

NORTHEAST UTILITIES



THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

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February 11, 1994

Docket Nos. 50-213
50-245
50-336
50-423
B14738

Re: GL 92-08

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Gentlemen:

Haddam Neck Plant
Millstone Nuclear Power Station, Unit Nos. 1, 2, and 3
Response to Request for Additional Information Regarding
Generic Letter 92-08, "Thermo-Lag 330-1 Fire Barriers,"
Pursuant to 10CFR50.54(f)

INTRODUCTION

The NRC Staff's letter of December 21, 1993,⁽¹⁾ requested additional information on the configuration and amounts of Thermo-Lag fire barrier material installed in the Haddam Neck Plant and Millstone Unit Nos. 1, 2, and 3. The NRC letter also requested information on the cable loadings within particular areas where Thermo-Lag is used. This information was requested by the NRC Staff to support resolution of issues identified in Generic Letter 92-08, "Thermo-Lag 330-1 Fire Barriers".

The Connecticut Yankee Atomic Power Company (CYAPCO) and Northeast Nuclear Energy Company (NNECO) are dedicated to the resolution of the Thermo-Lag issue and have assembled the requested information, where available, for the Haddam Neck Plant and Millstone Unit Nos. 1 and 2. As documented in our January 3, 1994,⁽²⁾ letter, Millstone Unit No. 3 currently does not rely on Thermo-Lag.

- (1) L. J. Callan letter to J. F. Opeka, "Request for Additional Information Regarding Generic Letter 92-08, 'Thermo-Lag 330-1 Fire Barriers,' Pursuant to 10CFR50.54(f)—Haddam Neck Plant and Millstone Units 1, 2, and 3 (TAC Nos. M85555, M85570, M85571, M85572)," dated December 21, 1993.
- (2) J. F. Opeka letter to the U.S. Nuclear Regulatory Commission, "Revised Response on the Use of Thermo-Lag," dated January 3, 1994.

Aug 11

CYAPCO and NNECO have provided our results in a tabular form to facilitate NRC Staff review. In order to comply with this request for information in an orderly fashion, we have identified each installation as a commodity type; that is, either a conduit, junction box, tray, group commodity, or air drop. There are many cases where a single wrapped component is reiterated since that commodity travels through multiple fire areas or a single cable is transported through a conduit, a tray, and a junction box. CYAPCO and NNECO have identified each raceway type as a separate commodity to facilitate identification of its installed attributes. In instances where a minor occurrence of a different commodity is present, such as a flat board used to enclose an elbow on a conduit run, this information was not specifically identified.

Located behind the tables are photographs, where available, of commodities which use Thermo-Lag. These photographs can be used in conjunction with the Thermo-Lag tables. The dimensions presented are as accurate as possible, given the time constraints to prepare this information.

CYAPCO and NNECO continue to believe, based on the preliminary test results, that our Thermo-Lag fire barriers are operable, but potentially degraded in that the systems and components protected by Thermo-Lag are still able to perform the intended safety function. CYAPCO and NNECO recognize that these installations may not be qualified to meet the requirements of 10CFR50, Appendix R. However, as currently noted by both the NRC and Nuclear Management and Resources Council (NUMARC), this issue is dynamic. As additional information is made available, our results and conclusions presented herein are subject to change. CYAPCO and NNECO have responded to all NRC requests for information, with the best available information. In some instances, CYAPCO and NNECO could not respond due to lack of information. Those portions of our response which are preliminary or to which we are unable to respond are identified as such in the attached tables.

Thermo-Lag Fire Barrier Configurations and Amounts

Thermo-Lag material used at the Haddam Neck Plant and at Millstone Unit Nos. 1 and 2 is comprised of 1-inch thick (nominal), three-hour rated board, and three-hour rated conduit pre-shaped sections. This three-hour rated material was used even in applications which only require a one-hour barrier. As noted previously, Millstone Unit No. 3 has made physical plant modifications, which have resulted in the removal of Thermo-Lag.

The dimensions presented in the attached tables are illustrative of the amount of Thermo-Lag material present and should not be used to convey actual dimensions.

Important Barrier Parameters

The installation details, such as joining methods and gap sizes, were confirmed, wherever possible, via observations of installed commodities.

Where these details were not apparent, installation documentation was reviewed, or interviews were conducted with the installers if available. Cable size, cable type, cable fill and jacket type were derived from unit raceway schedules and plant design documents. The distribution of cables within a raceway system for Millstone Unit Nos. 1 and 2 is as described in the Millstone Unit No. 2 Final Safety Analysis Report (FSAR). In the cases presented herein, the Millstone Unit No. 2 FSAR is applicable for Millstone Unit No. 1 since the subject cables are part of a backfeed from Unit 2. The distribution of cables at the Haddam Neck Plant was per the National Electric Code.

With respect to the maximum operating temperature for the cables, this variable is time dependent and, therefore, is not listed on the attached tables.

Acceptability of the commodities that are bounded by the NUMARC/Industry tests will be determined after NUMARC finalizes their test plan, the test results are analyzed, and the "Application Guide" is published. Future testing could identify additional parameters of importance, or demonstrate that some of the discussed parameters have minimal safety significance. CYAPCO and NNECO, therefore, emphasize the preliminary nature of the results included in the attached tables. CYAPCO and NNECO will modify these tables or similar data, as necessary to incorporate new findings as the information becomes available.

Thermo-Lag Fire Barriers Outside the Scope of the NUMARC Program

CYAPCO and NNECO have been pro-active in reducing our reliance on Thermo-Lag. As indicated in our January 3, 1994, letter, modifications have been made at Millstone Unit No. 3 such that Thermo-Lag is now not used. In addition, at the Haddam Neck Plant and Millstone Unit Nos. 1 and 2, action has been taken to decrease reliance on Thermo-Lag. Currently, as stated in previous CYAPCO and NNECO correspondence, compensatory measures remain in effect and no further corrective action is planned until the full scope of testing is complete, and the NUMARC Application Guide is accepted by NRC.

Ampacity Derating

The ampacity derating values used by CYAPCO and NNECO for cable tray, conduit and air drop are as follows: (1) encased cables in tray is 42.3 percent derated from cable full ampacity; (2) encased cables in conduit is 14.5 percent derated from cable full ampacity; (3) encased cables (air drop) is 42.3 percent derated from cable full ampacity.

These values are linear extrapolations from Texas Utilities (TU) tests, which arrived at 31.7 percent derated for cables in tray and air drops and 10.9 percent for cables in conduit.

Since the TU cable tray test was performed with more than a three conductor fill, further derating of cables does not have to be applied to this

configuration. TU cables in conduits and air drop tests contained only three conductors, therefore, further derating required by the National Electric Code 70, Table 310-16, Note 8, must be applied.

The maximum derated amperage for the cables listed represents the theoretical maximum continuous load that could be applied to the cable. This is not the actual load placed on the cable, which is much lower. The theoretical maximum load was used in this response since it represents the most conservative worst-case load, to compensate for any loss of margin due to the unknowns in the non-tested 1-inch Thermo-Lag derating factor.

In a few instances, the derated cable maximum amperage value is exceeded. It is important to remember that this deviation would be for a very short duration. If an under-voltage condition was not postulated, all cables would remain within preset limits. Further, the cables used at the Units are rated at 90°C for continuous duty. Operation at 98°C for a short period of time will have no effect on their operability.

CYAPCO and NNECO will revise these results dependent upon the results of the NUMARC three-hour ampacity duration tests.

Alternates

Three currently undefined factors must be considered in determining whether upgrades using additional Thermo-Lag materials are practical, and what alternatives would be most appropriate in case Thermo-Lag upgrades cannot be developed:

1. Test and acceptance criteria have not been finalized and issued by NRC. Proposed draft criteria contain new conservatisms in fire test methods and acceptance criteria that could affect the scope and complexity of upgrades to installed barriers. The content of the final criteria, and the resulting impact on CYAPCO and NNECO specific action plans, is uncertain.
2. Complete NUMARC Phase 2 test results will not be known until the mid-March time frame. Results of baseline (as installed) and upgraded test configurations from Phase 2 must be considered to determine appropriate action plans to address specific configurations. Moreover, further generic testing may be undertaken following Phase 2, as noted previously.
3. The NUMARC Application Guideline, to be finalized by mid-April, will include a matrix of important performance parameters and bounding conditions. Discussion with the NRC will be necessary to reach agreement upon the selection of comparison parameters and bounding conditions. The results of these NRC interactions will define the final content and would directly impact the generic applicability of a given test to an installed configuration.

