6/20/92

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

Docket No 50-446

MEMORANDUM FOR:

T. Murley	J. Zwolinski	B. Grimes
F. Miraglia	M. Virgilio	Acting DD, DRIS
W. Russell	D. Crutchfield	F. Congel
J. Partlow	W. Travers	E. Butcher
F. Gillespie	C. Rossi	J. Roe
S. Varga	J. Richardson	C. Thomas
J. Calvo	B. D. Liaw	W. Bateman, EDO
G. Lainas	A. Thadani	M. Slosson
B. Boger	G. Holahan	Operations Center

THRU: Suzanne C. Black, Director
Project Directorate IV-2
Division of Reactor Projects III/IV/V

FROM: Brian E. Holian, Senior Project Manager
Project Directorate IV-2
Division of Reactor Projects III/IV/V

SUBJECT: DAILY HIGHLIGHT

COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)

Texas Utilities is performing confirmatory testing of their protective fire barrier system (Thermo-Lag) at Omega Point Labs, in San Antonio, Texas, this week. TU Electric has taken the lead in Thermo-Lag testing in order to resolve questions regarding the fire barrier's effectiveness for existing Unit 1 installations, and to support the licensing of CPSES Unit 2 later this year. The utility contracted with Omega Point Labs to qualify a protective fire barrier system specifically for CPSES.

The tests consist of a series of one-hour fire endurance tests on a variety of cable tray and conduit "mock-ups". The "mock-ups" were designed to duplicate actual plant configurations. The fire barrier was installed using stock material, and actual plant procedures and personnel. Representatives from Plant Systems Branch witnessed the preparation of test specimens at the Labs in early May.

The first actual tests occurred on June 17, 1992. Three-quarter inch, one-inch and five-inch conduit configurations were tested. All tests passed American Nuclear Insurers criteria in that electrical cable continuity was not lost. However, for the three-quarter inch and one-inch conduit tests, and a common junction box, several temperature readings were out of specification. Additionally, subsequent investigation of the cabling revealed evidence of charring and blistering. NRC standards require that the protected components be free of fire damage.

1/2/2

TU Electric has established a roving fire watch for Unit 1, in accordance with their Fire Protection Manual. The three quarter-inch and one-inch conduit is present in six rooms, in both the Auxiliary and Safeguards buildings. TU Electric has also initiated fire watches in the cable tray rooms, until the results of the tests on the cable tray configurations are complete.

Preliminary information from testing of a twelve-inch cable tray configuration on June 18th showed satisfactory results. Thermocouple temperatures on the protected cables were less than 325 degrees Fahrenheit. Testing is expected to be completed by June 23rd. Plant Systems Branch, NRC contractors NIST and SNL, and Region IV personnel are present witnessing the testing.

Brian E. Holian, Senior Project Manager
Project Directorate IV-2
Division of Reactor Projects III/IV/V
Office of Nuclear Reactor Regulation

cc: All NRR PDs
A. Chaffee
L. Plisco
G. Imbro

MULTI-PLANT ACTION (MPA) X-301
PLANT LIST

(1) TAC NUMBER	(2) DOCKET NUMBER	(3) PLANT NAME	(4) LEAD PM	(5) RITS INIT	(6) EXCEPT PA NUM
M83839	50-313	ARKANSAS 1	ALEXION	TWA	
M83840	50-368	ARKANSAS 2	PETERSON	SGJ	
M____1	50-334	BEAVER VALLEY 1	DEAGAZIO	ABD	
M____2	50-412	BEAVER VALLEY 2	DEAGAZIO	ABD	
M____3	50-438	BELLEFONTE 1	THADANI	MBT	1111
M____4	50-439	BELLEFONTE 2	THADANI	MBT	1111
M____5	50-155	BIG ROCK POINT	STRANSKY	R4S	
M____6	50-456	BRAIDWOOD 1	PULCIFER	RPV	
M____7	50-457	BRAIDWOOD 2	PULCIFER	RPV	
M____8	50-259	BROWNS FERRY 1	ROSS	THR	
M____9	50-260	BROWNS FERRY 2	ROSS	THR	
M83850	50-296	BROWNS FERRY 3	ROSS	THR	
M____1	50-325	BRUNSWICK 1	LE	NAL	
M____2	50-324	BRUNSWICK 2	LE	NAL	
M____3	50-454	BYRON 1	HSIA	APH	
M____4	50-455	BYRON 2	HSIA	APH	
M____5	50-483	CALLAWAY 1	WHARTON	BRW	
M____6	50-317	CALVERT CLIFFS 1	MCDONALD	DGM	
M____7	50-318	CALVERT CLIFFS 2	MCDONALD	DGM	
M____8	50-413	CATAWBA 1	MARTIN	REM	
M____9	50-414	CATAWBA 2	MARTIN	REM	
M83860	50-461	CLINTON	GODY	AOG	
M____1	50-445	COMANCHE PEAK 1	BERGMAN	TKB	
M____2	50-446	COMANCHE PEAK 2	HOLIAN	BMH	1111
M____3	50-315	COOK 1	STANG	SFJ	
M____4	50-316	COOK 2	STANG	SFJ	
M____5	50-298	COOPER	BEVIN	RBB	
M____6	50-302	CRYSTAL RIVER 3	SILVER	HAS	
M____7	50-346	DAVIS BESSE	HOPKINS	JSH	
M____8	50-275	DIABLO CANYON 1	ROOD	HAR	
M____9	50-323	DIABLO CANYON 2	ROOD	HAR	
M83870	50-237	DRESDEN 2	SIEGEL	XBS	
M____1	50-249	DRESDEN 3	SIEGEL	XBS	
M____2	50-331	DUANE ARNOLD	SHIRAKI	CSE	
M____3	50-348	FARLEY 1	HOFFMAN	STH	
M____4	50-364	FARLEY 2	HOFFMAN	STH	
M____5	50-341	FERMI 2	COLBURN	TGC	
M____6	50-333	FITZPATRICK	MCCABE	B2M	
M____7	50-285	FORT CALHOUN 1	BLOOM	S4B	
M____8	50-244	GINNA	JOHNSON	AGJ	
M____9	50-416	GRAND GULF 1	O'CONNOR	PWO	
M83880	50-213	HADDAM NECK	WANG	ADW	
M____1	50-400	HARRIS 1	MOZAFARI	BRM	
M____2	50-321	HATCH 1	JABBOUR	KNJ	
M83883	50-366	HATCH 2	JABBOUR	KNJ	

MULTI-PLANT ACTION (MPA) X-201
PLANT LIST

(1) TAC NUMBER	(2) DOCKET NUMBER	(3) PLANT NAME	(4) LEAD PM	(5) RITS INIT	(6) EXCEPTI PA NUMB
M83884	50-354	HOPE CREEK	DEMBEK	SFD	
M 5	50-247	INDIAN POINT 2	WILLIAMS	MAW	
M 6	50-286	INDIAN POINT 3	CONCICELLA	NKC	
M 7	50-305	KEWAUNEE	HANSEN	A3H	
M 8	50-373	LASALLE 1	SIEGEL	XBS	
M 9	50-374	LASALLE 2	SIEGEL	XBS	
M83890	50-352	LIMERICK 1	CLARK	RJC	
M 1	50-353	LIMERICK 2	CLARK	RJC	
M 2	50-309	MAINE YANKEE	TROTTIER	EHT	
M 3	50-369	MCGUIRE 1	REED	TGR	
M 4	50-370	MCGUIRE 2	REED	TGR	
M 5	50-245	MILLSTONE 1	JAFFE	DHJ	
M 6	50-336	MILLSTONE 2	VISSING	GSV	
M 7	50-423	MILLSTONE 3	ROONEY	VLR	
M 8	50-263	MONTICELLO	LONG	WAL	
M 9	50-220	NINE MILE POINT 1	MENNING	J8M	
M83900	50-410	NINE MILE POINT 2	MENNING	J8M	
M 1	50-338	NORTH ANNA 1	ENGLE	LBE	
M 2	50-339	NORTH ANNA 2	ENGLE	LBE	
M 3	50-269	OCONEE 1	WIENS	LHW	
M 4	50-270	OCONEE 2	WIENS	LHW	
M 5	50-287	OCONEE 3	WIENS	LHW	
M 6	50-219	OYSTER CREEK	DROMERICK	AID	
M 7	50-255	PALISADES	MASCIANTONIO	ACM	
M 8	50-528	PALO VERDE 1	TRAMMELL	CMT	
M 9	50-529	PALO VERDE 2	TRAMMELL	CMT	
M83910	50-530	PALO VERDE 3	TRAMMELL	CMT	
M 1	50-277	PEACH BOTTOM 2	SHEA	J8S	
M 2	50-278	PEACH BOTTOM 3	SHEA	J8S	
M 3	50-440	PERRY 1	HALL	JRH	
M 4	50-293	PILGRIM 1	EATON	RCE	
M 5	50-266	POINT BEACH 1	SAMWORTH	RBS	
M 6	50-301	POINT BEACH 2	SAMWORTH	RBS	
M 7	50-282	PRAIRIE ISLAND 1	LONG	WAL	
M 8	50-306	PRAIRIE ISLAND 2	LONG	WAL	
M 9	50-254	QUAD CITIES 1	OLSHAN	LNO	
M83920	50-265	QUAD CITIES 2	OLSHAN	LNO	
M 1	50-458	RIVER BEND 1	PICKETT	DLP	
M 2	50-261	ROBINSON 2	LO	RHL	
M 3	50-335	SAINT LUCIE 1	NORRIS	JAN	
M 4	50-389	SAINT LUCIE 2	NORRIS	JAN	
M 5	50-272	SALEM 1	STONE	JTF	
M 6	50-311	SALEM 2	STONE	JTF	
M 7	50-206	SAN ONOFRE 1	KALMAN	GCK	
M83928	50-361	SAN ONOFRE 2	KOKAJKO	LHK	

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(1) TAC NUMBER	(2) DOCKET NUMBER	(3) PLANT NAME	(4) LEAD PM	(5) RITS INIT	(6) EXCEPTI PA NUMB
M83929	50-362	SAN ONOFRE 3	KOKAJKO	LHK	
M83930	50-443	SEABROOK 1	EDISON	GEE	
M 1	50-327	SEQUOYAH 1	LABARGE	DWL	
M 2	50-328	SEQUOYAH 2	LABARGE	DWL	
M 3	50-498	SOUTH TEXAS 1	DICK	GFD	
M 4	50-499	SOUTH TEXAS 2	DICK	GFD	
M 5	50-395	SUMMER 1	WUNDER	GGW	
M 6	50-280	SURRY 1	BUCKLEY	BCB	
M 7	50-281	SURRY 2	BUCKLEY	BCB	
M 8	50-387	SUSQUEHANNA 1	RALEIGH	FJR	
M 9	50-388	SUSQUEHANNA 2	RALEIGH	FJR	
M83940	50-289	THREE MILE ISLAND 1	HERNAN	RHH	
M 1	50-344	TROJAN	KOKAJKO	LHK	
M 2	50-250	TURKEY POINT 3	AULUCK	RCA	
M 3	50-251	TURKEY POINT 4	AULUCK	RCA	
M 4	50-271	VERMONT YANKEE	FAIRTILE	MBF	
M 5	50-424	VOGTLE 1	HOOD	DSH	
M 6	50-425	VOGTLE 2	HOOD	DSH	
M 7	50-382	WATERFORD	WIGGINTON	DXW	
M 8	50-390	WATTS BAR 1	TAM	PST	1111
M 9	50-391	WATTS BAR 2	TAM	PST	1111
M83950	50-397	WNP 2	ENG	PFE	
M 1	50-482	WOLF CREEK	RECKLEY	WNR	
M 2	50-295	ZION 1	HICKMAN	ZZY	
M83953	50-304	ZION 2	HICKMAN	ZZY	

THERMO-LAG
QUESTIONS AND ANSWERS

1. **Is there any immediate danger to the safety of nuclear power plants because of the Thermo-Lag problem that has been identified?**

   - The licensee actions in response to the bulletin will be primarily to establish fire watches in areas where they determine Thermo-Lag exists. This provides an equivalent level of safety.
   - The barriers will provide some level of fire protection.
   - Plants are equipped with other passive and active fire protection features which contribute to early fire detection and suppression.

2. **What is the Thermo-Lag 330 fire barrier system?**

   Thermo-Lag 330 is a fire barrier manufactured and supplied by Thermal Science, Incorporated (vendor), St. Louis, Missouri, that is used by NRC licensees to satisfy the our requirements for protecting equipment needed to shutdown the plant in the event of a fire. Thermo-Lag is manufactured with fire endurance ratings of 1 hour and 3 hours.

3. **How many plants use Thermo-Lag barriers?**

   The vendor has informed us that at least 50 nuclear power stations (NRC estimates 80 plants) use Thermo-Lag. The amount of Thermo-Lag used at each plant may vary.

4. **What level of fire resistance does the NRC require for fire barriers?**

   The NRC has conservatively selected 3-hours as the minimum fire resistance rating for fire barriers used to separate redundant safe shutdown systems. One-hour barriers with automatic fire detection and suppression systems are considered equivalent to 3-hour barriers.

   In an actual fire situation, the fire resistance required of a barrier depends on the expected severity of the fire to which it may be exposed. Typical nuclear plant fire loads are not great enough to produce a fire approaching the severity of a test fire. In addition, an actual nuclear power plant fire would have a much slower temperature rise than the test fire. In large open volumes, such as most nuclear plant fire areas, a fully developed fire may occur in one part of the area, but it is not probable that the entire volume (fire area) would become fully involved by fire. Unless a fire reaches this stage, it is not likely to present a credible challenge to any nuclear power plant fire barrier.

5. **What are the NRC's concerns regarding Thermo-Lag fire barriers?**

Recent fire endurance testing of wide cable tray and small conduit configurations have demonstrated that they fail sooner than previously thought. This has necessitated the issuance of NRC Bulletin 92-01.

6. **What actions has the NRC taken?**

Current actions include the issuance of NRC Bulletin 92-01 to all licensee notifying them of the recent Thermo-Lag fire endurance test failures on small conduits and wide trays. In addition, the NRC is scheduled to meet on July 7 1992, with industry to discuss Thermo-Lag fire barrier issues.

Past actions included:

- Established NRR Special Review Team in July 1991.
- Issued IN 91-47, "Failure of Thermo-Lag Fire Barrier Material To Pass Fire Endurance Test," August 6, 1991.
- Issued IN 91-79, "Deficiencies in the Procedures for Installing Thermo-Lag Fire Barrier Materials," December 6, 1991.
- Prepared a proposed generic letter.
- Met with NUMARC on February 19, 1992.
- Information Notice 92-46, "Thermo-Lag Fire Basrrier Material Special Review Team Final Findings, Current Fire Endurance Tests, and Ampacity Calculation Errors," June 23, 1992

7. **How long has the NRC known about this problem and what actions has the agency taken?**

Testing conducted beginning the week of June 15, 1992 resulted in failures of fire barrier systems enclosing wide cable trays and small conduits.

River Bend Station first reported installation problems with Thermo-Lag to the NRC in 1987. The test failure of Thermo-Lag was reported in December 1989. These reports were reviewed by the NRC by our routine processes. The issues were not considered to be applicable to other plants until the spring of 1991, following the receipt of some allegations and an NRC site visit to River Bend Station. Since that time, three information notices have been issued and a meeting was held with the industry to discuss potential problems with Thermo-Lag.

8. **Why did it take so long for the NRC to take action on this issue?**

Upon receiving actual test failure data the NRC acted Immediately.

Previously, the NRC did not consider the River Bend reports applicable to the rest of the industry until the spring of 1991. Previous information was considered to only involve specific problems at River Bend. We will certainly go back and review our handling of the previous issues for lessons learned.

9. **Why weren't these issues found by NRC inspectors?**

Similar problems have been found at other facilities over the last 10 years. However, the identification of these types of problems would not be normally expected by our inspectors. This engineering area is very specialized. In addition, the installation problems are difficult to identify when the fire barrier is already installed.

10. **What will the licensees have to do to correct the problem?**

The immediate problem is addressed by establishing compensatory fire watches where suspect Thermo-Lag is installed. The actions to correct the Thermo-Lag fire barrier discrepancies may range from minor repairs, to complete replacement of some barriers.

11. **Why is the Inspector General's Office involved with the investigation?**

An OIG/OI Investigative team has been formed to look into the matters involving Thermo-Lag. I cannot address any specifics of the investigation since it still ongoing.

12. **Is it true that NRC officials favored Thermo-Lag over other products?**

The Inspector General would review these types of issues and I cannot address the question.

13. **Why were allegations overlooked or ignored by the NRC?**

That type of issue would be under the responsibility of the Inspector General. The NRC does have a formal tracking program to ensure review of all allegations received.

