FIRE BARRIER TO REMAIN INTACT - NO VISIBLE SIGNS OF CONDUCTOR OR RACEWAY AFTER STANDARD FIRE EXPOSURE AND HOSE STREAM TEST.

HOSE STREAM TEST

- SOLID STREAM AFTER HALF DURATION OR APPLICATION OF HOSE STREAM AS RECOMMENDED BY SRP 9.5.1 AFTER FULL DURATION.

FIRE ENDURANCE TEST ACCEPTANCE CRITERIA - CONT.

CABLE CONDITION

- IF TEMPERATURE LIMIT EXCEEDED, VISUAL INSPECTION OF CABLES SHOULD NOT REVEAL VISIBLE DAMAGE

DEMONSTRATE CABLE FUNCTIONALITY (GL 86-10)

(REQUIRED WHEN FIRE TEST ACCEPTANCE CRITERIA IS NOT MET)

FUNCTIONALITY TESTING

POWER/CONTROL CABLES

* MEGGER TESTS (BEFORE AND AFTER FIRE EXPOSURE)
* AC OR DC HIGH POTENTIAL TEST
(CABLES $\geq$ 1000 VOLTS)

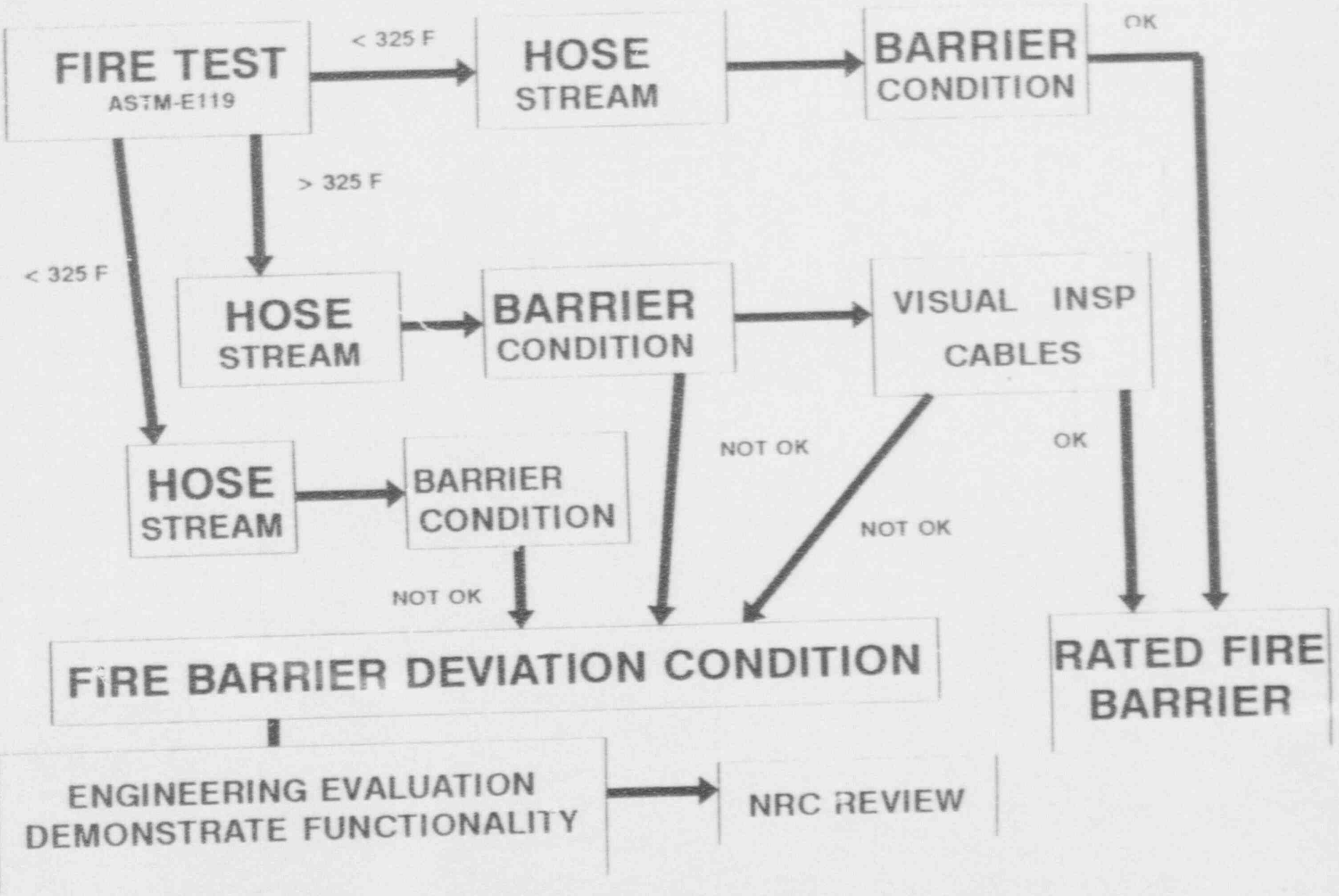
INSTRUMENTATION CABLES

* MEGGER (BEFORE, DURING, AND AFTER FIRE EXPOSURE)

THERMAL EXPOSURE THRESHOLD DETERMINATION

* AIR OVEN TEST AT RATED CABLE VOLTAGE
* EQ DOCUMENTATION

FIRE BARRIER TESTING
ACCEPTANCE CRITERIA



ASSURANCE OF ADEQUATE FIRE BARRIER SYSTEMS (OTHER THAN THERMO-LAG)

- ASSESS FIRE BARRIER PROGRAMMATIC ISSUES AND THEIR APPLICABILITY TO OTHER FIRE BARRIER SYSTEMS

- MONITOR ACTIONS (BY LICENSEES) TO EVALUATE THE ADEQUACY OF FIRE BARRIER PRODUCTS, DESIGNS AND APPLICATIONS.