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Further, the NRC Staff letter provided only a partial listing of resolution alternatives. If necessary, CYAPCO and NNECO will implement the most appropriate approach to rectify this issue.

Schedules

Due to the uncertainties noted in many of the items above, a detailed integrated schedule currently can not be developed. CYAPCO and NNECO will continue to work with NUMARC and the NRC in resolution of these issues. When these issues are better defined, a detailed integrated schedule will be developed. CYAPCO and NNECO are currently anticipating that the Phase 2 test report and Application Guide will be issued in April 1994. Should ampacity testing be needed, CYAPCO and NNECO anticipate this issue to be performed in the summer of 1994.

Sources and Correctness of Information

The information used in the attached report was obtained and verified by plant walkdowns, drawing reviews, and personnel interviews. In certain instances, data could not be verified since it would result in the destruction of the commodity.

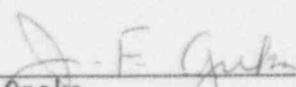
Conclusion

CYAPCO and NNECO are committed to resolve the Thermo-Lag issue at our plants. As was documented in our January 3, 1994, letter, NNECO and CYAPCO will take the necessary appropriate steps which, at Millstone Unit Nos. 1 and 2, and Haddam Neck will include, in certain instances, removal or other suitable action in addressing the Thermo-Lag issue. As finalized test reports are issued, or as additional accepted data is published, CYAPCO and NNECO will revise the attached tables or provide an alternative document.

If you should have any questions on the above or attached, please contact my staff.

Very truly yours,

CONNECTICUT YANKEE ATOMIC POWER COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY



J. F. Opeka
Executive Vice President

Attachments
cc: See Page 6

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cc: T. T. Martin, Region I Administrator
A. B. Wang, NRC Project Manager, Haddam Neck Plant
J. W. Andersen, NRC Acting Project Manager, Millstone Unit No. 1
G. S. Vissing, NRC Project Manager, Millstone Unit No. 2
V. L. Rooney, NRC Project Manager, Millstone Unit No. 3
D. H. Jaffe, NRC Project Manager, Millstone Station
W. J. Raymond, Senior Resident Inspector, Haddam Neck Plant
P. D. Swetland, Senior Resident Inspector, Millstone Unit Nos. 1, 2,
and 3

Subscribed and sworn to before me

this 11 day of February 1994

Lorraine J. D'Amico

Date Commission Expires: 3/31/98

Docket Nos. 50-213
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Attachment 1

Haddam Neck Plant
Millstone Nuclear Power Station, Unit Nos. 1, 2, and 3

Response to Request for Additional Information
Regarding Generic Letter 92-08,
"Thermo-Lag 330-1 Fire Barriers"

February 1994

TSI - Thermo-Lag Commodity Index

PLANT	COMMODITY NO.	PLANT AREA	COMMODITY TYPE
Millstone Unit One	T-3C-1	TBCCW Area	Conduit - 3Hr.
Millstone Unit One	T-3C-2	TBCCW Area	Conduit - 3Hr.
Millstone Unit One	T-3C-3	TBCCW Area	Grouped Conduit - 3Hr.
Millstone Unit One	T-3C-4	TBCCW Area	Grouped Conduit - 3Hr.
Millstone Unit One	T-6-1	Aux Boiler Area	Junction Box - 1Hr.
Millstone Unit One	M-17-1	Manhole 17	Air Drop - N/A
Millstone Unit One	T-12C-1	Lower HVAC Area	Conduit - N/A
Millstone Unit Two	T-9-1	Cable Vault	Tray - 1Hr.
Millstone Unit Two	A-24-1	Cable Spreading	Air Drop - 1Hr.
Millstone Unit Two	A-24-2	Cable Spreading	Tray - 1Hr.
Millstone Unit Two	A-24-3	Cable Spreading	Air Drop - 1Hr.
Millstone Unit Two	A-24-4	Cable Spreading	Tray - 1Hr.
Millstone Unit Two	A-24-5	Cable Spreading	Tray - 1Hr.
Millstone Unit Two	A-24-6	Cable Spreading	Conduit - 1Hr.
Millstone Unit Two	A-24-7	Cable Spreading	Conduit - 1Hr.
Millstone Unit Two	T-1A-1	14'-6" Turbine Bldg.	Conduit - 3Hr.
Millstone Unit Two	T-1A-2	14'-6" Turbine Bldg.	Tray - 3Hr.
Millstone Unit Two	T-1A-3	14'-6" Turbine Bldg.	Tray - 3Hr.
Millstone Unit Two	T-1A-4	14'-6" Turbine Bldg.	Conduit - 3Hr.
Millstone Unit Two	T-1C-1	31'-6" Turbine Bldg.	Group Tray/Cond.-3Hr.
Millstone Unit Two	T-1C-2	31'-6" Turbine Bldg.	Conduit - 3Hr.
Millstone Unit Two	T-1F-1	54'-6" Turbine Bldg.	Tray - 3Hr.
Millstone Unit Two	A-6A&B-1	Charging Area	Conduit - 3Hr.
Millstone Unit Two	A-6A&B-2	Charging Area	Tray - 3Hr.

PLANT	COMMODITY NO.	PLANT AREA	COMMODITY TYPE
Millstone Unit Two	A-6A&B-3	Charging Area	Air Drop - 3Hr.
Millstone Unit Two	T-7-1	Switchgear Area	Tray - 3Hr.
Millstone Unit Two	T-7-2	Switchgear Area	Junction Box - 3Hr.
Haddam Neck	A-1EF-1	RHR Pump Pit	Conduit - N/A
Haddam Neck	R-1-1	Cable Vault	Junction Box - 1Hr.
Haddam Neck	R-1-2	Cable Vault	Conduit - 1Hr.

NOTES

1. All cable insulation and jacketing materials are 90°C thermoset per specification. Cables listed with no insulation or jacketing material need to have these materials identified as well as the 90°C rating confirmed. The cables in question are stocked or project specific cables which do not have a unique identifier in the Millstone Unit No. 2 cable raceway program. Kerite FR cable as installed is rated for 90°C. The entry in the FSAR, Table 8.7-1 was a conservative derate. (2 & 3)
2. To calculate heating load current in cables, 4000V was used as minimum voltage for 4.16kV bus loads, and 414V was used as a minimum voltage for 480V bus loads. The formula used were:
 - a. I_c for motors = $KW/(\sqrt{3}) * V * \text{efficiency}$
 - b. I_c for KW loads = $KW/(\sqrt{3}) * V$
3. Cables in tray or conduit are separated from Thermo-Lag inner surfaces by thickness of the raceway material. In the case of air drops, which means that the cables are encased with Thermo-Lag, the cables are touching the inside surface of the Thermo-Lag covering. (5)
4. There are no materials such as Sealtemp cloth or similar between the cables and the inside surface of the Thermo-Lag wrap. (6)
5. The temperature above which the listed cables can no longer operate in a continuous fashion without accelerated loss of life is 90°C (continuous) for cable rating purposes, 130°C (short term) for emergency operations, and 250°C (milli-seconds) for short circuit conditions. (8)
6. In the cable routing tables the column, "cable load amps" represents the theoretical maximum amperage that the cable can carry. The column for the "cable derate Amps" represents the allowed derated ampacity of the cable which would give a 90°C temperature in the cables conductor with an ambient temperature of 40°C. As long as the load's column is less than the derate column, the installation is acceptable. In those few cases in which the temperature exceeds 90°C, there are explanations in the tables comments column that this is due to a temporary condition, such as an under-voltage condition at the motor's terminals or that the battery charger is recharging a discharged battery, plus carrying normal loads. These are both short-term conditions. (7)
7. The numbers in parenthesis used above, refer to the required information relating to ampacity, items 1 to 8 on page three of the NRC letter of December 21, 1993
8. The photographs located behind have been highlighted to show the referenced commodity. If no arrows are present on a sheet, all photos depict the referenced commodity.