14. **What electrical systems does Thermo-Lag protect and what kind of material is used in Thermo-Lag?**

Thermo-Lag is used to protect electrical cables used for equipment that would be needed to shut down the plant in the event of a fire.

Thermo-Lag is referred to as a subliming material, and the content of the material is proprietary information.

15. **Is the problem with Thermo-Lag mainly in the improper installation of the material or is the quality of the material also under question?**

The NRC has concerns regarding both the installation of the material and the ability of the material to provide an adequate fire barrier, even if it is installed in accordance with the vendor's recommendations.

16. **Other than problems associated with fire endurance are there other concerns the NRC may have with Thermo-Lag fire barriers?**

Yes, in addition to the fire endurance concerns the NRC has identified concerns with installation of the various design configurations and with cable ampacity. These include:

- Ampacity derating factors for the Thermo-Lag 330 fire barrier system are indeterminate.

- 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 installed Thermo-Lag fire barrier configurations.

- Some licensees have not adequately reviewed their installed fire barrier configurations to ensure that they either replicate the tested configurations or provide an equivalent level of protection.

RE: 5THMM

TSI

22 June 1992

B.N. FELDMAN, P.E.

U S Nuclear Regulatory Commission
Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, Maryland 20852

Attention: Mr. Ashok C. Thadani, Director
Division of Systems Technology
Office of Nuclear Reactor Regulation

Reference: TSI's Letter Dated 16 June 1992 - Results of the Formal Fire Resistive Tests Conducted on the THERMO-LAG 330 Fire Barrier For the Protection of Cable Trays, Conduits, Junction Boxes and Cable Trays

Subject: Texas Utilities One Hour THERMO-LAG Test Program
Omega Point Laboratory

Dear Mr. Thadani:

The purpose of this letter is to update you on the preliminary results of the recent fire resistive tests performed by Texas Utilities at the facilities of Omega Point Laboratories in San Antonio, Texas.

In the letter referenced above, we advised you of the results of two successful, TSI sponsored, one hour fire resistive and water hose stream impingement tests utilizing the THERMO-LAG 330 Prefabricated Panels and Preshaped Conduit Sections, having a thickness of 0.625" ± 0.125". Accessory materials such as THERMO-LAG 330-1 Subliming Trowel Grade Material, THERMO-LAG Stress Skin, Stainless Steel Banding and Stainless Steel Tie Wires were used.

The following articles were tested:

(i) 36" Open Top, Ladder Back Cable Tray, using one layer of generic power, control, and instrumentation cables

(ii) 3/4" Diameter, Schedule 40, Steel Electrical Conduit, using one layer of generic instrumentation cables, and employing two conduiets and a junction box

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Telex: Domestic 44-2384 • Overseas 209901 • Telecopier (314) 349-1207

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The tests were conducted at Omega Point Laboratory under their total control, which also included quality control during construction.

Preliminary results of ASTM E119 flame environment temperatures, electrical integrity measurements, and the internal test article thermocouples temperatures placed on the cables were previously submitted.

Texas Utilities also engaged Omega Point Laboratory to conduct several one hour fire endurance and water hose impingement tests on their plant specific designs. Thermal Science personnel witnessed these tests. We consider it important to communicate our observations to you .

The test articles utilized THERMO-LAG 330 Fire Barrier System Materials purchased through the normal procurement process from Thermal Science, Inc. Materials utilitized in these tests included THERMO-LAG 330 Prefabricated Panels (0.625" ± 0.125" thickness), THERMO-LAG 330 Preshaped Conduit Sections (0.625" ± 0.125" thickness), and THERMO-LAG 330-1 Subliming Trowel Grade Material. Stainless steel banding and stainless steel tie wire were also used in the construction. The construction of the test articles was performed by Peak Seals under contract to Texas Utilities.

The test articles were instrumented with thermocouples placed on the cables and portions of the internal steel enclosures of the test articles. The cables used were plant specific to Comanche Peak.

The following are our observations:

- 5 Inch Steel Conduit utilizing Two Condulets, a Junction Box, Structural Supports, and a Penetrant through the fire barrier.

  The results of the tests were successful. This includes the preservation of electrical integrity for the duration of the fire and water hose stream impingement exposures, and not exceeding the TU targeted temperature limits. Examination of the cables did not indicate fire damage.

•3/4 Inch Steel Conduit utilizing Two Condulets, a Junction Box and Sructural Supports.

The electrical integrity was preserved during the fire and water hose stream impingement exposures. The maximum targeted temperature limits on the cables were exceeded. Heat damage was observed on some of the cables. The need for a construction design upgrade is indicated.

•12 Inch Open Top Ladder Back Cable Tray with Structural Supports.

The electrical integrity was maintained for the entire duration of both the fire endurance and water hose stream exposures. The targeted temperature limits were not exceeded. Examination of the cables following the termination of the test did not show any evidence of fire damage to the cables.

•30 Inch Open Top, Ladder Back Cable Tray with Structural Supports, and a "T" Section.

The TU plant specific method of fastening the THERMO-LAG 330 Fire Barrier Materials to the cable tray failed. It was observed in one instance that a fire barrier joint opened up in the proximity of the "T" section, allowing for the flame to penetrate into the cable tray. The test was terminated upon circuit integrity failure. The construction design requires upgrading.

The detailed test results and specific construction designs of the Texas Utilities test comprise the proprietary property of Texas Utilities. For further details, you may contact them direct.

As a part of TSI's ongoing sponsored test activity at Omega Point Laboratory, a "general utility", easily implemented, one hour construction upgrade design is being completed by our personnel under Omega Point's quality control surveillance for testing. It utilitizes:

- A 36 inch wide open top, ladder back cable tray
- THERMO-LAG 330 Prefabricated Panels, standard factory fabricated, (0.625" ± 0.125" thick)
- THERMO-LAG 330-1 Subliming Trowel Grade Material
- THERMO-LAG Stress Skin
- Stainless Steel Banding
- Stainless Steel Tie Wire

The construction of the cable tray utilizes certain procedures delineated in TSI's Technical Note 20684, Revision V, "THERMO-LAG 330 Fire Barrier System, Installation Procedures Manual, Power Generating Plant Applications." Some of the joints between the sections of THERMO-LAG 330 Prefabricated Panels are not being prebuttered, and are targeted to have a gap width of circa 0.100 inches.

It is contemplated that this upgrade design, subject to appropriate approval, will be suitable for open top, ladder back cable trays, 36 inches and smaller, loaded with one or more layers of cables, and of like underlying construction.

The above tests are targeted for completion within the next six (6) weeks.

The three hour fire endurance test program on a 36" wide open top, ladder back cable tray, and a 3/4" diameter steel conduit is continuing as previously advised. Be assured that as soon as valid test information is available on the results of these efforts, you will be promptly informed.

Yours truly,

Rubin Feldman
President

RF/meg

TSI

16 June 1992

RUBIN FELDMAN, P.E.
Chairman

U S Nuclear Regulatory Commission
Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, Maryland 20852

Attention: Mr. Ashok C. Thadani, Director
Division of Systems Technology
Office of Nuclear Reactor Regulation

Dear Mr. Thadani:

The NRC has previously received communications from Thermal Science, Inc. relating to fire resistive testing of the THERMO-LAG 330 Fire Barrier System applied to 36 inch wide, open top, ladder back cable trays and 3/4 inch diameter conduits.

We are pleased to inform you that on Tuesday, June 9, 1992, a very successful one hour fire resistive and water hose stream test was completed at the independent fire test facilities of Omega Point Laboratory in San Antonio, Texas. The one hour ASTM E119 fire simulation was followed by a 2-1/2 minute water hose stream exposure. Only generic cables were used. The cable tray contained one row of randomly spaced #12/7, #16/2 and 300 MCM cables. This was the first of several planned formal tests.

The following fire barrier materials were used:

For the Cable Tray, Junction Boxes and Condulets:

- THERMO-LAG 330 Prefabricated Panels - 0.625" ± 0.125" nominal thickness
- THERMO-LAG 330-1 Subliming Trowel Grade Material
- Stainless Steel Banding Material
- Stainless Steel Tie Wire

For Conduits:

- THERMO-LAG 330 Preshaped Conduit Sections - 0.625" ± 0.125" nominal thickness
- THERMO-LAG 330-1 Subliming Trowel Grade Material
- Stainless Steel Banding Material

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The following are the highlights of this test:

- Electrical integrity was maintained throughout the fire endurance and water hose stream exposures.

- Cable Tray Test Assembly - The maximum and average temperatures are shown in Figures 1 through 4 enclosed herein.

- Conduit Assembly - The maximum and average temperatures are shown in Figure 5. This is a TSI plot of the Omega Point developed and provided data. We have eliminated one malfunctioning thermocouple from this plot.

- Following the completion of the fire endurance and water hose stream test, portions of the THERMO-LAG wrap were removed from the test articles, with the following results:

  - The cables exhibited no damage whatsoever and were intact and flexible.

  - The nylon ties exhibited no damage and were flexible.

  - The paint on the junction boxes was intact and retained its gloss.

  - A definable thickness of THERMO-LAG 330 was present on the stress skin which was not damaged

The test program, which is currently continuing with other planned tests, is under the total control of Omega Point Laboratory and includes:

- The construction of the test articles,
- The installation of the fire barrier system materials,
- Test article instrumentation,
- The performance of the fire endurance and water hose stream tests.
- The performance electrical circuitry integrity monitoring,
- All pertinent Quality Control Documentation

Omega Point Laboratory will publish the test reports.

The tests are being conducted in accordance with the applicable prerequisites of:

Test Plan No. 31192-A Engineering Test Plan to Perform One Hour Fire Endurance Tests Followed by Water Hose Stream Tests On a 36 Inch Wide Steel Open Top, Ladder Back Cable Tray (With One Layer Of Generic Cables) and Steel Conduit Test Articles Protected With The THERMO-LAG 330 Fire Barrier System

ANI's Bulletin B.7.2, 11/87 "ANI/MAERP RA Guidelines For Fire Stop and Wrap Systems At Nuclear Facilities - Attachment B, Standard Fire Endurance Test Method To Qualify A Protective Envelope For Class IEEE Electrical Circuits", Revision I, dated November 1987, as applicable

U S Nuclear Regulatory Commission's Generic Letter 86-10
To All Power Reactor Licensees And Applicants For Power Reactor Licenses, dated 24 April 1986 "Implementation Of Fire Protection Requirements", as applicable

ASTM E119 (88) "Standard Methods of Fire Tests of Building Construction and Materials", as applicable

The planned details of construction are contained in the above referenced test plan. The final laboratory report, of course, is expected to provide the step by step details of what and how it was done.

The information presented herein is preliminary. It may be modified by the laboratory in its final report. Please contact this office if you have any questions.

We look forward to a continuing association.

Yours truly,

Rubin Feldman
President

RAL/meg
Enclosures

FIGURE 1

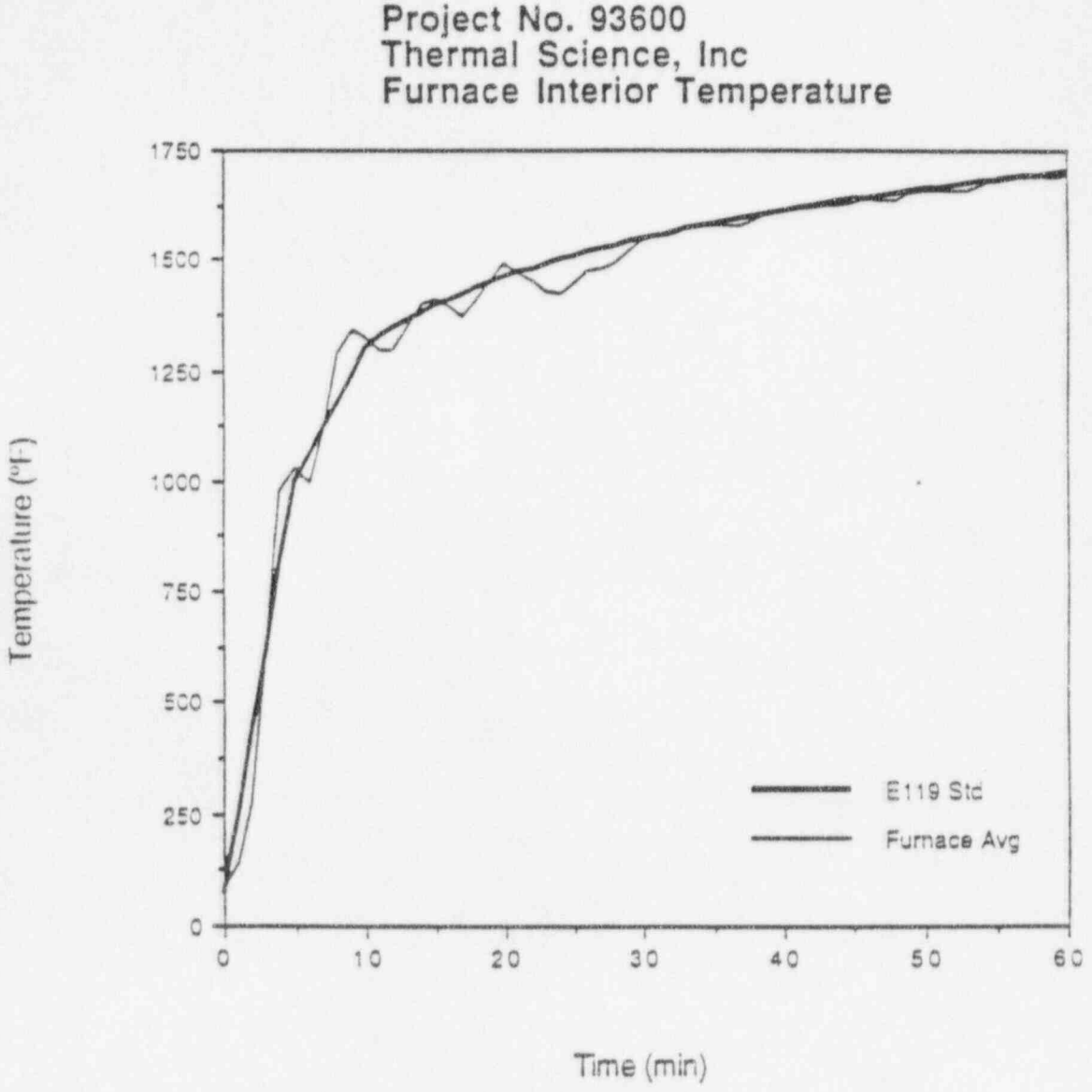

Project No. 93600
Thermal Science, Inc
Furnace Interior Temperature
Temperature (°F)
1750
1500
1250
1000
750
500
250
0
0
10
20
30
40
50
60
Time (min)
E119 Std
Furnace Avg