3M Ceramic Materials Department

- Seventeen Years of Passive Fire Protection Experience.

- Thirteen Years of Passive Fire Protection in the Nuclear Industry.

- Fire Protection Products and Systems that have been successfully fire tested worldwide; including Canada, England, France, Germany, Japan, Norway, Spain, Sweden and others.

- Fire Protection Products that meets or exceed the rigorous International Standards Organization (ISO) requirements.

- Fire Protection Systems that are both Underwriters Laboratory (UL) classified, and Factory Mutual Research Corporation (FMRC) approved.

- Tests include ASTM E119, E84, E814, UL 1709 (HIFT).

3M Ceramic Materials Department

- Seventeen Years of Passive Fire Protection Experience.

- Thirteen Years of Passive Fire Protection in the Nuclear Industry.

- Fire Protection Products and Systems that have been successfully fire tested worldwide; including Canada, England, France, Germany, Japan, Norway, Spain, Sweden and others.

- Fire Protection Products that meets or exceed the rigorous International Standards Organization (ISO) requirements.

- Fire Protection Systems that are both Underwriters Laboratory (UL) classified, and Factory Mutual Research Corporation (FMRC) approved.

- Tests include ASTM E119, E84, E814, UL 1709 (HIFT).

3M Interam™ Fire Protection Products
Selected User Sites

*1. Palisades
2. Fermi 2
3. Watts Bar 1 & 2
4. Salem 1 & 2
*5. Hopecreek 1
6. Nine Mile Point 1
*7. Quad Cities 1 & 2
8. Dresden 2 & 3
9. Connecticut Yankee
10. Rancho Seco
*11. Fort Calhoun
12. Perry 1
*13. Seabrook
14. Point Beach
15. Kewaunee
16. Brunswick
17. Beaver Valley 2
*18. Monticello
*19. WPPSS 2
20. TMI
21. Arkansas Power
22. San Onofre

* NRC Review to Date

8122225

3M Family of Fire Protection Products

- Interam E-53A Endothermic Mat
- Interam E-54A Endothermic Mat
- Interam CS-195 Composite Sheet
- Fire Barrier CP-25 Intumescent Caulk
- FireDam 150 Endothermic Caulk
- Interam T-49 Aluminum Foil Tape

Actual Seismic Tests

- Testing conducted at Southwest Research Institute
- Tested in accordance with IEEE 323-1974, IEEE 344-1975, IEEE 381-1977, and NRC Regulatory Guide 1.60
- Both 1- and 3-hour systems were tested
- Results: Both systems passed twice required SSE (Safe Shutdown Earthquake) level

3M Interam™
Fire Protection Products
Extensive Ampacity Tests

- 3M ------ 50+ Configurations
- UL ------ 30+ Configurations
- SwRI --- 15+ Configurations

Ceramic Materials Department

Interam™ Fire Protection Products

3M

8122201

3M Ceramic Materials Department

Additional outside testing and evaluation of 3M Fire Protection Products and Systems conducted Globally include:

Southwest Research Institute (SWrI)
Omega Point
Certified Testing Labs (CTL)
American Nuclear Insurers (ANI)
Nuclear Mutual Limited (NML)
Twin Cities Testing (TCT)
Warnock Hershey
Bellcore
American Telephone & Telegraph (AT&T)
Northern Telecom
Underwriters Laboratory of Canada (ULC)
British Columbia Telephone
Bell of Canada
Australian Telephone
CSTB France

3M is a member or otherwise provides technical support to such organizations as ASTM, NFPA, IEEE, NEC, and the UL Ad Hoc Fire Barrier Committee, as well as support of such United States Model Building Codes as BOCA, SBCCI, ICBO, and CABO's.

3M Ceramic Materials Department is also a World Leader in developing new and innovative products designed for passive fire protection.

Accelerated Aging and Weathering
E-50 Series Mat

Test	Conditions	Time
Heat Aging	90°C	1 Year
High Humidity	90% RH-32°C	1 Year
Water Immersion	Room Temperature	60 Days
Weatherometer	UV/UVCON, 1-1XW	2000 Hrs

Results: No endothermic change; est life - minimum 40 yrs

3M Interam™ Fire Protection Products
Extensive Fire Tests

- 3M ----- 700+ Configurations
- UL ----- 250+ Configurations
- SwRI -- 15+ Configurations
- Warnock Hershey, Factory Mutual, Portland Cement, VTEC
- Canada, England, France, Germany, Japan, Norway, Spain, Sweden

Surface Burning Characteristics

Test	Results
Flame Spread	.7
Fuel Contributed	0
Smoke Contribution	0

3M Interam™ Fire Protection Products

- More than just fully qualified systems
- Thorough Quality Assurance Program
- Installation Training & Certification
- Application Engineering Services
- Internal Fire Test Capabilities

3M Weight Information

	E-53A	E-54A
Nominal Thickness	.3	.4
Color	Green	Blue
Mfg Weight Specs	1.25 - 1.60	1.51 - 2.11
Average Weight	1.43	1.81

Weights listed are pounds/square foot/layer

8122215

tual Seismic Tests

- Results: Both systems passed twice required SSE (Safe Shutdown Earthquake) level