Milestone Unit One

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

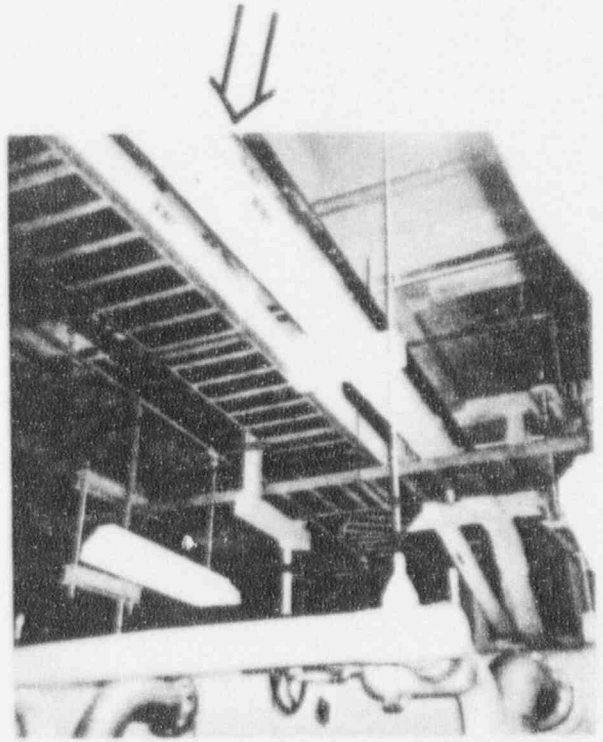
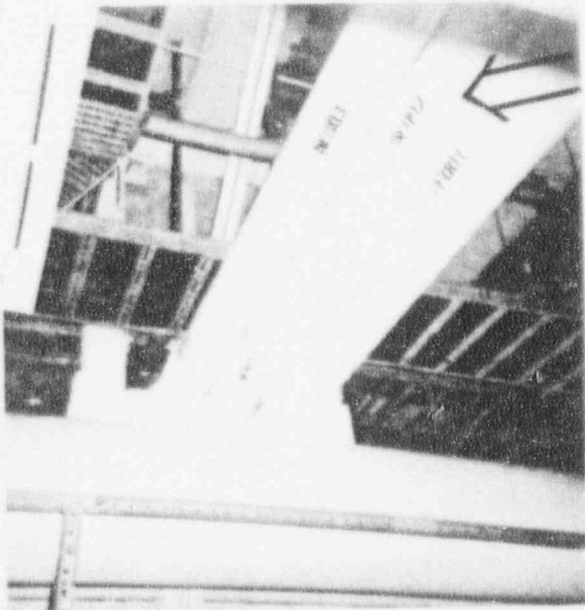
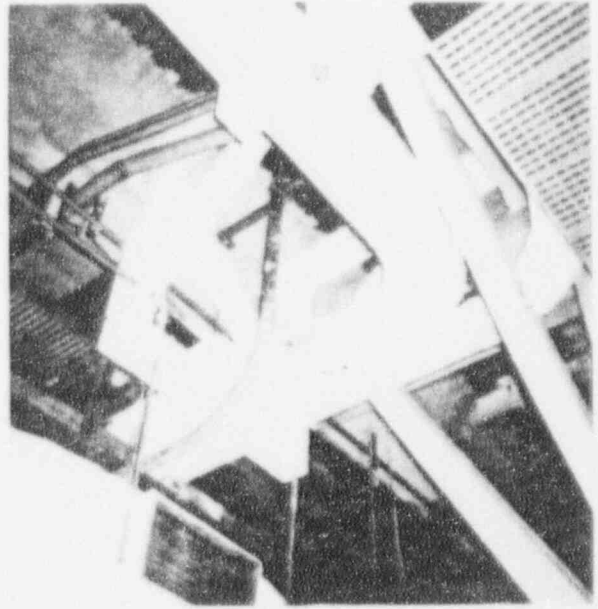
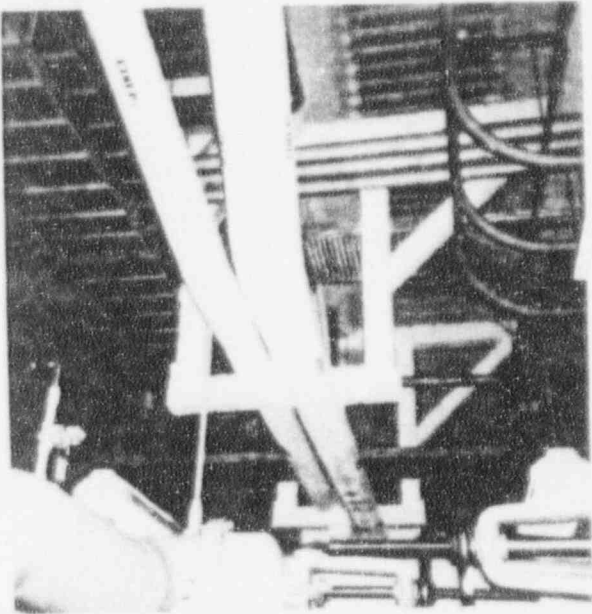
Plant	Millstone One	Fire Area/Elevation	T-3C/14' - 6"
Building	Turbine Building	Commodity No.	T-3C-1

Commodity Description: **CONDUIT** - One 5" conduit (5F002) wrapped with three hour rated conduit sections. This commodity runs from the outer turbine building wall to the box commodity at the Diesel Room wall that groups all the conduits (5F002, 5F003, 5F001 & 1F001) together.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a three hour rated enclosure around this conduit.
Design Fire Rating	3 Hours (Three hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	One 5" conduit wrapped using two half conduit sections.
I B. 2 Total Linear Feet	Approximately 61 feet.
Total Square Feet	N/A
II A. Raceway Orientation (Hort./Vert.)	Mostly horizontal - minor vertical run.
Raceway Material (AL/Steel)	Steel
Tray Type (Solid/Ladder)	N/A
Thermal Short Protection (Hanger/Etc.)	Thermal short protection provided for 18".
Air Drop	N/A
Unsupported Span (Tray/Box)	N/A
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of approximately 5% wire ties and 95% steel bands. Banding is spaced approximately 10" - 12" apart. Some banding is covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-battered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/16" to 1/2" (at bends) with the majority being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	Yes
Cable Type/Size	5A505/A 3-1/C Triplexed 750 AL 5 kV.
Jacket Type	Hypalon

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Conductor Insulator Type	EPR
Cable Fill %	45%
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with steel conduit, wrap material surrounds conduit.
Cable Operating Temperature	90deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Plan ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	No - Cables are not loaded under normal condition (backfeed). Max derated ampacity for this circuit is 198.5, which is less the the 409 amps. the circuit is capable of carrying.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value of 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results. Area is protected by early warning smoke detection. Very limited fire loading, with no direct fire exposure to wrapped component. High ceiling, with large open, area precludes heat build-up around wrapped commodity.
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

Millstone Unit One



5" conduit 5F002 & 5F003, 3" conduit 5F001 and 1F001
Unit One to Unit Two Backfeed Cables