FIGURE 2

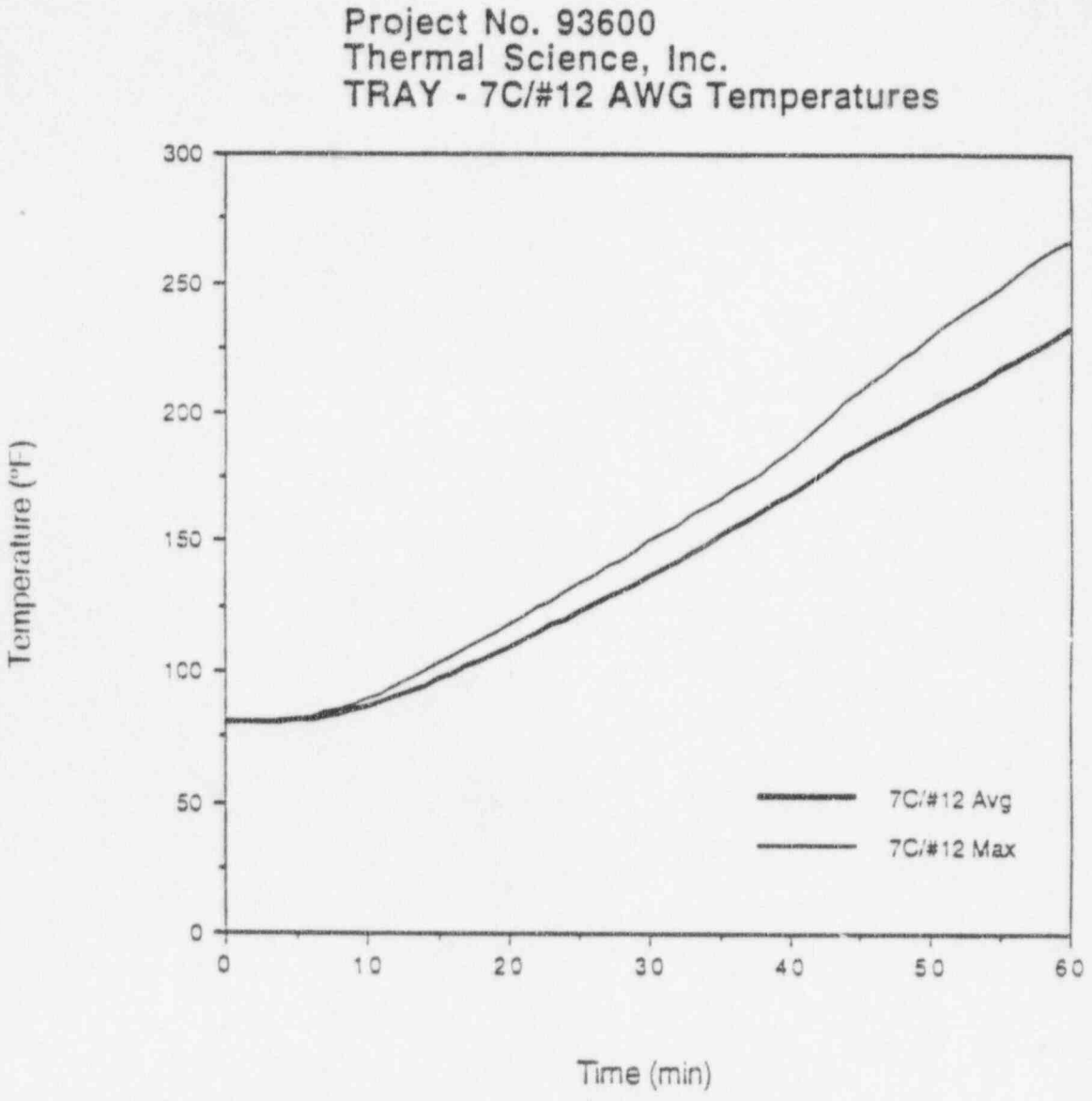

Project No. 93600
Thermal Science, Inc.
TRAY - 7C/#12 AWG Temperatures
Temperature (°F)
300
250
200
150
100
50
0
0
10
20
30
40
50
60
Time (min)
7C/#12 Avg
7C/#12 Max

FIGURE 3

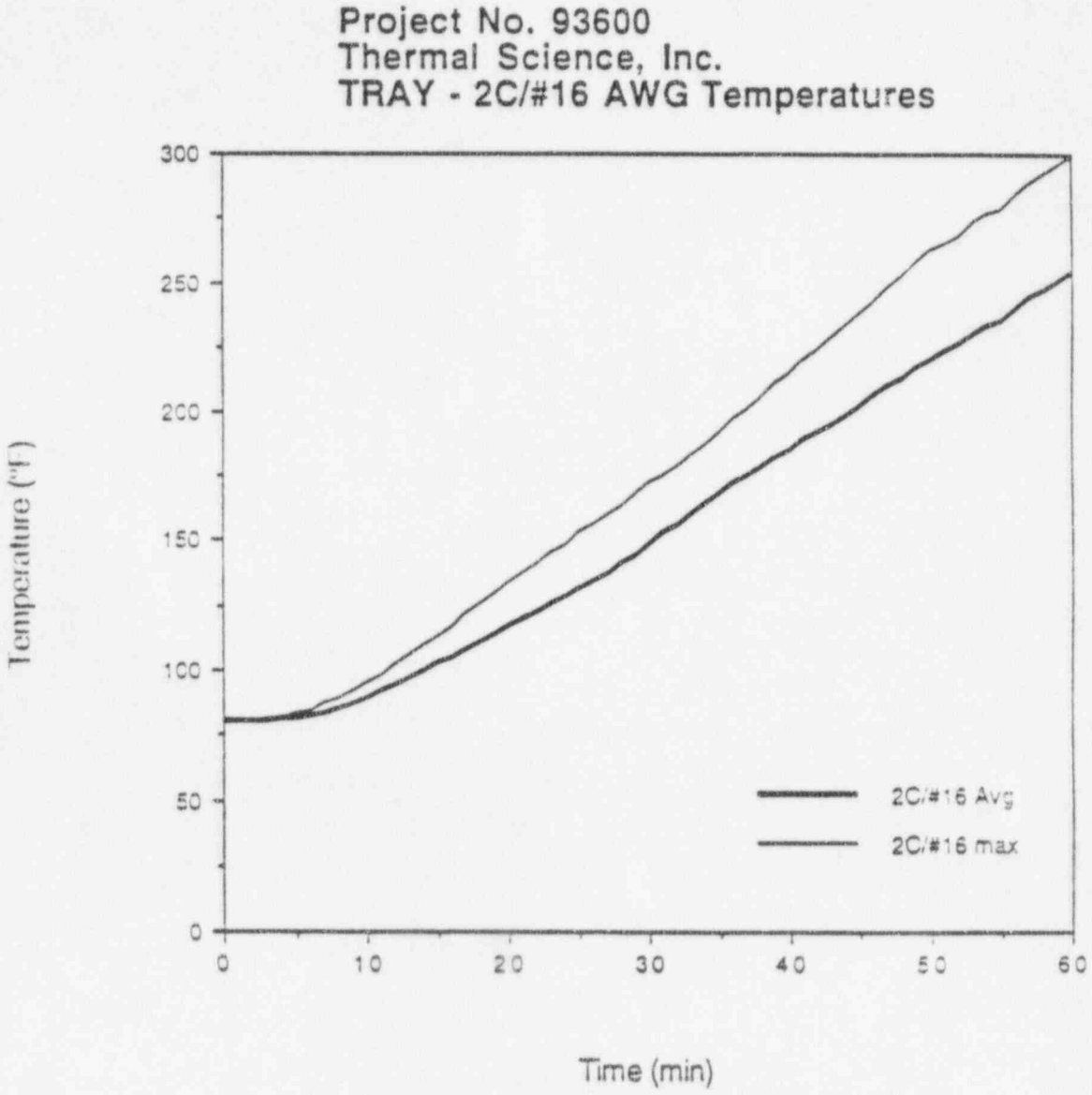

Project No. 93600
Thermal Science, Inc.
TRAY - 2C/#16 AWG Temperatures
Temperature (°F)
300
250
200
150
100
50
0
0
10
20
30
40
50
60
Time (min)
2C/#16 Avg
2C/#16 max

FIGURE 4

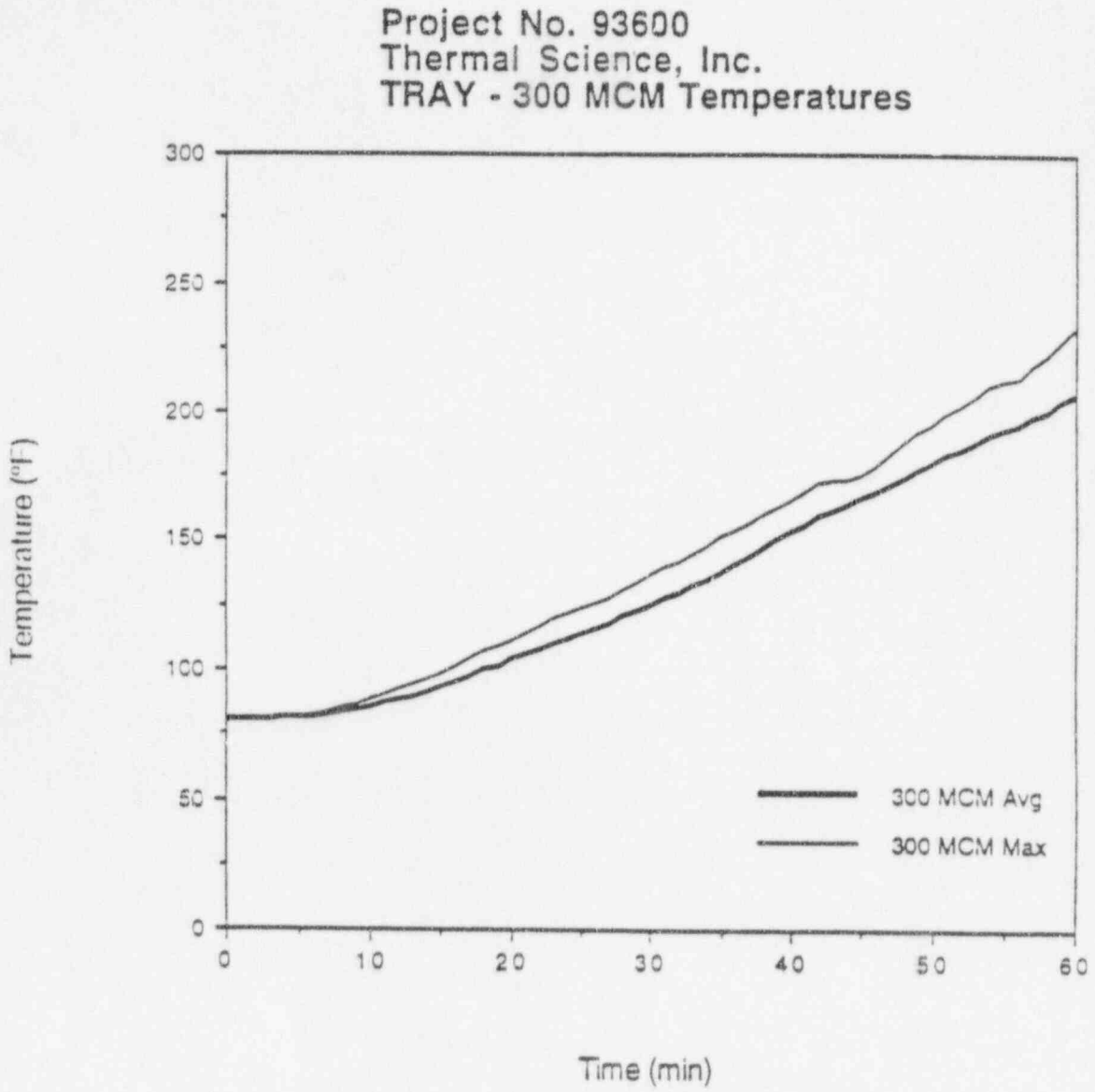
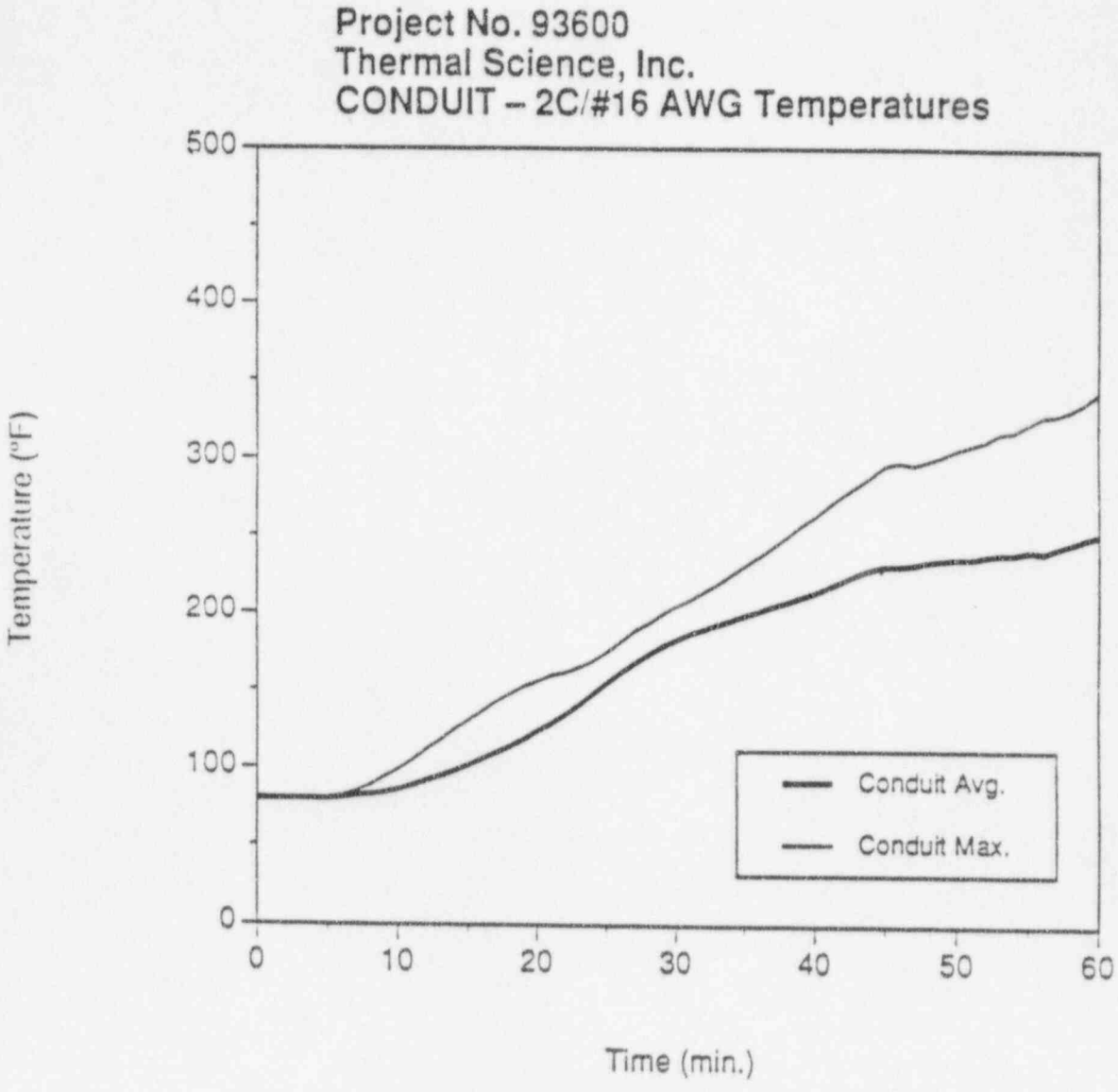
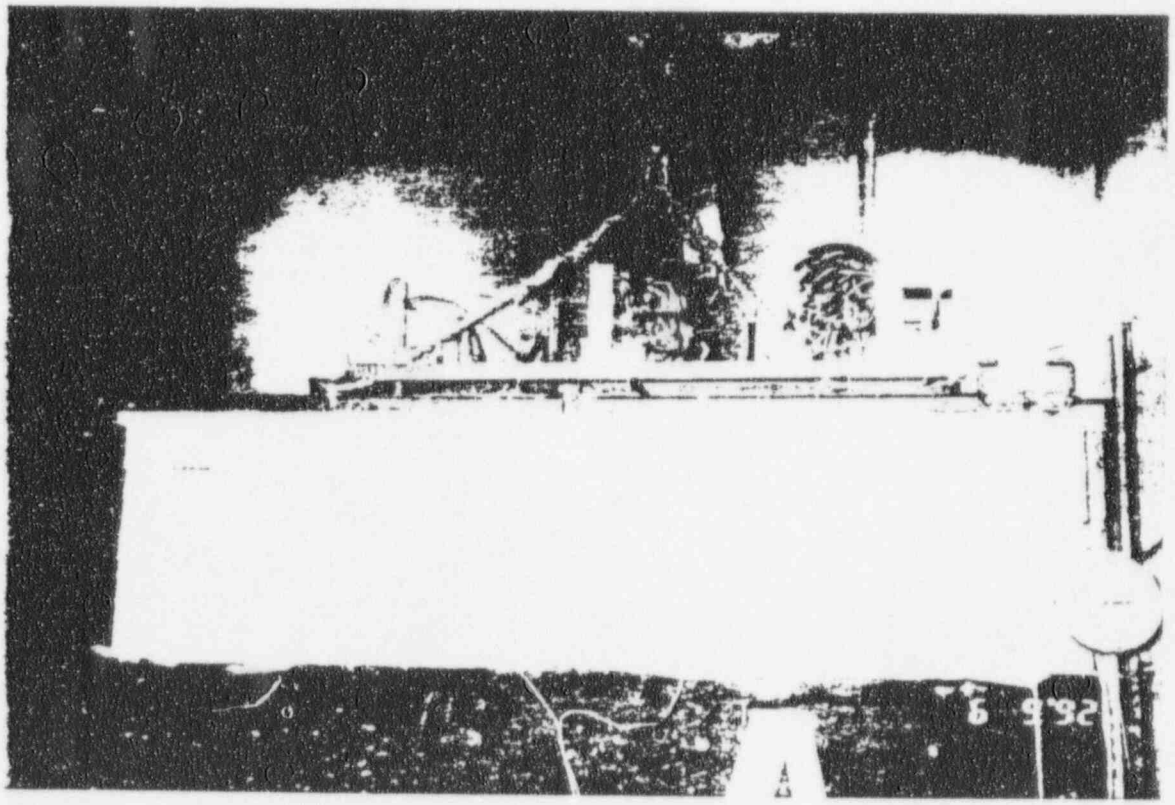
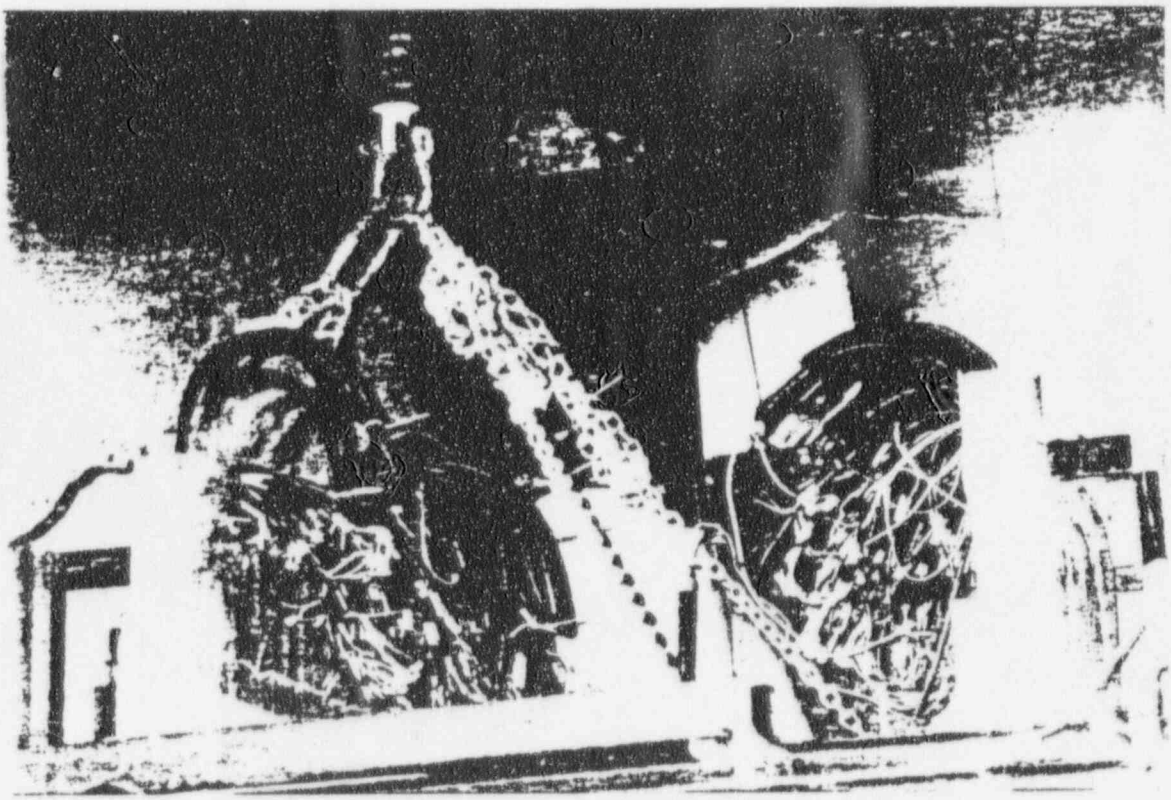

Project No. 93600
Thermal Science, Inc.
TRAY - 300 MCM Temperatures
Temperature (°F)
300
250
200
150
100
50
0
0
10
20
30
40
50
60
Time (min)
300 MCM Avg
300 MCM Max

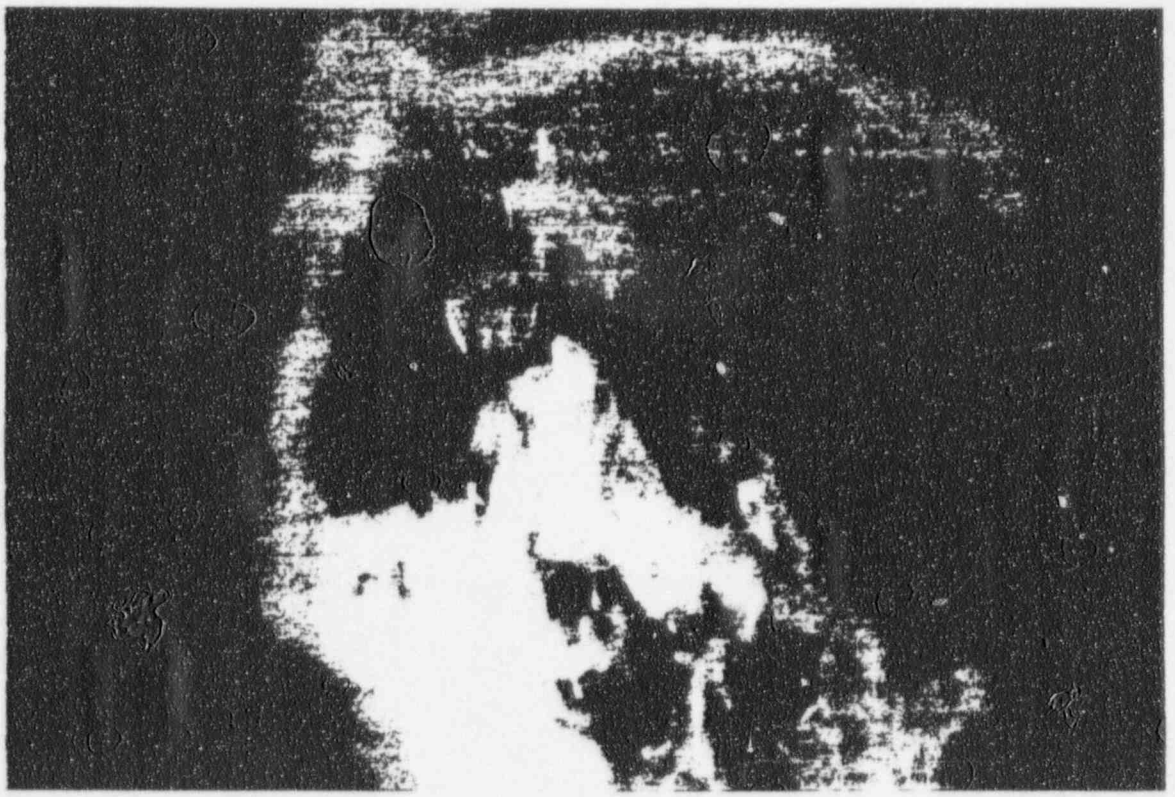
FIGURE 5

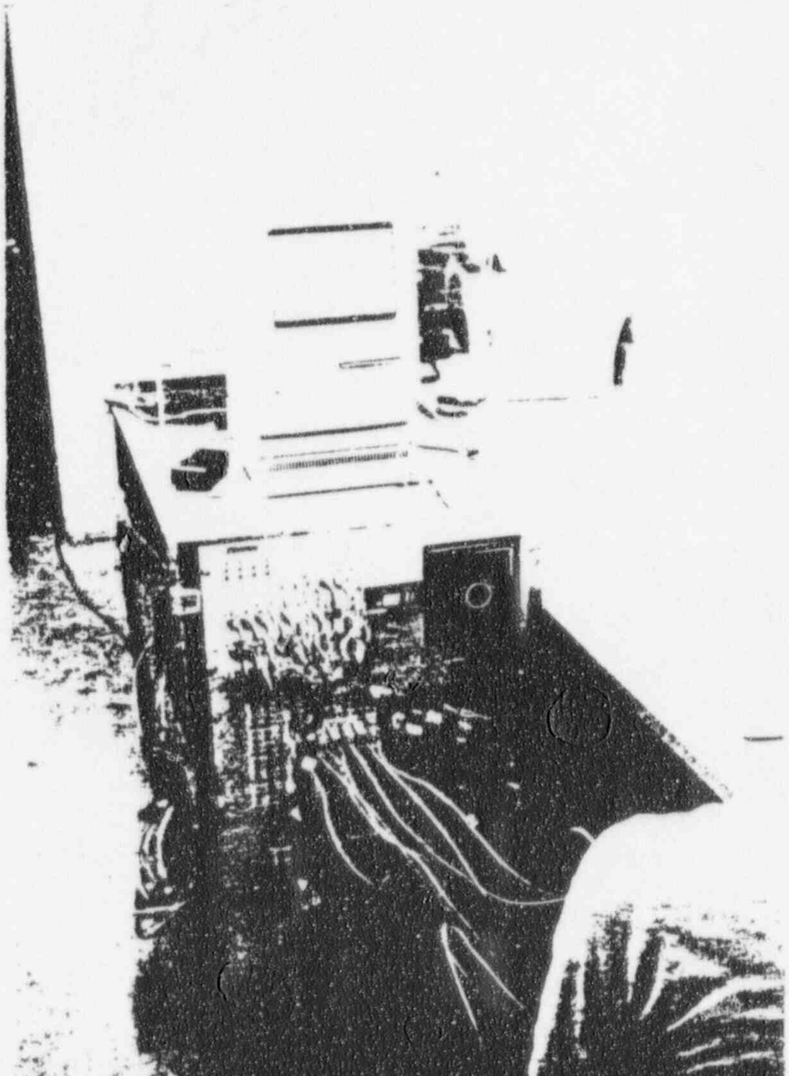


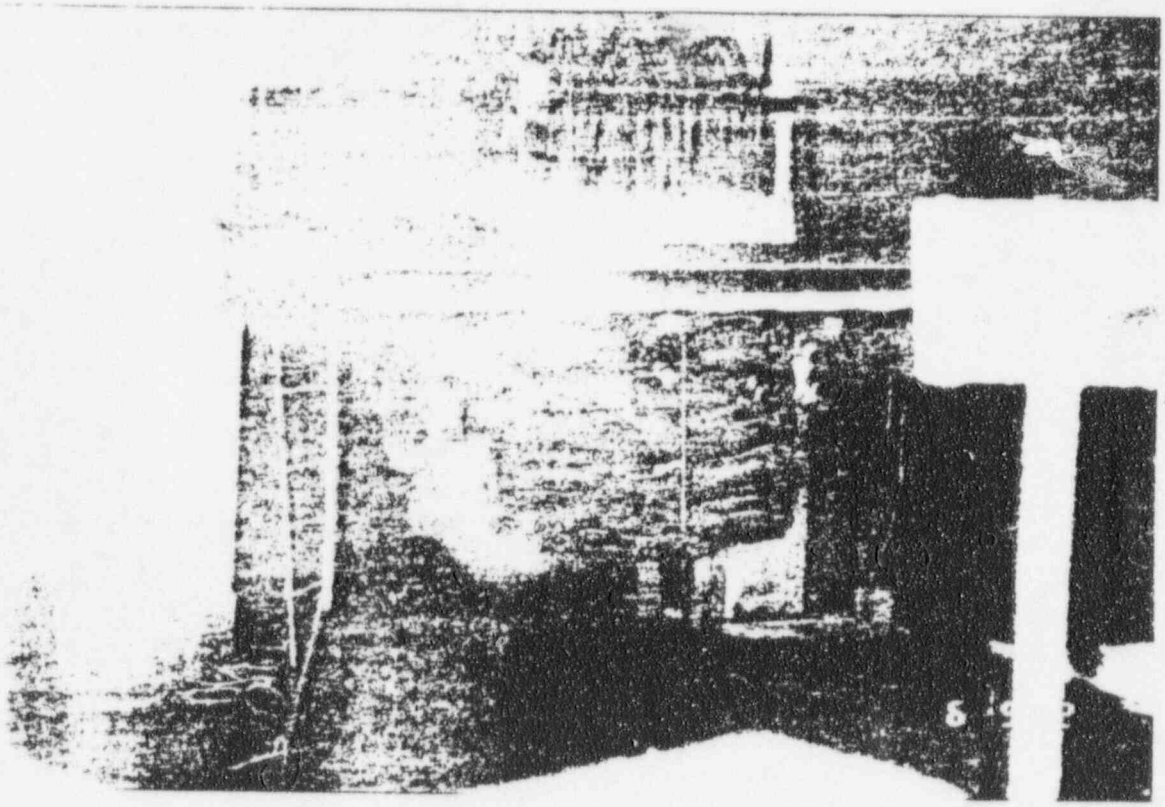
TSI Data Reduction

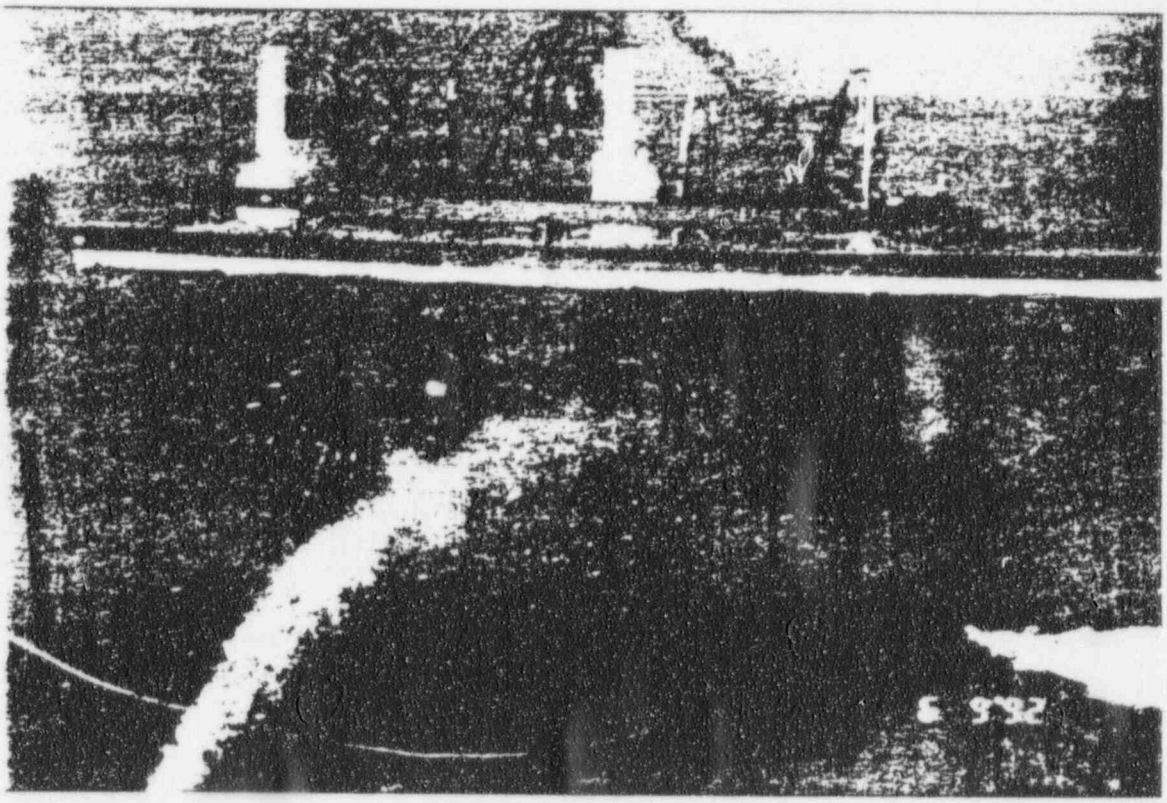


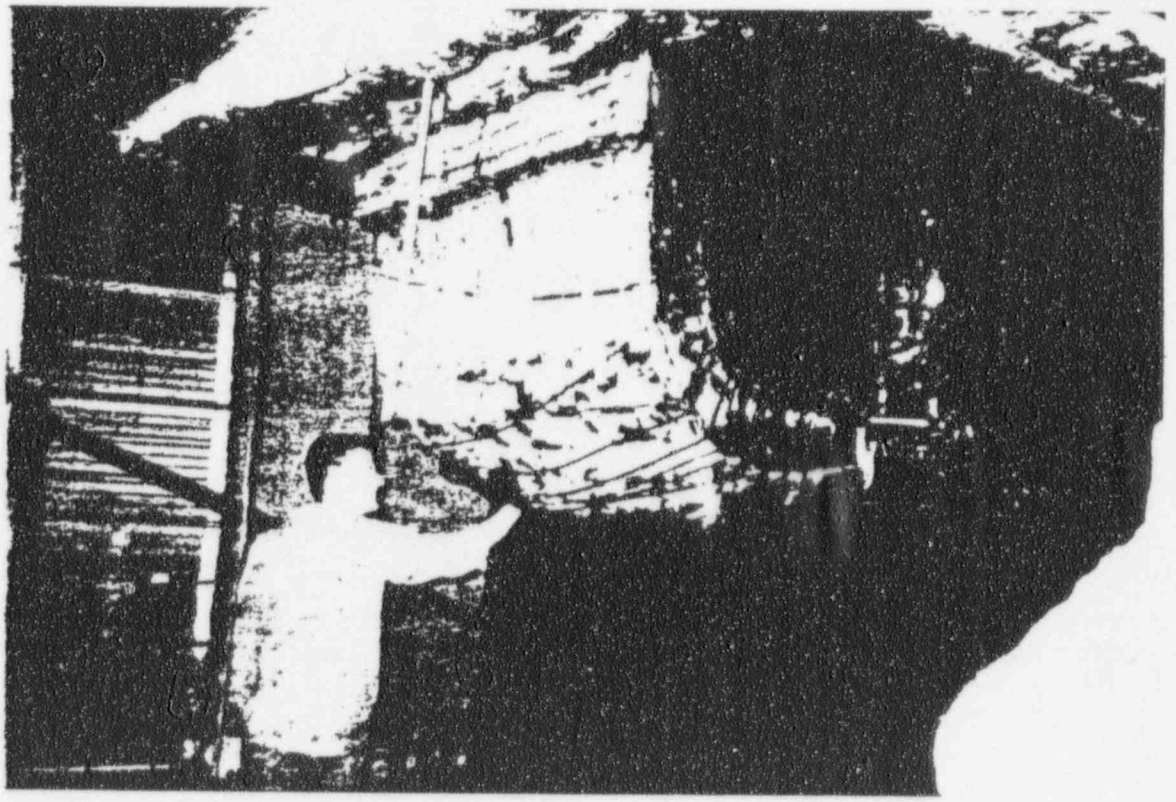


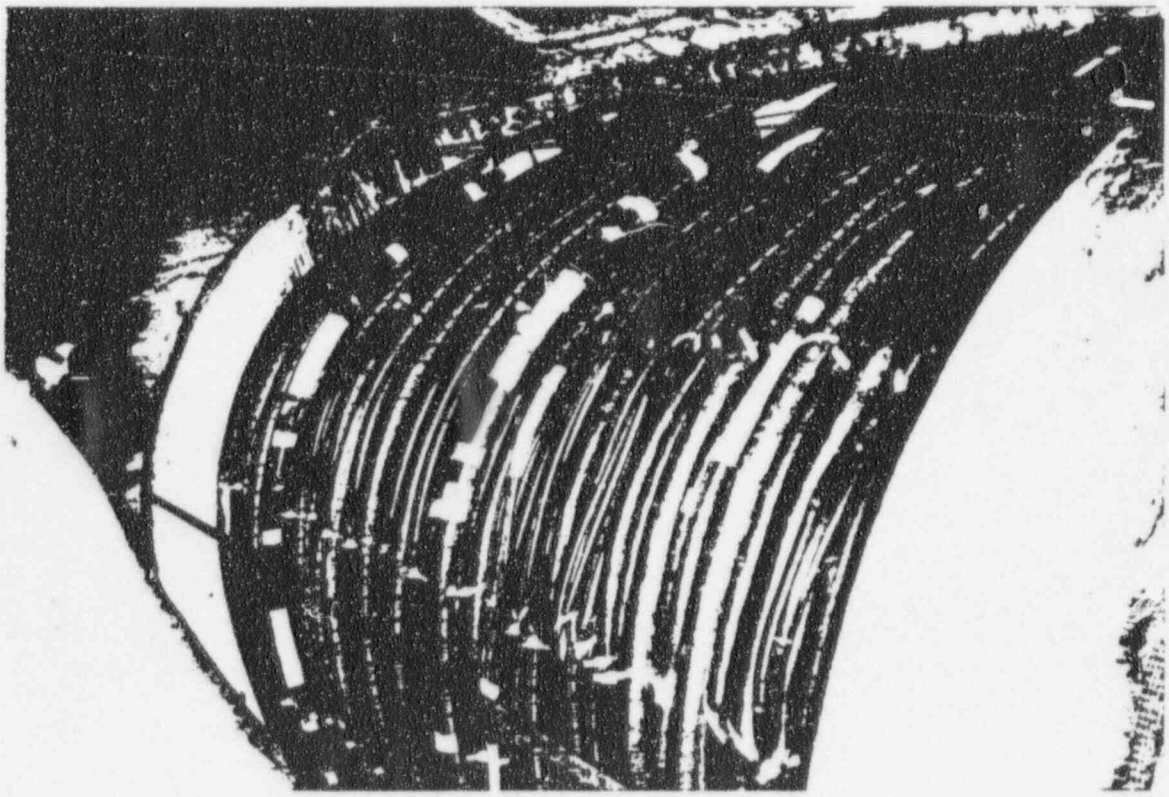


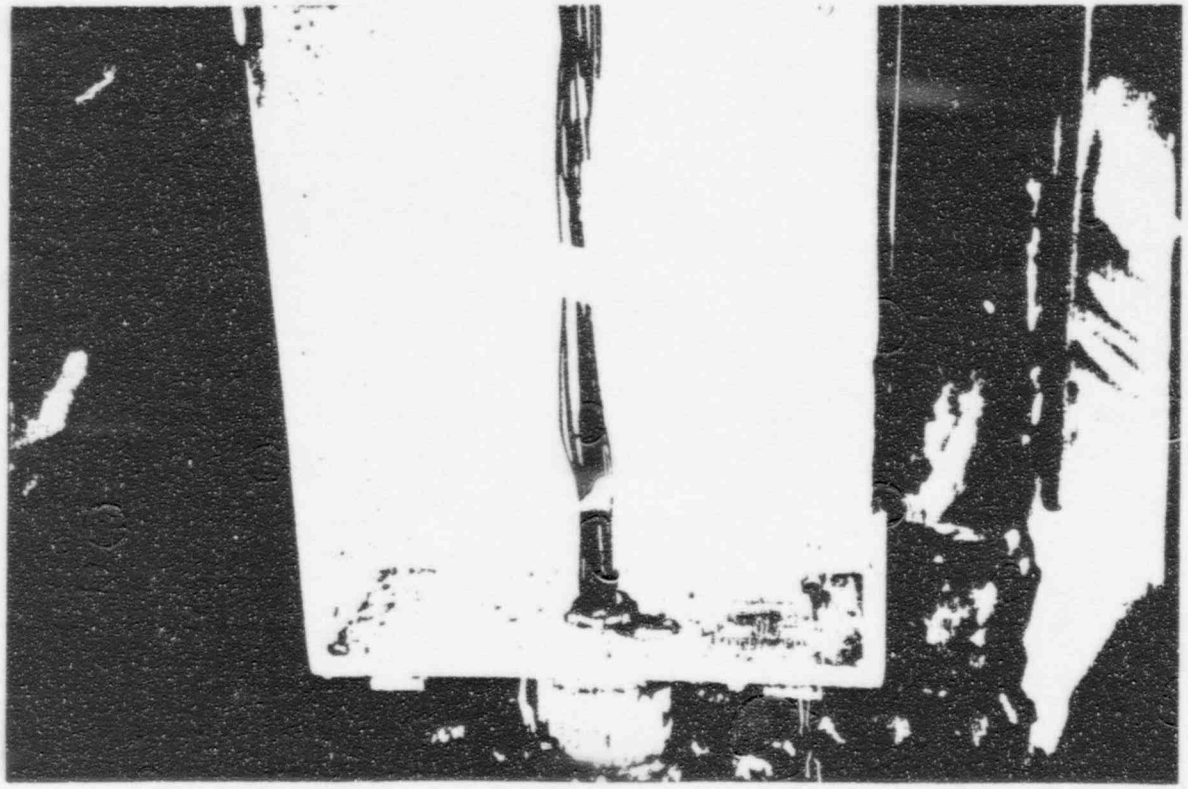