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

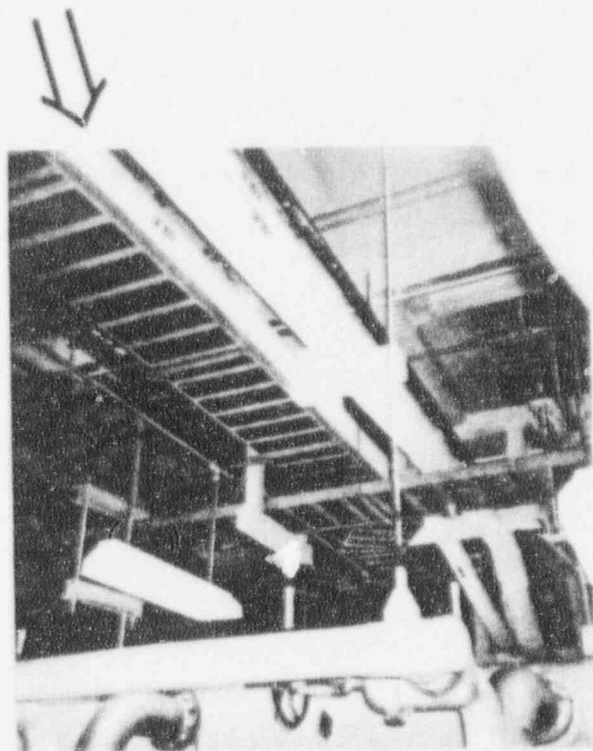
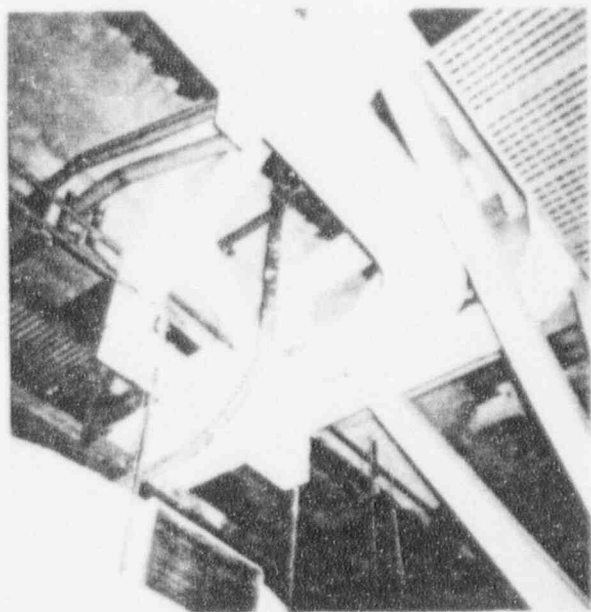
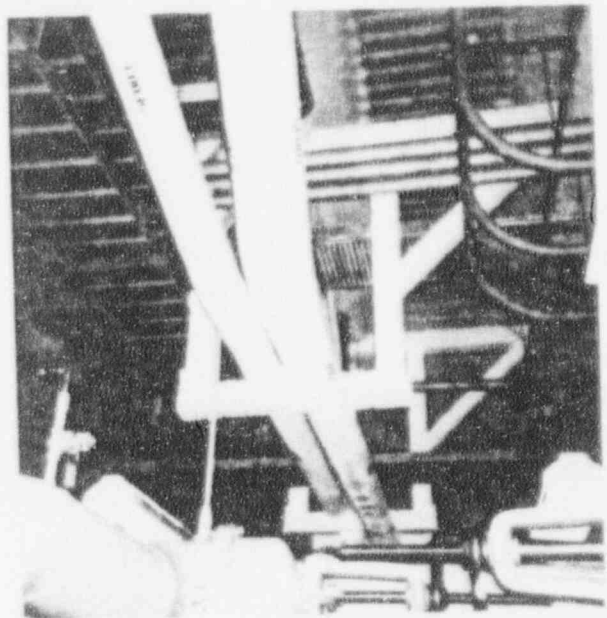
Plant	Millstone One	Fire Area/Elevation	T-3C/14' - 6"
Building	Turbine Building	Commodity No.	T-3C-2

Commodity Description: **CONDUIT** - One 5" conduit (5F003) wrapped with three hour rated conduit sections. This commodity runs from the outer turbine building wall to the box commodity at the Diesel Room wall that groups all the conduit together.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a three hour rated enclosure around this conduit.
Design Fire Rating	3 Hours (Three hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	One 5" conduit wrapped using two half conduit sections.
I. B. 2 Total Linear Feet	Approximately 61 feet.
Total Square Feet	N/A
II. A. Raceway Orientation (Hort./Vert.)	Mostly horizontal - minor vertical run.
Raceway Material (AL/Steel)	Steel
Tray Type (Solid/Ladder)	N/A
Thermal Short Protection (Hanger/Etc.)	Thermal short protection provided for 18".
Air Drop	N/A
Unsupported Span (Tray/Box)	N/A
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of approximately 5% wire ties and 95% steel bands. Banding is spaced approximately 10" - 12" apart. Some banding is covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/16" to 1/2" (at bends) with the majority 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	Yes
Cable Type/Size	5A505/P 3-1/C Triplexed 750 Al. 5 kV.
Jacket Type	Hypalon
Conductor Insulator Type	EPR

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Cable Fill %	45%
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with steel conduit, wrap material surrounds conduit.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	No - Cables are not loaded under normal condition (backfeed). Max derated ampacity for this circuit is 198.5, which is less the the 409 amps. the circuit is capable of carrying.
Within Industry Ampacity Rating Testing?	N/A
Further Ampacity Study Required?	Yes- Actual derating value for 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results. Area is protected by early warning smoke detection. Very limited fire loading, with no direct fire exposure to wrapped component. High ceiling, with large open, area precludes heat build-up around wrapped commodity
VI. B. Proposed Schedule	Final dispoition can not be determined until NUMARC publishes the final test report.

Millstone Unit One



5" conduit 5F002 & 5F003, 3" conduit 5F001 and 1F001
Unit One to Unit Two Backfeed Cables

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone One	Fire Area/Elevation	T-3C/ 14' - 6"
Building	Turbine Building	Commodity No.	T-3C-3

Commodity Description: **GROUPED CONDUITS** - Two 3" conduits (5F001 and 1F001 {incidental, wrapped due to proximity of this conduit to 5F001}) wrapped with three hour rated conduit sections with two straight board sections. This commodity runs from the outer turbine building wall to the box commodity at the Diesel Room wall that groups all the conduit together.

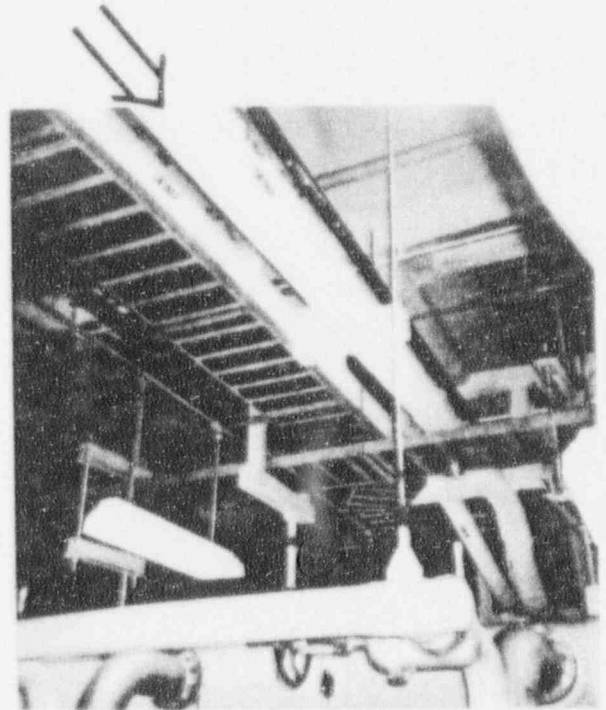
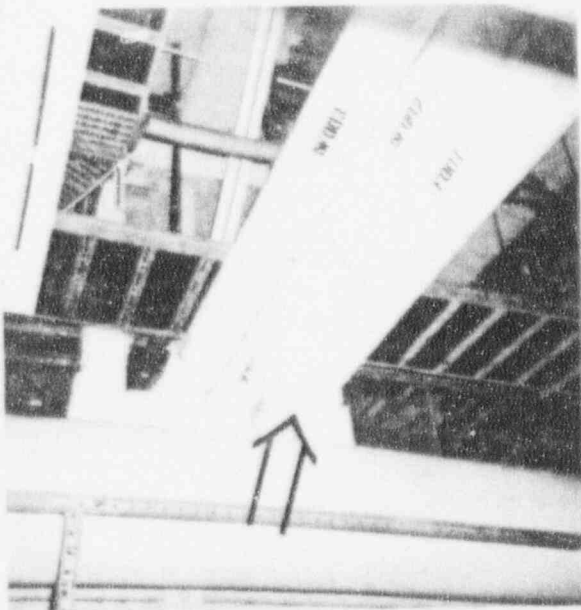
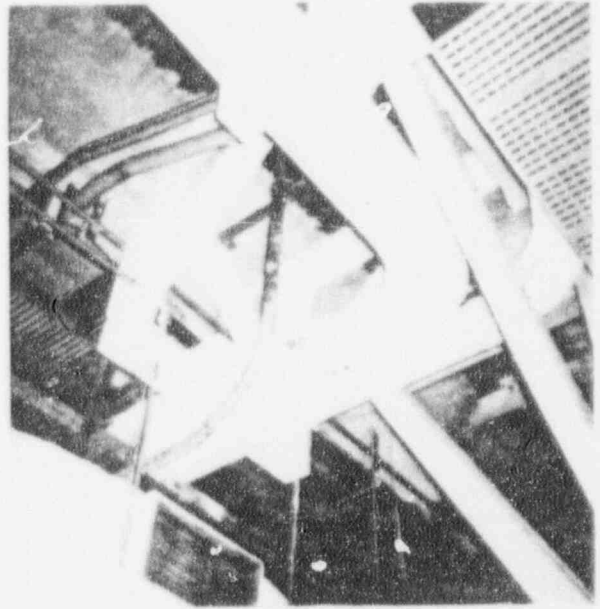
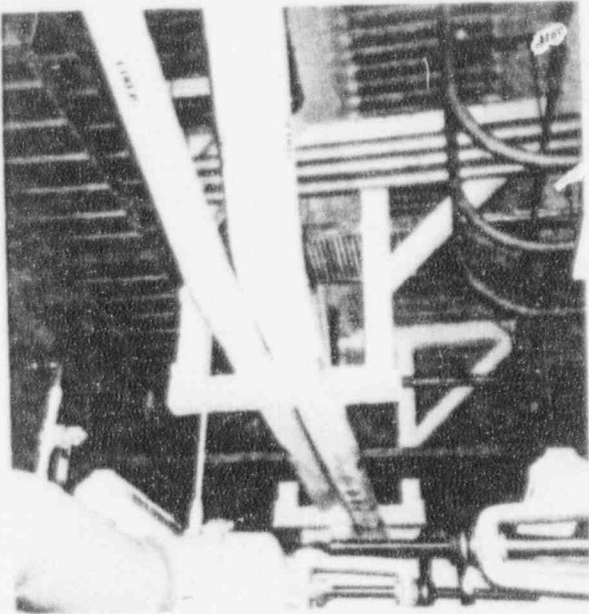
50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed on 5F001 to meet Appendix R requirements. 1F001 is wrapped due to its close proximity to 5F001. 1F001 is not required to be protected.
Intended Purpose of Barrier	Provides a three hour rated enclosure around conduit 5F001
Design Fire Rating	3 Hours (Three hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	These two conduits are wrapped together using two flat board sections with two half round conduit sections.
I. B. 2 Total Linear Feet	Approximately 61 feet.
Total Square Feet	N/A
II. A. Raceway Orientation (Hort./Vert.)	Mostly horizontal - minor vertical run.
Raceway Material (AL/Steel)	Steel
Tray Type (Solid/Ladder)	N/A
Thermal Short Protection (Hanger/Etc.)	Thermal short protection provided for 18".
Air Drop	N/A
Unsupported Span (Tray/Box)	N/A
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of approx. 5% wire ties and 95% steel bands. Banding is spaced approximately 10" - 12" apart. Some banding is covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/16" to 1/2" (at bends) with the majority being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	Yes

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Cable Type/Size	5F001 - 5A602/D - 7/C#14 1kV 5F001 - 5A602/E - 3/C #6 1kV 1F001 - 1P2468/B ** 1F001 - 1P2473/B ** 1F001 - 1A601/C ** ** Instrument Cable - 2/C #16 Cu XLPE 6...V
Jacket Type	5A602/D - Kerite FR 5A602/E - Anaconda Hypalon
Conductor Insulator Type	5A602/D - FR (65 mil) 5A602/E - EPR
Cable Fill %	5F001 - 15% 1F001 - 5%
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with steel conduit, wrap material surrounds conduit.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	5A602/D - Max derated ampacity is less than 2, which is less than 15.4 amps. the cable is capable of carrying. 5A602/E - Max derate ampacity. is less than 30, which is less than 46.3 amps. the cable is capable of carrying. *
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value for 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results. Area is protected by early warning smoke detection. Very limited fire loading with no direct fire exposure to wrapped component. High ceiling with large open area precludes heat build-up around wrapped commodity.
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

* Cable ampacity information not provided for Conduit 1F001 since instrument cables not a concern.

F_T3C3(f)

Millstone Unit One



5" conduit 5F002 & 5F003, 3" conduit 5F001 and 1F001
Unit One to Unit Two Backfeed Cables

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone One	Fire Area/Elevation	T-3C/ 14' - 6"
Building	Turbine Building	Commodity No.	T-3C-4

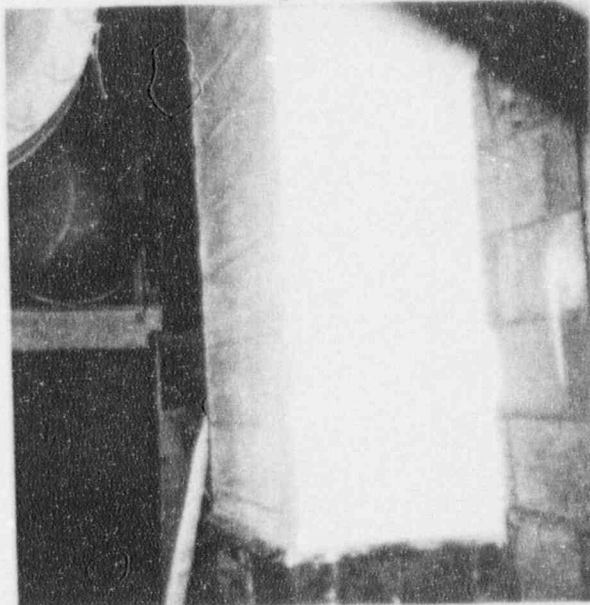
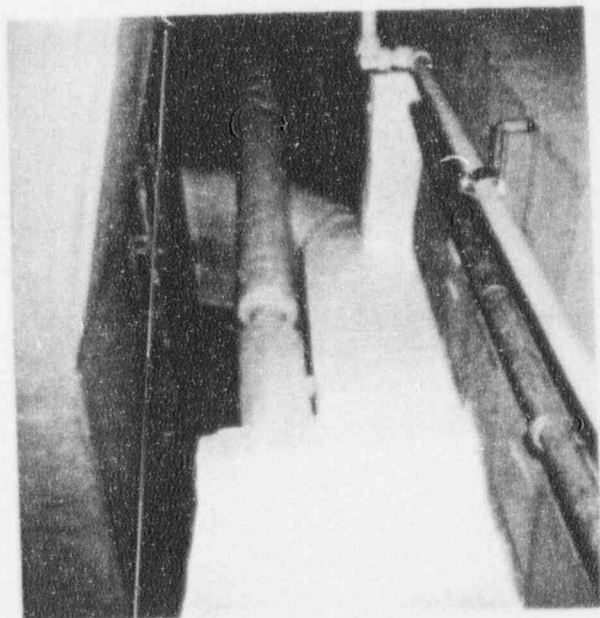
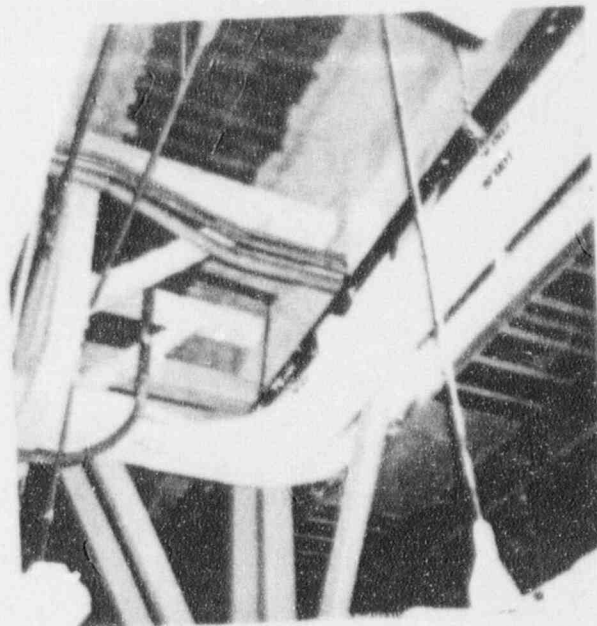
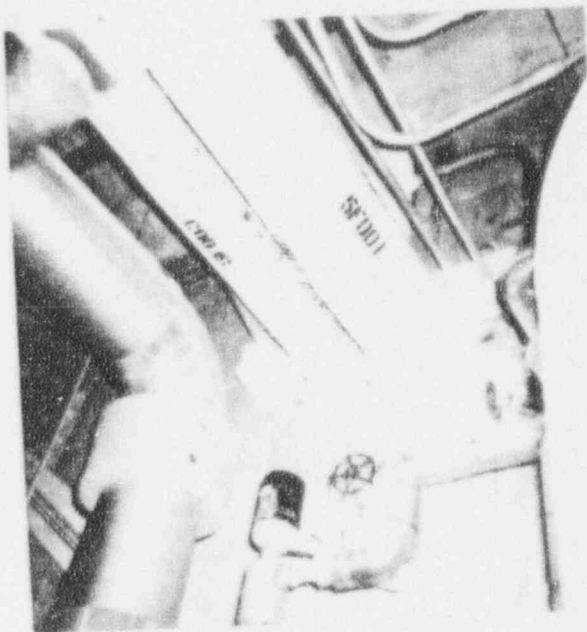
Commodity Description: **GROUPED CONDUITS** - Conduits 5F001, 1F001, 5F002, and 5F003 are grouped together and protected with three hour rated boards sections. This commodity starts where the conduits come together in the overhead, and extends vertically down to a concrete duct bank. The box is formed against the concrete wall.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a three hour rated enclosure around this conduit.
Design Fire Rating	3 Hours (Three hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	Box enclosure around the conduits. Box is formed against the concrete wall. 2 1/2 feet wide, 1 1/2 feet deep, 10 feet high.
I. B. 2 Total Linear Feet	Approximately 10 feet high.
Total Square Feet	Approximately 41.3 sq. feet.
II. A. Raceway Orientation (Hort./Vert.)	Vertical
Raceway Material (AL/Steel)	Steel conduits inside this box enclosure.
Tray Type (Solid/Ladder)	N/A
Thermal Short Protection (Hanger/Etc.)	None required.
Air Drop	N/A
Unsupported Span (Tray/Box)	2 1/2 feet
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of approx. 5% wire ties and 95% steel bands. Banding is spaced approximately 10" - 12" apart. Some banding is covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-butteted and are butt together. Joints are covered with trowel grade material. Gap size ranges from 1/16" to 1/2" (at bends) with the majority being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	Yes
Cable Type/Size	See Commodity sheets T-3C-1, T-3C-2, and T-3C-3.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Jacket Type	See Commodity sheets T-3C-1, T-3C-2, and T-3C-3.
Conductor Insulator Type	See Commodity sheets T-3C-1, T-3C-2, and T-3C-3.
Cable Fill %	See Commodity sheets T-3C-1, T-3C-2, and T-3C-3.
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with steel conduit, wrap material surrounds conduit.
Cable Operating Temperature	See conduit data sheets for cable information.
Max. Oper.Temp. Of Cable Before Failure	See conduit data sheets for cable information.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	See Commodity sheets T-3C-1, T-3C-2, and T-3C-3.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	N/A
V. B. Proposed Resolution	<p>Waiting for NUMARC testing results.</p> <p>Area is protected by early warning smoke detection.</p> <p>Very limited fire loading with no direct fire exposure to wrapped component.</p> <p>High ceiling, with large open area, precludes heat build-up around wrapped commodity.</p>
VI. B Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