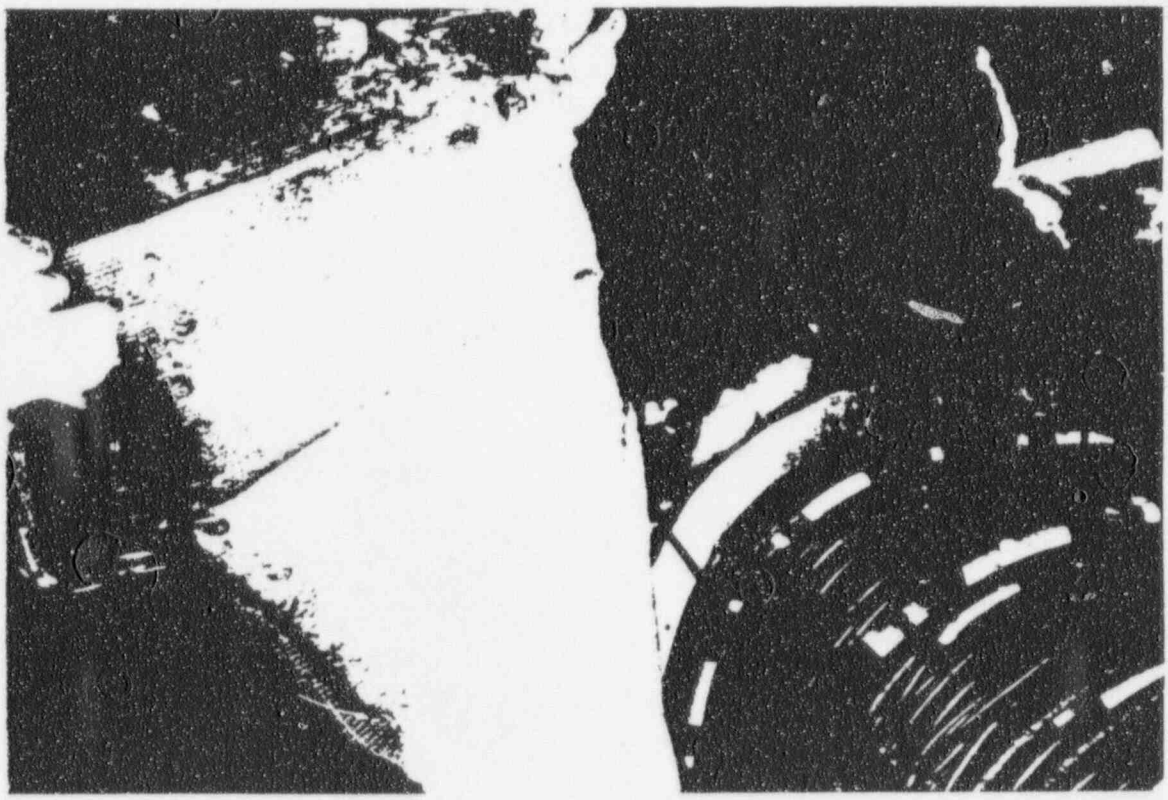


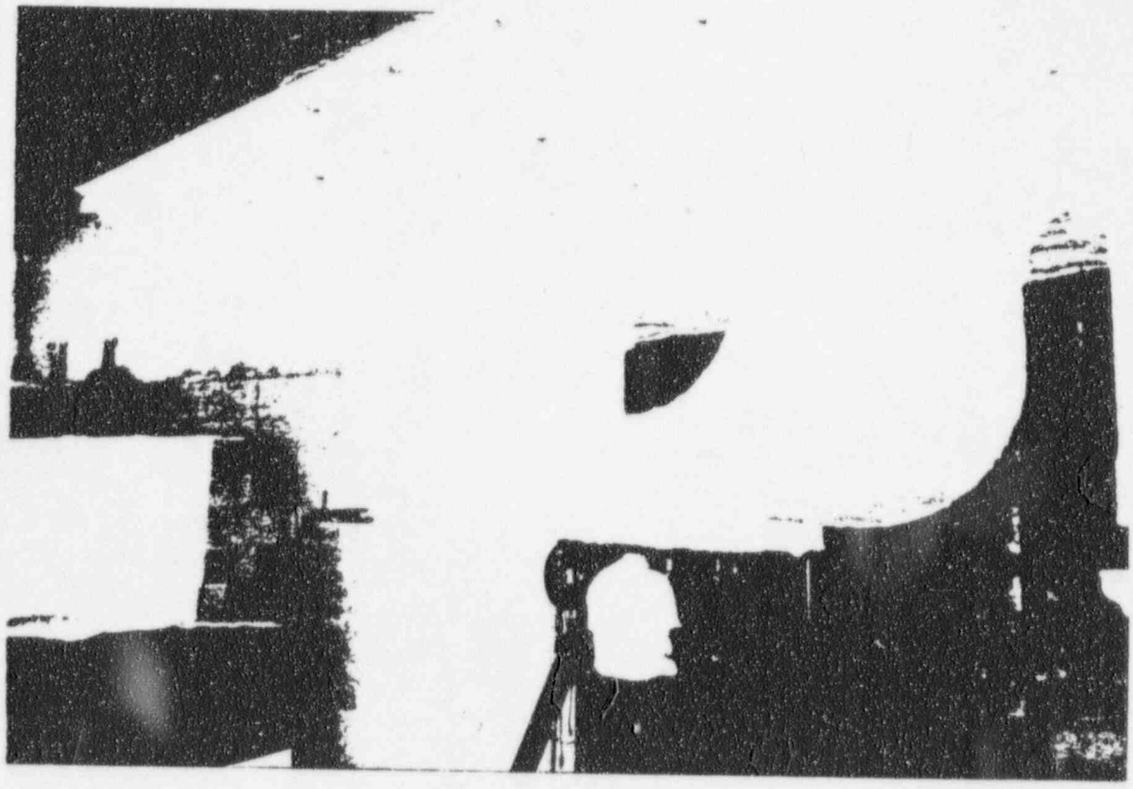


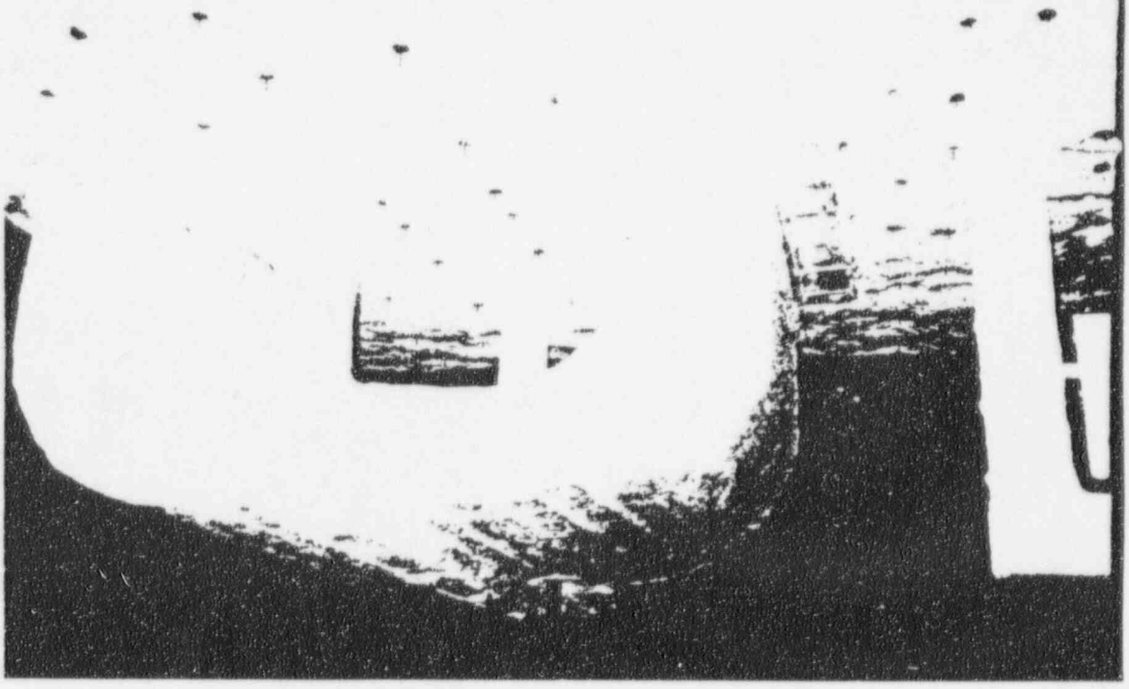


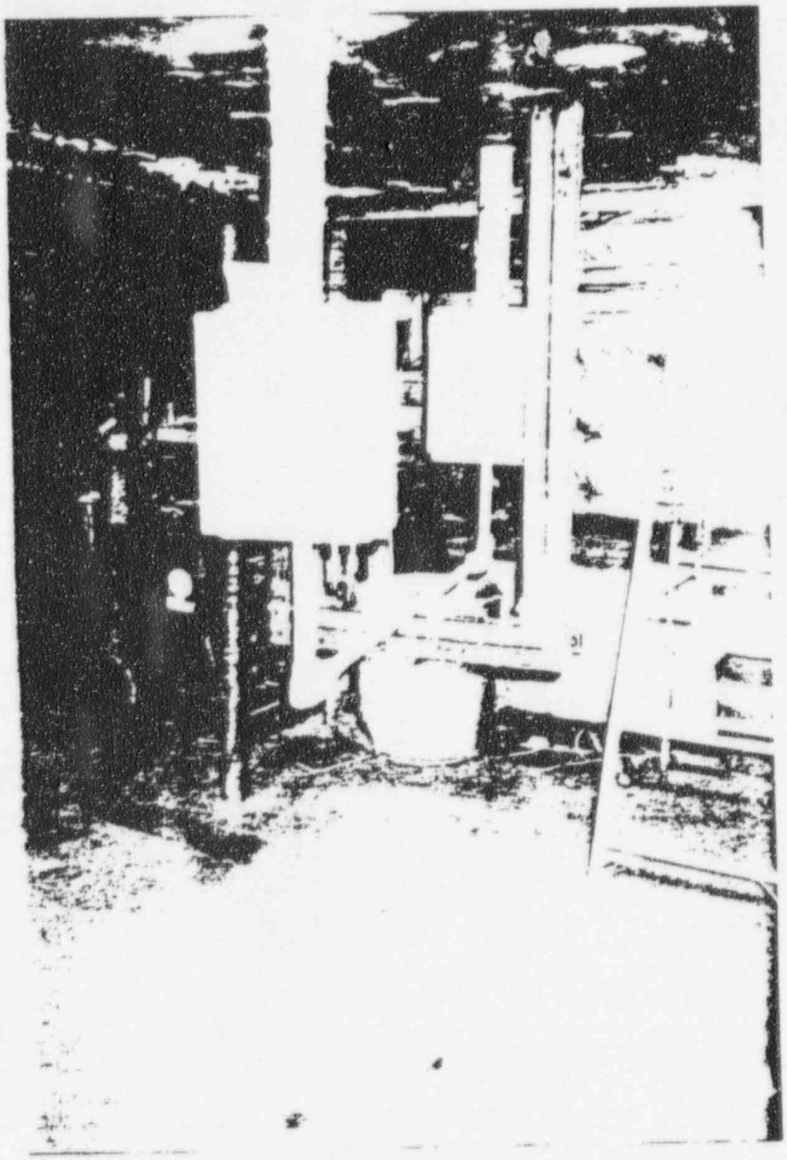


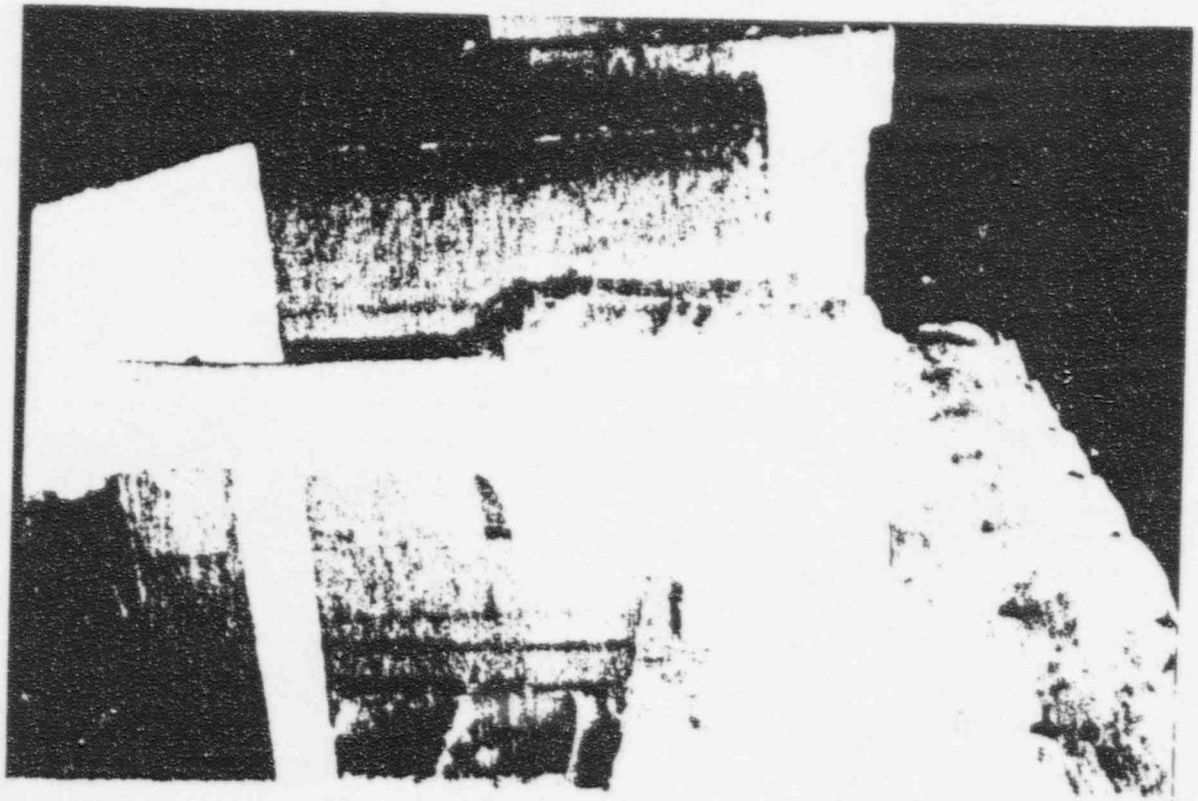


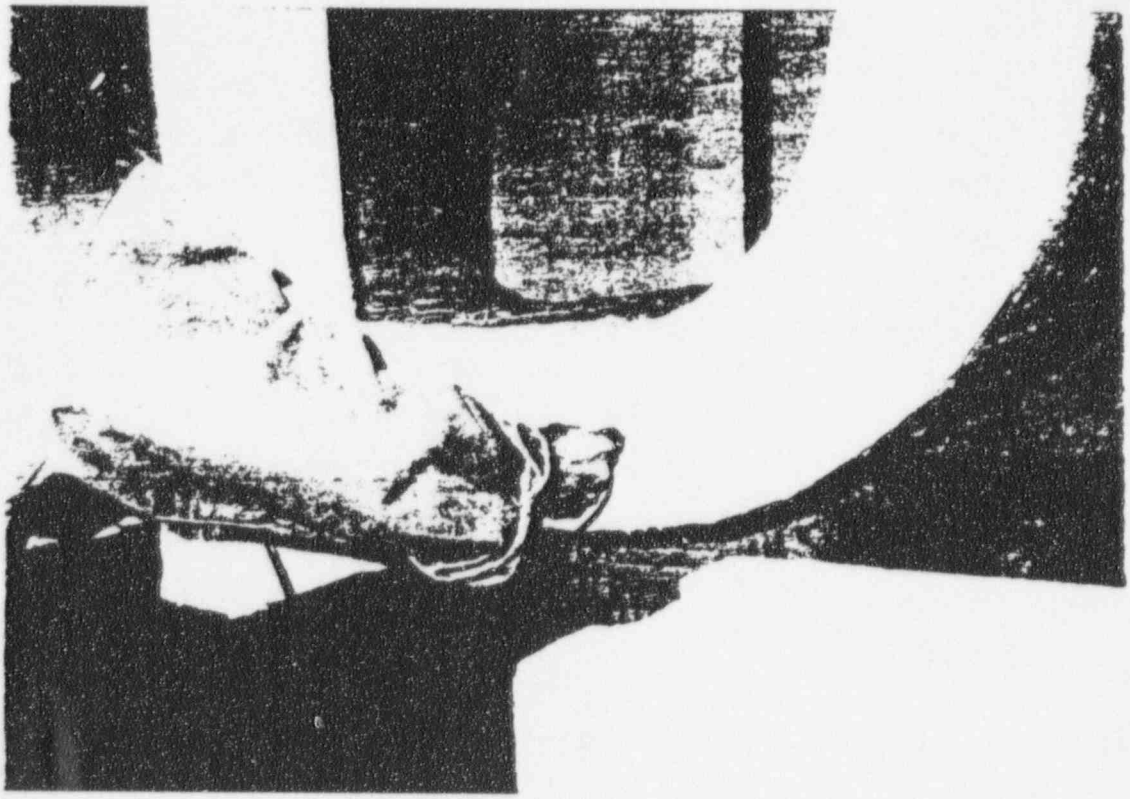


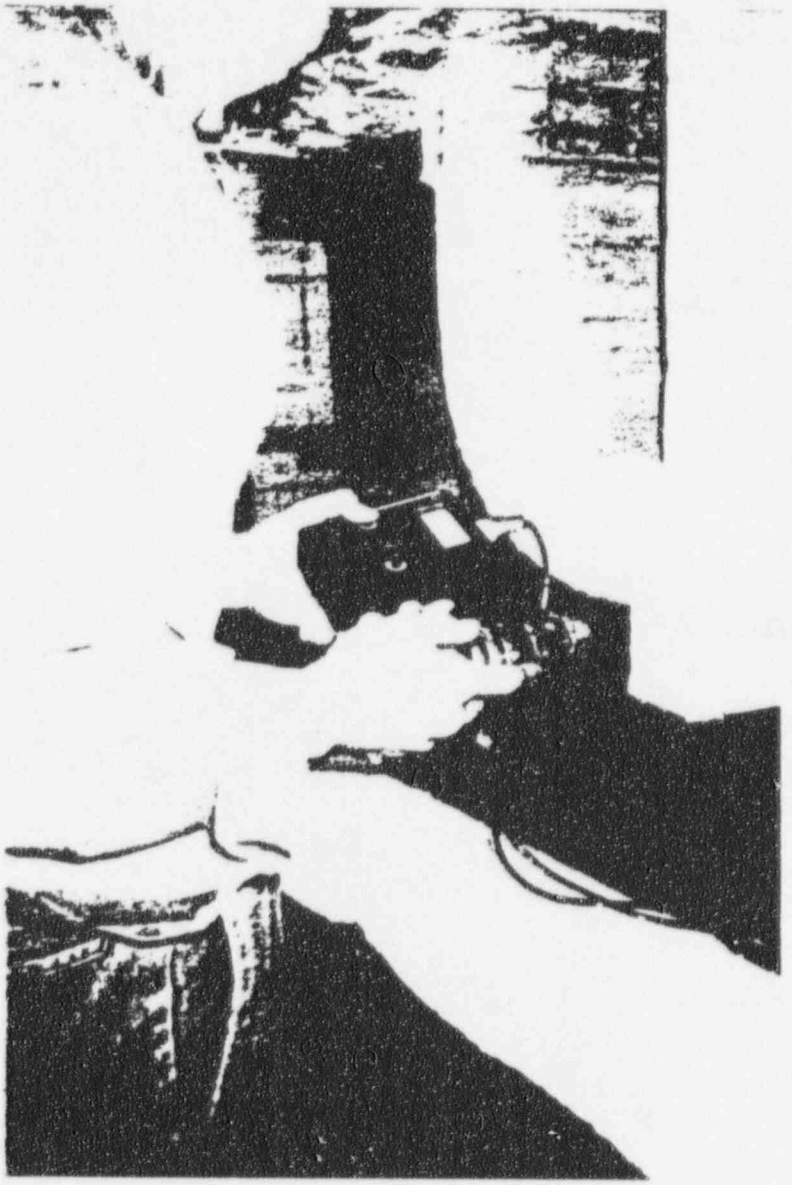


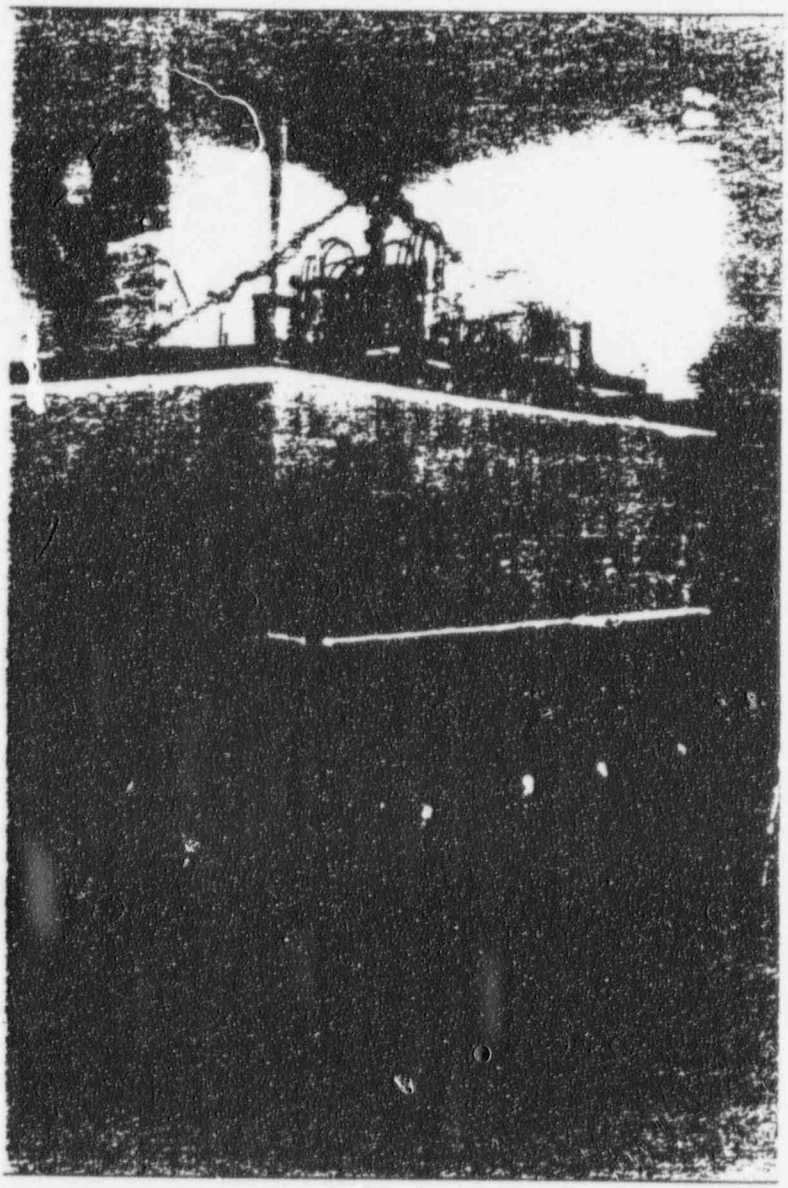












PART I – RESOLUTION OF TECHNICAL ISSUES THERMO–LAG

TECHNICAL ISSUES TO BE CONSIDERED WITH INDUSTRY

Ampacity Derating Testing and Factors Used (Issue 1.1)

Fire Test Acceptance Criteria (Issue 2.1)

Extrapolation of Fire Test Results (Issue 2.4)

Impact of Optional Products (e.g., Topcoat) Applied to Thermo–Lag on Fire Resistive Rating (Issue 2.6)

Thickness of Material Actually Fire Tested (Issue 2.7)

Review and Analysis of Fire Test Failures (Issue 2.8)

Validity and Analysis of ITL Fire Test Reports (Issue 2.9)

Deviations and Changes Installation Procedures/ Methods (Issue 3.1)

Level of Quality Control Applied During Construction (Issue 3.3)