F_T3C4.(f)

Millstone Unit One



5" conduit 5F002 & 5F003, 3" conduit 5F001 and 1F001
Unit One to Unit Two Backfeed Cables

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone One	Fire Area/Elevation	T-6/ 14' - 6"
Building	Turbine Building	Commodity No.	T-6-1

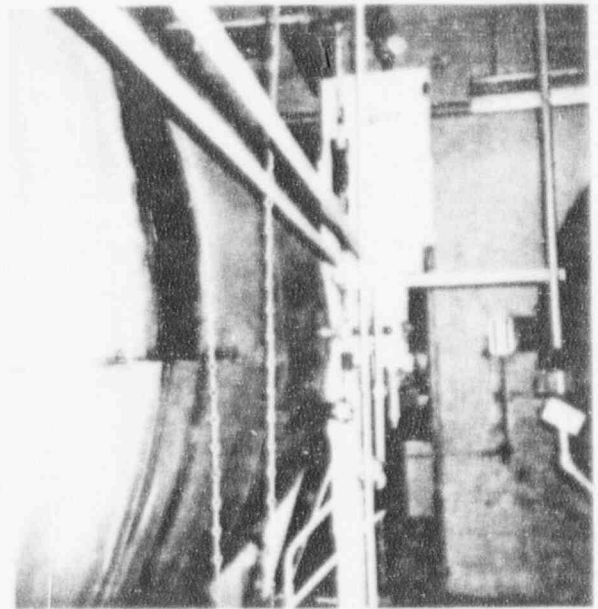
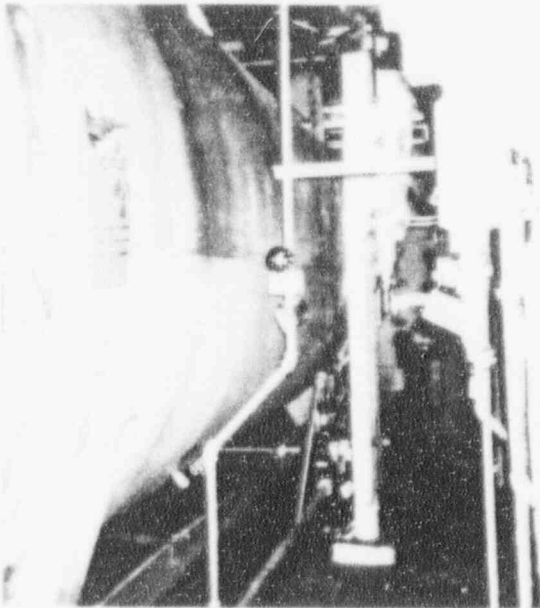
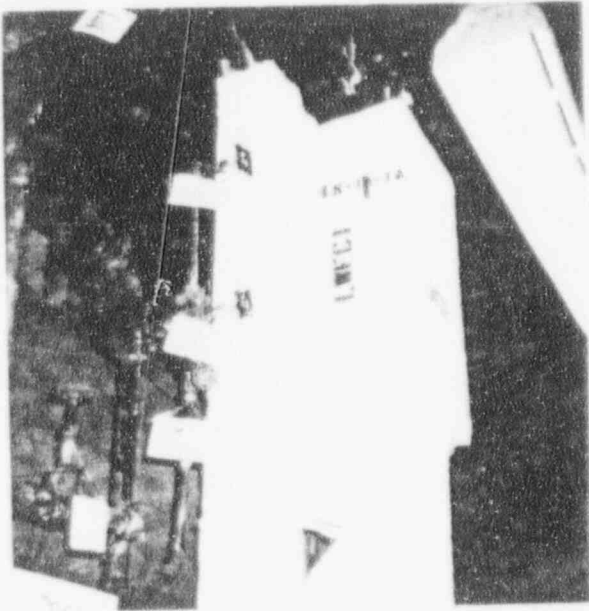
Commodity Description: **JUNCTION BOX (3)**- Three level switches are inside their own Hoffman Junction box on supports. The supports, from the floor are protected for three hours, as is the junction box.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet a fire protection SER commitment.
Intended Purpose of Barrier	Provides a one hour rated enclosure around these level switches.
Design Fire Rating	3 Hours (One hour rating needed per SER commitment).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	Box enclosure around the three separate junction boxes. Box is formed against the steel support. 15" wide, 15" deep, 27" high, each box.
I. B. 2 Total Linear Feet	N/A
Total Square Feet	Approximately 3.52 sq. feet each, total 11.5 sq. feet.
II. A. Raceway Orientation (Hort./Vert.)	N/A
Raceway Material (Al./Steel)	Steel - Hoffman Junction Box.
Tray Type (Solid/Ladder)	N/A
Thermal Short Protection (Hanger/Etc.)	Steel support has been protected from floor to box.
Air Drop	N/A
Unsupported Span (Tray/Box)	15" wide, 15" deep, 27" high.
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of approx. 60% wire ties and 40% steel bands. Banding is spaced approximately 10" - 12" apart. Some banding is covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and are butted together. Joints are covered with trowel grade material. Gap size ranges from 1/16" to 1/4" with the majority being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	Yes
Cable Type/Size	C11100AE, AF, AK, AJ, AN, AP - 2/C #14 600V C11100AC - 2- 1/C #14, 600V SIS
Jacket Type	Unknown

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Conductor Insulator Type	Unknown
Cable Fill %	Unknown
Other Materials Present	None
Cable Contact with Barrier Material	Items are enclosed in Junction box, junction box wrapped with material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	All cables - Max derated ampacity is less than 2, which is less than 6.9 amps. the cable is capable of carrying.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes- Actual derating value for 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results. Area is protected by automatic wet-piped sprinkler system.
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

F_T6.(f)

Millstone Unit One



LWFC 1, LWFC 2, and LWFC 3
Auxiliary Boiler Water Level Instrumentation

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone One	Fire Area/Elevation	Manhole 17/ 10' - 0" (Below 14' - 6")
Building	Turbine Building	Commodity No.	M-17-1

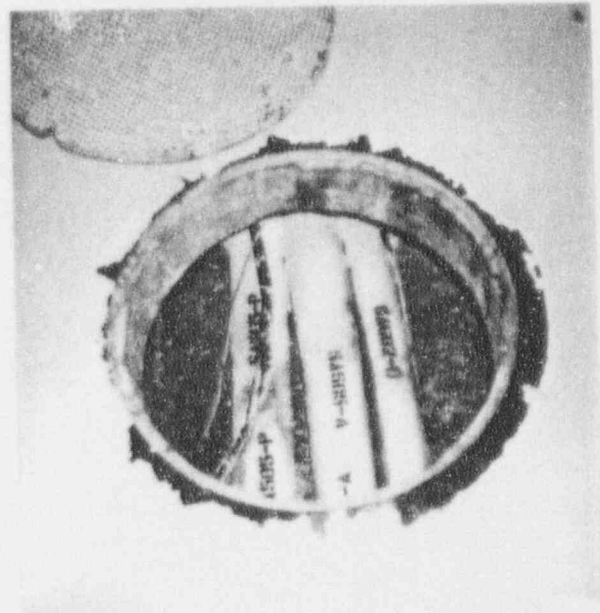
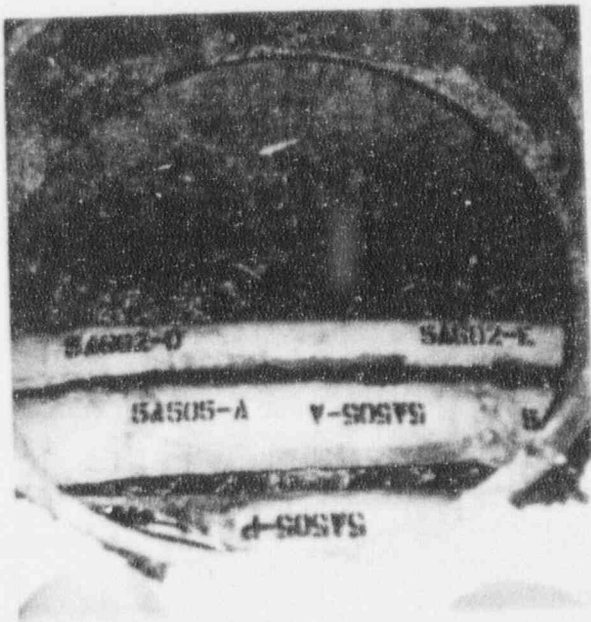
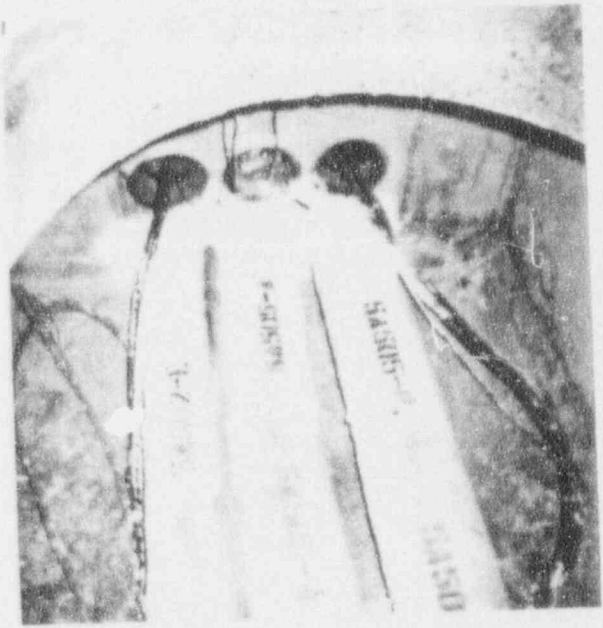
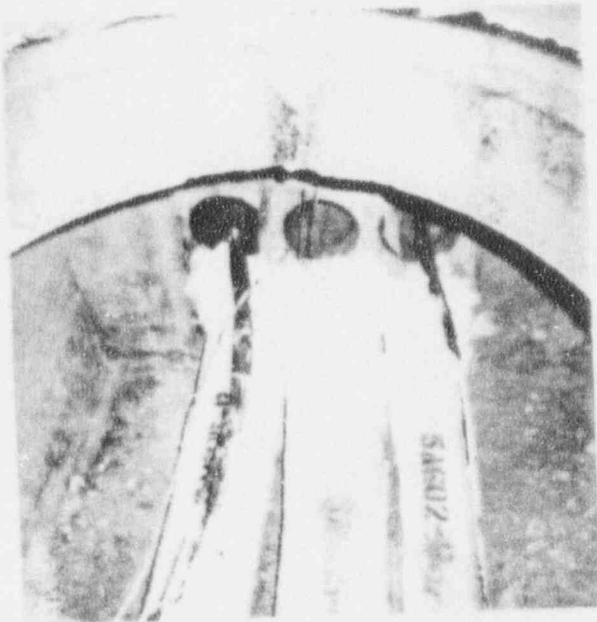
Commodity Description: **AIR DROP** - Cables in the manhole are wrapped in three 5" conduit half sections. These commodities runs below the turbine building in a manhole. This installation is no longer required to meet Appendix R.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material is not needed for separation. Material has been left in place.
Intended Purpose of Barrier	None
Design Fire Rating	3 Hours (Not needed for Appendix R)
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	Cables wrapped as air drops using two half conduit sections (3 installations).
I. B. 2 Total Linear Feet	Approximately 5 feet each, total of 15 feet.
Total Square Feet	N/A
II. A. Raceway Orientation (Hort./Vert.)	Horizontal
Raceway Material (Al/Steel)	N/A
Tray Type (Solid/Ladder)	N/A
Thermal Short Protection (Hanger/Etc.)	N/A
Air Drop	Yes
Unsupported Span (Tray/Box)	5 feet
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 100% wire ties. Banding is spaced approximately 8" apart. Some banding is covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/32" to 1/2" (at bends) with the majority 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	Yes
Cable Type/Size	5A505/A 3-1/C Triplexed 750 Al. 5 kV. 5A505/P 3-1/C Triplexed 750 Al. 5 kV. 5A602/D 7/C #14 Cu, 1 kV Control 5A602/E 3/C #6 Cu, 1 kV Power.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Jacket Type	5A505/A/P, 5A602/E - Hypalon 5A602/D - FR
Conductor Insulator Type	5A505/A/P, 5A602/E -EPR 5A602/D - FR
Cable Fill %	15% - 45%
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	5A505/A&P -Max derated ampacity for these circuits is 198.5, which is less than the 409 amps. the circuit is capable of carrying. 5A602/D - Max derated ampacity for this circuit is less than 2 amps, which is less than the 6.9 amps. the circuit is capable of carrying. 5A602/E - Max derated ampacity for this circuit is <30, which is less than the 38.9 amps. the circuit is capable of carrying.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value of 1" material is needed.
V. B. Proposed Resolution	A three hour fire rated barrier has been installed to separate the Turbine Building from the manhole. Fire wrap is no longer required.
VI. B Proposed Schedule	Completed

File f_m171(f)