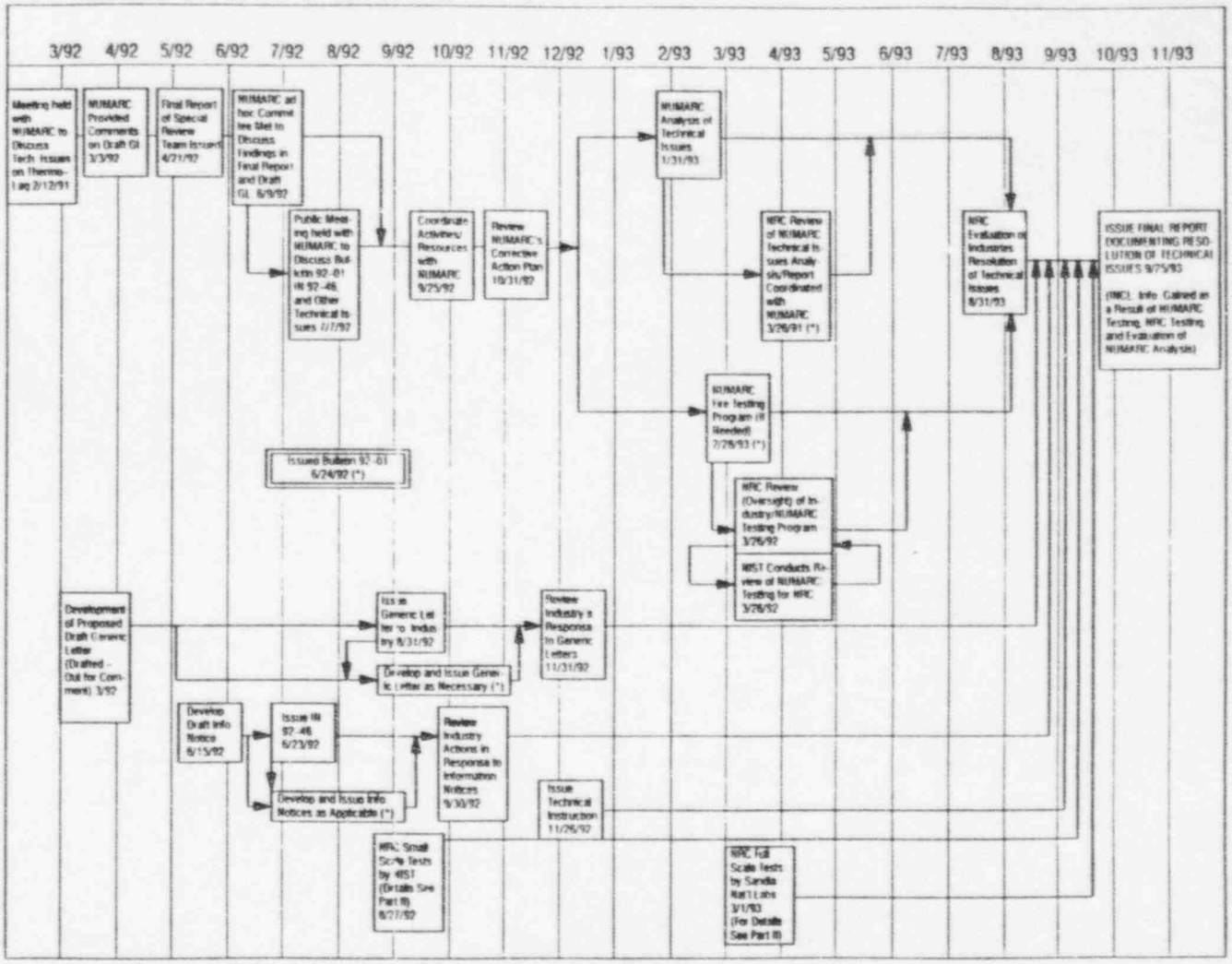
Adequacy of the Training Provided to Installers (Issue 3.4)

Adequacy of Utility's Receipt Inspection to Thermo–Lag (Issue 3.6)

Adequacy of Thermo–Lag to be an Adequate Fire Barrier (e.g., fire wall, fire barrier equipment enclosure, penetration seal) (Issue 5.1)

Acceptability of Using Stainless Steel Stress Skin (Issue 5.5)

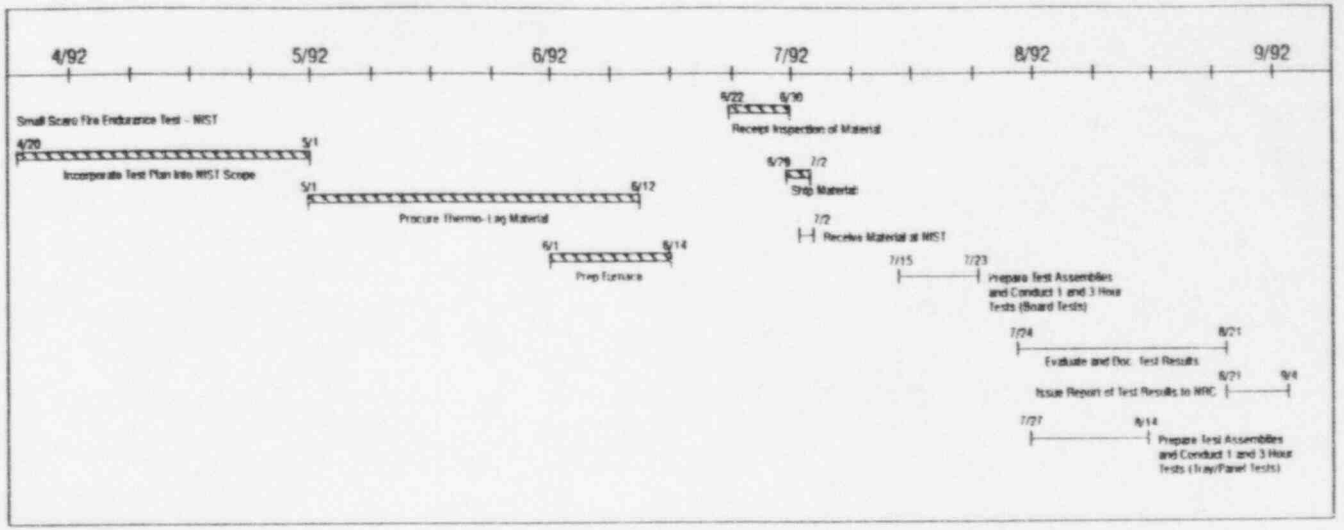
Impact the Use Thermo–Lag Installations may Have on Electrical Raceway Seismic Design Basis (Issue 5.6)

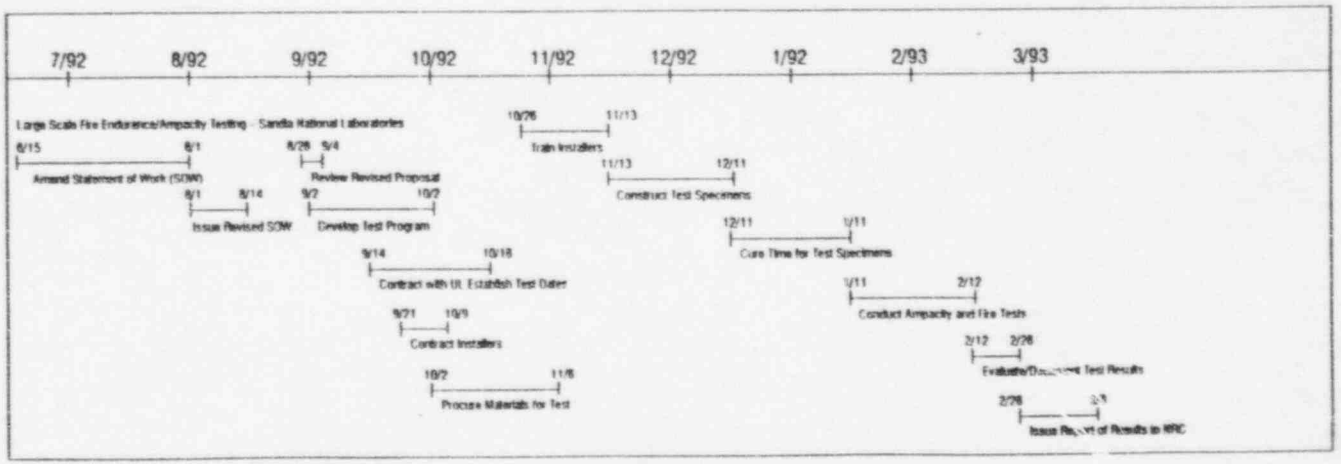


(*) As Information becomes Available Information Notices, Bulletins and Generic Letters May be Issued.

PART II – FIRE/AMPACITY TESTING

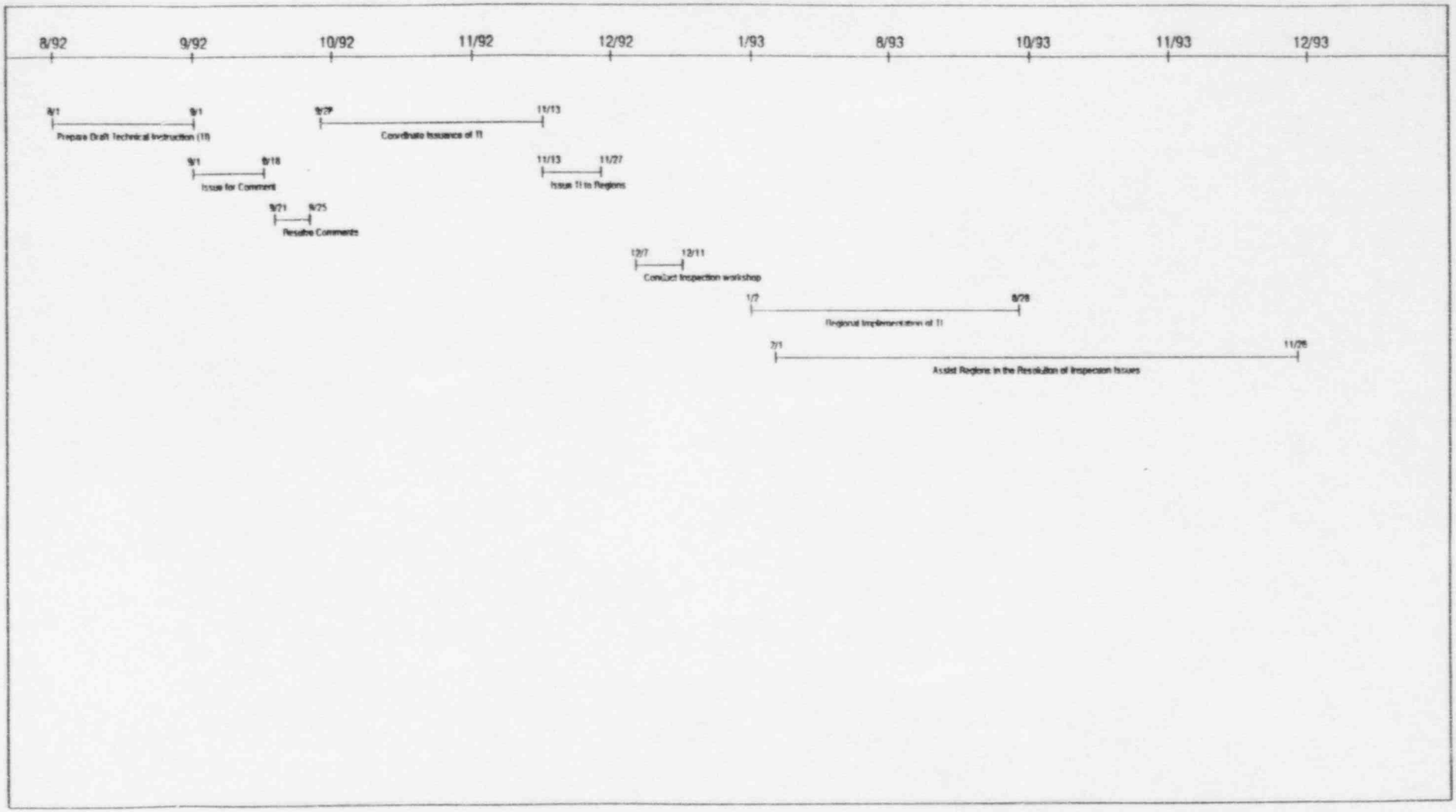
TECHNICAL ISSUES TO BE CONSIDERED WITH INDUSTRY
Ampacity Derating Testing and Factors Used (Issue 1.1)
Falsification of Ampacity Test Results (Issue 1.2)
Fire Test Acceptance Criteria (Issue 2.1)
Flaming of Thermo-Lag (Issue 2.3)
Extrapolation of Fire Test Results (Issue 2.4)
Testing Configuration Variables (Issue 2.5)
Optional Products (Issue 2.6)
Thickness Tested (Issue 2.7)
Fire Test Failures (Issue 2.8)
ITL Fire Test Reports (Issue 2.9)
Time-Temperature Curve (Issue 2.10)
Falsification of Test Results (Issue 2.11)
Installation Procedures Changes (Issue 3.1)
Joint Installation Method (Issue 3.2)
Quality Control During Construction (Issue 3.3)
Adequacy of the Training Provided to Installers (Issue 3.4)
CLOSED Toxicity of Off-Gases from Burning Thermo-Lag (Issue 4.1)
Physical Problems with Installers (Issue 4.2)
CLOSED chloride Content (Issue 5.3)





Note: "Shaded Areas" Indicate Completed Activities.

PART III – INSPECTION OF THERMO–LAG



June 22, 1992

PRELIMINARY NOTIFICATION OF EVENT OR UNUSUAL OCCURRENCE -- PNO-IV-92-29

This preliminary notification constitutes EARLY notice of events of POSSIBLE safety or public interest significance. The information is as initially received without verification or evaluation, and is basically all that is known by the Region IV staff on this date.

FACILITY: TU Electric
Comanche Peak SES, Units 1 and 2
Docket: 50-445; 50-446

Licensee Emergency Classification:
___ Notification of Unusual Event
___ Alert
___ Site Area Emergency
___ General Emergency
_X_ Not Applicable

SUBJECT: THERMOLAG INITIAL TEST RESULTS

Texas Utilities is continuing with confirmatory testing of their protective fire barrier system (Thermo-Lag) at Omega Point Labs, in San Antonio, Texas, this week. TU Electric has taken the lead in Thermo-Lag testing in order to resolve questions regarding the fire barrier's effectiveness for existing Unit 1 installations and to support the licensing of CPSES Unit 2 later this year. The utility contracted with Omega Point Labs to qualify a protective fire barrier system specifically for CPSES.

The tests consist of a series of 1-hour fire endurance tests on a variety of cable tray and conduit "mock-ups." The "mock-ups" were designed to duplicate actual plant configurations. The fire barrier was installed using stock material and actual plant procedures and personnel. Representatives from the Plant Systems Branch of NRR witnessed the preparation of test specimens at the labs in early May.

The first actual tests occurred on June 17-18, 1992. The tests were performed on 3/4-inch, 1-inch, and 5-inch conduit configurations and a 12-inch cable tray. The 3/4- and 1-inch conduit test experienced temperature readings greater than the test acceptance criteria. Subsequent inspection of the 3/4-inch and 1-inch conduit cable revealed evidence of charring and blistering. NRC standards require no physical fire damage. The 3/4-inch conduit cable suffered damage such that the corductor was visible. The 1-inch conduit cable appeared intact and passed a wet megger test. The 5-inch conduit and 12-inch cable tray both met the test acceptance criteria.

A 30-inch cable tray was tested on June 19, 1992. The Thermo-Lag installation failed during the test. The test was terminated early to assess the damage. Because of the results of the 30-inch cable tray tests, the licensee has postponed testing of the 36-inch cable tray. The licensee is considering additional testing of a modified 36-inch cable tray.

Test configurations were not developed for the 18- and 24-inch cable trays. The licensee is evaluating the applicability of the test results for the installed 18- and 24-inch cable trays. The licensee has established fire watches for all areas required for safe shutdown where Thermo-Lag is installed in Unit 1.

RIV:D:DRP
JEBeach;df
6/22/92

RA
RDMartin
6/22/92

IE 34 - 1/1

June 24, 1992

MEMORANDUM FOR: Ashok C. Thadani, Director
Division of Systems Technology

FROM: Conrad E. McCracken, Chief
Plant Systems Branch

SUBJECT: FORTHCOMING MEETING WITH NUCLEAR MANAGEMENT AND RESOURCES COUNCEL (NUMARC)

DATE & TIME: Tuesday, July 7, 1992
9:30 a.m. - 12:30 p.m.

LOCATION: U.S. Nuclear Regulatory Commission
One White Flint North, Room 16 B 11
11555 Rockville Pike
Rockville, Maryland

PURPOSE: To discuss Thermo-Lag fire barrier issues and the proposed generic letter

*PARTICIPANTS

NRC	NUMARC
A. Thadani	A. Marion
G. Holahan	(et. al.)
C. McCracken	
R. Architzel	
P. Madden	
P. Gill	

Original signed by

Conrad E. McCracken, Chief
Plant Systems Branch
Division of Systems Technology

cc: See next page

*Meetings between NRC technical staff and applicants or licensees are open for interested members of the public, petitioners, intervenors, or other parties to attend as observers pursuant to "Open Meeting Statement of NRC Staff Policy," 43 Federal Register 28058, 6/28/78.

cc:
Mr. Alex Marion, Manager
Technical Division
Nuclear Management and Resources Council
1776 Eye Street, N.W. Suite 300
Washington, D.C. 20006-2496

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6/24/92	6/24/92	6/24/92

[G:\meetnote]

Enclosure

NRC/NUMARC MANAGEMENT MEETING AGENDA

July 7, 1992

1. INTRODUCTION

2. NRC discussion of Bulletin Number 92-01:

   Failure of Thermo-Lag 330 Fire Barrier System to Maintain Cabling in Wide Cable Trays and Small Conduits Free From Fire Damage

3. NUMARC discussion of NRC Bulletin Number 92-01

4. Discuss current status of other Thermo-Lag fire barrier issues

5. NUMARC presentation on industry initiatives and planned actions to resolve Thermo-Lag fire barrier issues

6. Discuss specific NUMARC comments on Draft Generic Letter 92-XX, "Thermo-Lag Fire Barriers"

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

June 26, 1992

MEMORANDUM FOR: All NRR Project Managers

FROM: James G. Partlow
Associate Director for Projects
Office of Nuclear Reactor Regulation

SUBJECT: MPA X-201, NRC BULLETIN NO. 92-01, FAILURE OF THERMO-LAG 330 FIRE BARRIER SYSTEM TO MAINTAIN CABLING IN WIDE CABLE TRAYS AND SMALL CONDUITS FREE FROM FIRE DAMAGE.

On June 24, 1992, NRC Bulletin 92-01 (Enclosure 1) was sent to all operating reactor licensees and holders of construction permits. The bulletin requests that licensees promptly identify and implement compensatory measures, as appropriate, to address the failure of Thermo-Lag 330 fire barrier system to maintain cabling free from fire damage.

Specifically, the bulletin requires all holders of operating licenses, immediately upon receipt of the bulletin, to: (1) determine which plant areas contain Thermo-Lag fire barrier systems installed on small conduits or wide trays; and (2) implement compensatory measures, such as fire watches, in accordance with plant procedures, consistent with those which would be implemented by either plant technical specifications or an operating license condition for an inoperable fire barrier. In addition, licensees, within 30 days after receiving the bulletin, must provide a written notification stating whether they have Thermo-Lag 330 fire barrier systems in their facilities and whether they have taken the requested actions and describing the measures they plan to take to restore fire barrier operability.

Licensees who cannot implement established compensatory measures in accordance with the bulletin for specific cases (e.g., high radiation areas, etc.) should provide verbal notification and document the reasons in a docketed letter which provides the basis and proposed alternatives to achieve an equivalent level of protection. These letters are to be forwarded by licensees without delay and should provide enough detail for the staff to make a determination of acceptability. The specific cases will be evaluated individually by the lead technical reviewers. In these instances, a Temporary Waiver of Compliance (TWOC) may be warranted and will be evaluated in accordance with established procedures. Project managers should coordinate activities associated with the request for a TWOC as well as assuring that the reviewers receive a copy of the letter. A copy should also be provided to the lead project manager.

An individual TAC No. for MPA X-201 has been established for each plant (Enclosure 2). Other instructions on how the MPA can be closed out will be provided at a later date. The technical contacts for this MPA are

Contact:
A. S. Masciantonio, NRR
504-1337

Ralph Architzel (504-2804) and Pat Madden (504-2854) in the Plant Systems Branch. The lead project manager is Armand Masciantonio (504-1337) in Project Directorate III-1.

Enclosure 3, Thermo-Lag Questions and Answers, was developed by the Plant Systems Branch for the Office of Public Affairs. It is included solely as additional background information for the project manager's personal use.

Original signed by

James G. Partlow
Associate Director for Projects
Office of Nuclear Reactor Regulation

Enclosures:
1. NRC Bulletin 92-01
2. List of Tac Nos.
3. Thermo-Lag Questions and Answers

cc w/enclosures:
J. Taylor
H. Thompson
J. Sniezek
J. Partlow, NRR
W. Russell
Division Directors, NRR
Asst. Directors, NRR
Project Directors, NRR
Regional Administrators
C. Berlinger
S. Treby, OGC
J. Conran, CRGR

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OFFICE	ADP
NAME	JPartlow
DATE	6/26/92

ENCLOSURE 1

OMB No.: 3150-0012
NRCB 92-01

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555

June 24, 1992

NRC BULLETIN NO. 92-01: FAILURE OF THERMO-LAG 330 FIRE BARRIER SYSTEM TO MAINTAIN CABLING IN WIDE CABLE TRAYS AND SMALL CONDUITS FREE FROM FIRE DAMAGE

Addressees

For Action:

All holders of operating licenses for nuclear power reactors.

For Information:

All holders of construction permits for nuclear power reactors.

Purpose

This bulletin notifies you of failures in fire endurance testing associated with the Thermo-Lag 330 fire barrier system that is installed to protect safe shutdown capability, requests all operating reactor licensees to take the recommended actions, and requires that these licensees provide the U.S. Nuclear Regulatory Commission (NRC) with a written response describing the actions taken associated with this bulletin.

Background

On August 6, 1991, the NRC issued Information Notice (IN) 91-47, "Failure of Thermo-Lag Fire Barrier Material To Pass Fire Endurance Test," which provided information on the fire endurance tests performed by the Gulf States Utilities Company on Thermo-Lag 330 fire barrier systems installed on wide aluminum cable trays and the associated failures. On December 6, 1991, the NRC issued Information Notice 91-79, "Deficiencies In The Procedures For Installing Thermo-Lag Fire Barrier Material," which provided information on deficiencies in procedures that the vendor (Thermal Science, Inc.) provided for installing Thermo-Lag 330 fire barrier material. As a result of on-going concerns associated with the indeterminate qualifications of Thermo-Lag 330 fire barrier installations, on June 23, 1992, the NRC issued Information Notice 92-46, "Thermo-Lag Fire Barrier Material Special Review Team Final Report Findings, Current Fire Endurance Testing, and Ampacity Calculation Errors."

Description of Circumstances

Upon reviewing INs 91-47 and 91-79, Texas Utilities (TU) Electric instituted a fire endurance testing program to qualify its Thermo-Lag 330 electrical

raceway fire barrier systems for its Comanche Peak Steam Electric Station. The testing was performed during the weeks of June 15 and June 22, 1992.

TU Electric's test program consisted of a series of 1-hour fire endurance tests (using the ASTM-E119 Standard Time Temperature Curve) on a variety of cable tray and conduit "mock-ups." TU Electric designed these "mock-ups" or test articles to duplicate existing installed plant configurations. Plant personnel used stock material to construct the test articles. The Thermo-Lag fire barrier installation on the test articles was performed in accordance with TU Electric's Thermo-Lag installation procedures. These procedures were developed from the vendor's recommended installation procedures.

The Thermo-Lag fire barrier systems for the TU Electric test articles were constructed using pre-formed 1-hour Thermo-Lag 330 panels and conduit shapes. The joints and seams were constructed by pre-buttering seams and joints with trowel grade Thermo-Lag 330-1 and holding the assembly together with stainless steel banding.

On June 17, 1992, the first test article was tested. This article consisted of a junction box with a 3/4-, 1-, and 5-inch conduit entering and exiting through the junction box. Throughout the 1-hour fire endurance test, the cabling routed inside the conduits was monitored in accordance with the American Nuclear Insurer's criteria for low voltage circuit integrity and continuity. Throughout the test, none of the cables experienced a failure in circuit integrity. The licensee noted that the thermocouple temperature on the inside cover of the junction box on the unexposed side reached 539 °F and that hot spots (temperatures on the cable in excess of 500 °F) on the 3/4-inch conduit and the 1-inch conduit developed. On June 18, 1992, the cables were pulled from the test article. There were no visible signs of thermal degradation on the cables routed in the 5-inch conduit. The cable inside the 3/4-inch conduit was thermally damaged in two locations and cable in the 1-inch conduit was damaged in one location.

On June 18, 1992, TU Electric performed a 1-hour fire endurance test on a 12-inch wide tray configuration. Preliminary test result information indicated that the configuration passed the test satisfactorily. Throughout the fire endurance test, the thermocouple temperatures on the cables inside the test article were less than 325 °F.

On June 19, 1992, a 30-inch wide ladder back tray configuration was tested. At 17 minutes into the test, the Thermo-Lag 330 panel on the bottom of the test article began to sag. At 18 minutes, the joint at the interface between the tray support and the tray showed signs of weakening and separation. The internal temperatures within areas of the test article showed signs of exceeding 325 °F at 25 minutes. The joint fully separated in 41 minutes resulting in cable circuit integrity failure and fire damage to the cables.

Discussion

Section 50.48(a) of Title 10 of the Code of Federal Regulations (10 CFR 50.48(a)) requires that each operating nuclear power plant have a fire

protection plan that satisfies Appendix A to 10 CFR Part 50, General Design Criteria (GDC) 3, "Fire Protection." GDC 3 requires 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. In 10 CFR 50.48(b), the NRC states that Appendix R to 10 CFR Part 50 establishes fire protection features required to satisfy Criterion 3 of Appendix A to 10 CFR Part 50 for certain generic issues for nuclear power plants licensed to operate prior to January 1, 1979. Sections III.G, III.J, and III.O of Appendix R are applicable to nuclear power plants licensed to operate prior to January 1, 1979. In 10 CFR 50.48(e), the NRC requires that all plants licensed to operate after January 1, 1979, shall complete all fire protection modifications needed to satisfy Criterion 3 to Appendix A of 10 CFR Part 50 in accordance with the provisions of their operating licenses.

NRC-approved plant fire protection programs as referenced by the Plant Operating License Conditions and Appendix R to 10 CFR Part 50, Section III G.1.a, "Fire Protection of Safe Shutdown Capability," require one train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control stations to be free from fire damage.

To ensure that electrical cabling and components are free from fire damage, Section III G.2 of Appendix R requires the separation of safe shutdown trains by separation of cables and equipment and associated circuits of redundant trains by a fire barrier having a 3-hour rating or enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating. In addition to providing the 1-hour barrier, fire detection and an automatic fire suppression system shall be installed in the fire area.

Under fire conditions, the thermal degradation of an electrical raceway fire barrier system, such as the Thermo-Lag system, could lead to both trains of safe shutdown systems being damaged by fire. This may significantly affect the plant's ability to achieve and maintain hot standby/shutdown conditions.

The NRC considered the failures of the recent Thermo-Lag fire barrier fire endurance testing and has determined that the 1- and 3-hour pre-formed assemblies installed on small conduit and wide cable trays (wider than 14 inches) do not provide the level of safety as required by NRC requirements.

Requested Actions

All holders of operating licenses for nuclear power reactors, immediately upon receiving this bulletin, are requested to take the following actions:

1. For those plants that use either 1- or 3-hour pre-formed Thermo-Lag 330 panels and conduit shapes, identify the areas of the plant which have Thermo-Lag 330 fire barrier material installed and determine the plant areas which use this material for protecting either small diameter conduit or wide trays (widths greater that 14 inches) that provide safe shutdown capability.

2. In those plant areas in which Thermo-Lag fire barriers are used to protect wide cable trays, small conduits, or both, the licensee should implement, in accordance with plant procedures, the appropriate compensatory measures, such as fire watches, consistent with those which would be implemented by either the plant technical specifications or the operating license for an inoperable fire barrier.

3. Each licensee, within 30 days of receiving this bulletin, is required to provide a written notification stating whether it has or does not have Thermo-Lag 330 fire barrier systems installed in its facilities. Each licensee who has installed Thermo-Lag 330 fire barriers is required to inform the NRC, in writing, whether it has taken the above actions and is required to describe the measures being taken to ensure or restore fire barrier operability.

Backfit Discussion

These types of fire barriers are currently installed at operating power reactor sites and are required to meet either a condition of a plant's operating license or the requirements of Section III.G of Appendix R to 10 CFR Part 50. The actions requested by this bulletin do not represent a new staff position but are considered necessary to bring licensees into compliance with existing NRC rules and regulations where these test results are relevant. Therefore, this bulletin is being issued as a compliance backfit under the terms of 50.109(a)(4). In addition, pursuant to the Charter of the Committee to Review Generic Requirements (CRGR), this bulletin is being issued as an immediately effective action (10 CFR 50.109(a)(6)). This bulletin is being issued with the knowledge of the CRGR.

Address the required written reports to the U. S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555, under oath or affirmation under the provisions of Section 182a, Atomic Energy Act of 1954, as amended and 10 CFR 50.54(f). In addition, submit a copy to the appropriate regional administrator.

This request is covered by Office of Management and Budget Clearance Number 3150-0012, which expires June 30, 1994. The estimated average number of burden hours is 60 person hours for each licensee response, including those needed to assess the new recommendations, search data sources, gather and analyze the data, and prepare the required letters. This estimate of the average number of burden hours pertains only to the identified response-related matters and does not include the time needed to implement the requested action. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Information and Records Management Branch, Division of Information Support Services, Office of Information Resources Management, U. S. Nuclear Regulatory Commission, Washington, D.C. 20555, and to the Paperwork Reduction Project (3150-0011), Office of Information and Regulatory Affairs, NEOB-3019, Office of Management and Budget, Washington, D.C. 20503.

Although no specific response is required with respect to the following information, the following information would assist the NRC in evaluating the cost of complying with this bulletin:

(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 requested reports and documentation;

(3) the additional short-term costs incurred to address the inspection findings such as the costs of the corrective actions or the costs of down time; and

(4) an estimate of the additional long-term costs that will be incurred as a result of implementing commitments such as the estimated costs of conducting future inspections or increased maintenance.

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

Charles E. Rossi

Charles E. Rossi, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical contacts: Ralph Architzel, NRR
(301) 504-2804

Patrick Madden, NRR
(301) 504-2854

Attachment:
List of Recently Issued NRC Bulletins

POLICY ISSUE
(Information)

June 24, 1992

SECY-92-227

For: The Commissioners

From: James M. Taylor
Executive Director for Operations

Subject: THE FAILURE OF THE THERMO-LAG FIRE BARRIER SYSTEM TO MAINTAIN CABLING IN WIDE TRAYS AND SMALL CONDUITS FREE FROM FIRE DAMAGE

Purpose: To inform the Commission that the staff is issuing NRC Bulletin 92-01, "Failure of Electrical Raceway Thermo-Lag Fire Barrier Systems to Maintain Cabling in Wide Trays and Small Conduits Free From Fire Damage," to all holders of operating licenses or construction permits for nuclear power reactors. The staff is issuing this bulletin to inform each licensee of failures in fire endurance testing associated with Thermo-Lag 330 fire barrier system and that certain immediate actions are required to be taken by licensees to compensate for the reduced level of fire safety afforded by these barrier systems. A copy of the NRC bulletin is enclosed.

Discussion: Section III.G of Appendix R to 10 CFR Part 50, contains the requirements for assuring that one train of safe shutdown capability at each nuclear power reactor is free from fire damage. Section

CONTACT:
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NOTE: TO BE MADE PUBLICLY AVAILABLE IN 10 WORKING DAYS FROM THE DATE OF THIS PAPER

DESIGNATED ORIGINAL

Certified By G.T. 6/24/92

III.G of Appendix R allows the separation of redundant safe shutdown trains either by separating the trains with a barrier rated for 3-hour fire endurance or by enclosing one safe shutdown train in a barrier rated for 1-hour fire endurance. If the licensee chooses the 1-hour barrier, they must also provide fire detection and automatic fire suppression capability for the specific plant area.

During the week of June 15, 1992, TU Electric conducted 1-hour fire endurance tests on Thermal-Lag 330 fire barrier systems installed on conduits and cable trays at its Comanche Peak facility. The results of this testing indicated that the Thermo-Lag fire barrier systems installed on the 3/4- and 1-inch conduits and the 30-inch wide cable tray test articles failed to preclude fire damage to the cabling routed inside the raceway.

Upon considering the insights gained from the recent Thermo-Lag fire endurance testing, the staff concludes fire degradation to Thermal-Lag fire barrier systems installed on small diameter conduits and wide trays could result in fire damage to both trains of a safe shutdown system. The staff has determined that the 1- and 3-hour Thermo-Lag systems do not provide the level of safety specified by NRC regulations.

Licensee actions requested by the bulletin include the following: (1) determine which plant areas contain Thermo-Lag fire barrier systems installed on small conduits or wide trays; and (2) implement compensatory measures, such as fire watches, in accordance with plant procedures, consistent with those which would be implemented by either plant technical specifications or an operating license condition for an inoperable fire barrier. In addition, licensees, within 30 days after receiving the bulletin, must provide a written notification stating whether they have Thermo-Lag 330 fire barrier systems in their facilities and whether they have taken the requested actions and describing the measures they plan to take to restore fire barrier operability.

On June 23, 1992, the staff informed the Committee to Review Generic Requirements (CRGR) of the bulletin and CRGR recommended in favor of its prompt issuance. To ensure that each licensee maintains an appropriate level of plant fire safety until these barriers can be restored to an operable status the staff has issued this bulletin in accordance with emergency provisions of the CRGR Charter.

Coordinaton: The Office of the General Counsel has reviewed the attached bulletin and has no legal objections.

James M. Taylor
Executive Director
for Operations

Enclosure:
NRC Bulletin 92-01, Failure of Thermo-Lag Fire Barrier 330 System to Maintain Cabling in Wide Cable Trays and Small Conduits Free From Fire Damage

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