Millstone Unit One



Cables 5A505A, 5A505P, 5A602D and 5A602E
Unit One to Unit Two Backfeed Cables

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

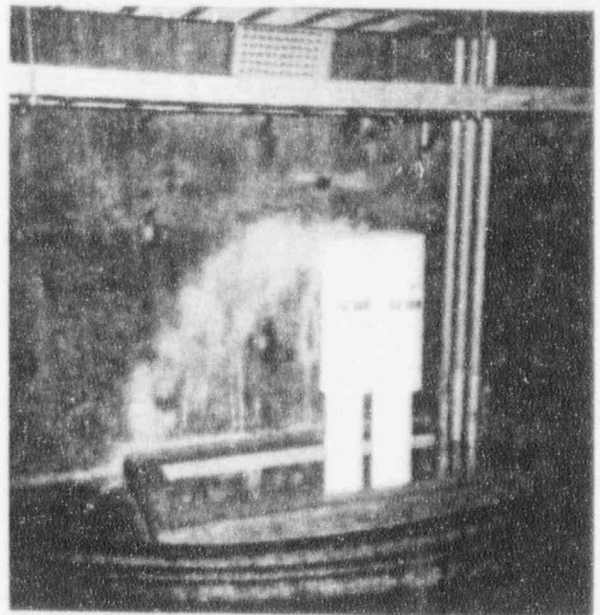
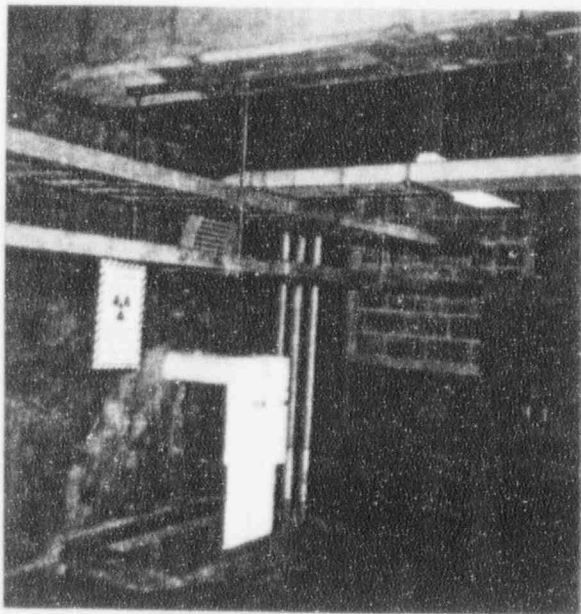
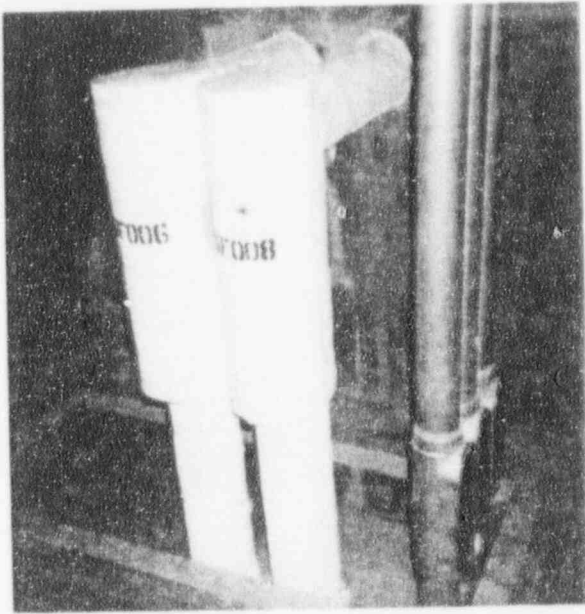
Plant	Millstone One	Fire Area/Elevation	T-12C/54' - 6 "
Building	Turbine Building	Commodity No.	T-12C-1

Commodity Description: **CONDUIT** -Two 4" conduits wrapped separately from the concrete floor to outer wall. This installation is no longer required to meet Appendix R

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material is not needed for separation. Material has been left in place.
Intended Purpose of Barrier	None
Design Fire Rating	3 Hours (Not needed for Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	Two 4" conduits wrapped separately.
I. B. 2 Total Linear Feet	Approximately 5 feet each, total of 10 feet.
Total Square Feet	N/A
II. A. Raceway Orientation (Hort./Vert.)	Horizontal and vertical.
Raceway Material (AL/Steel)	Steel
Tray Type (Solid/Ladder)	N/A
Thermal Short Protection (Hanger/Etc.)	N/A
Air Drop	N/A
Unsupported Span (Tray/Box)	5 feet
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 100% steel banding. Banding is spaced approximately 9" apart. Some banding is covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/32" to 1/2" (at bends) with the majority being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	Yes
Cable Type/Size	Conduit 5F008 - 5F609/A 3-1/C Triplexed 4/0 Cu 5 kV. power Conduit 5F006 - 5A604/A 3-1/C Triplexed 4/0 Cu 5 kV. power
Jacket Type	FR
Conductor Insulator Type	HT Kerite

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Cable Fill %	23% Both.
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with steel conduit, wrap material surrounds conduit.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	5A609/A -Max derated ampacity for this circuit is 33.2, which is less the the 234 amps. the circuit is capable of carrying. 5A604/A - Max derated ampacity for this circuit is 47.7 amps, which is less the 234 amps. the circuit is capable of carrying.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value of 1" material is needed.
V. B. Proposed Resolution	A three hour rated fire barrier has been installed to separate the Turbine Building from these conduits. Fire wrap is no long required.
VI. B Proposed Schedule	Completed

Millstone Unit One



4" conduit 5F006 & 5F008, power to shutdown cooling pump P-1002A, and CRD pump M8-21A

Millstone Unit Two

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone Two	Fire Area/Elevation	T-9/ 45' - 0"
Building	Turbine Building	Commodity No.	T-9-1

Commodity Description: **TRAY** -6" cable wire ways (Z26TA10 and Z25XA10), run from the floor of the Cable Vault to the ceiling of the vault. Units are wrapped together.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a one hour enclosure around these cables.
Design Fire Rating	3 Hours (One hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	6" and 6" cable tray wrapped with flat board sections. 10" deep x 18" wide x 23' long
I. B. 2 Total Linear Feet	Approximately 23 feet
Total Square Feet	Approximately 72.8 sq. feet
II. A. Raceway Orientation (Hort./Vert.)	Horizontal and Vertical
Raceway Material (AL/Steel)	Steel
Tray Type (Solid/Ladder)	Wire way
Thermal Short Protection (Hanger/Etc.)	Thermal short protection provided for 18"
Air Drop	N/A
Unsupported Span (Tray/Box)	18" (10" spacing between wire ties & banding).
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by factory.
Banding Description (size/type/spacing)	Banding consists of 20% wire ties and 80% steel bands. Banding is spaced approximately 10" apart. Banding is not covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttred and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/16" to 1/4" with the majority being 1/8".
Does Internal Banding Exist	No
Addition Trowel Material	No
Cable Type/Size	See Attached Cable Sheet.
Jacket Type	See Attached Cable Sheet.
Conductor Insulator Type	See Attached Cable Sheet.
Cable Fill %	26% (Z25XA10)

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with tray. Tray in contact with wrap material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdowns/Drawings/Calcs)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	Not at this time.
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	See Attached Cable Data Sheets.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value of 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results. Area is protected by early warning smoke detection and sprinklers. Very limited fire loading with limited direct fire exposure to wrapped component.
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC publishes final test report.

File F_T91(f)

Cable Data Sheet

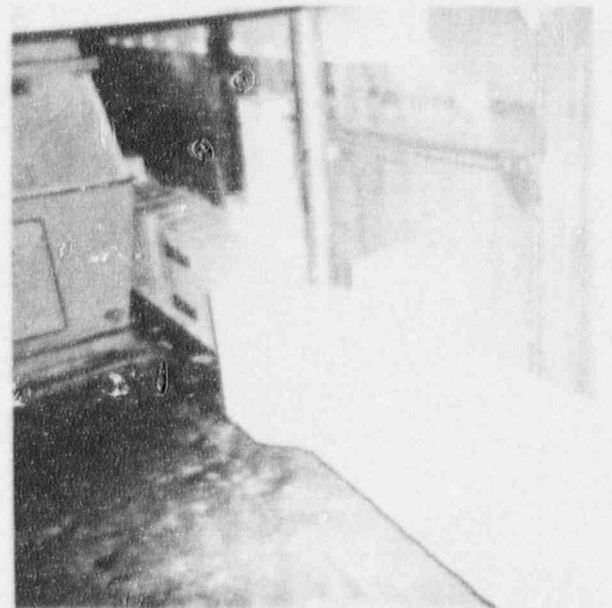
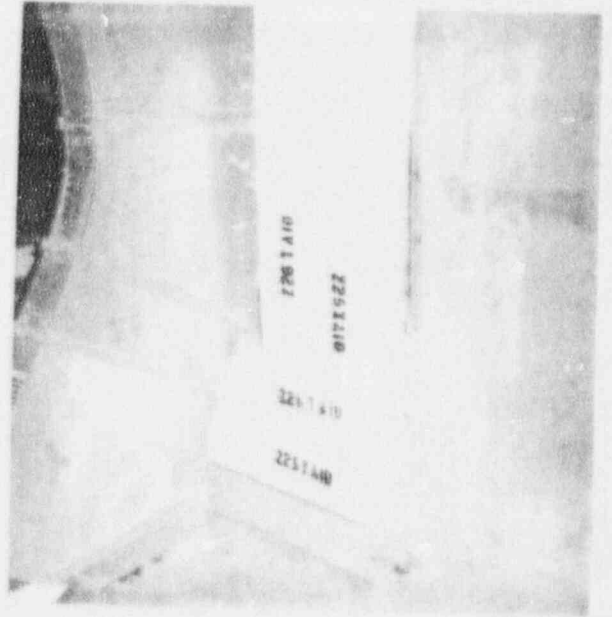
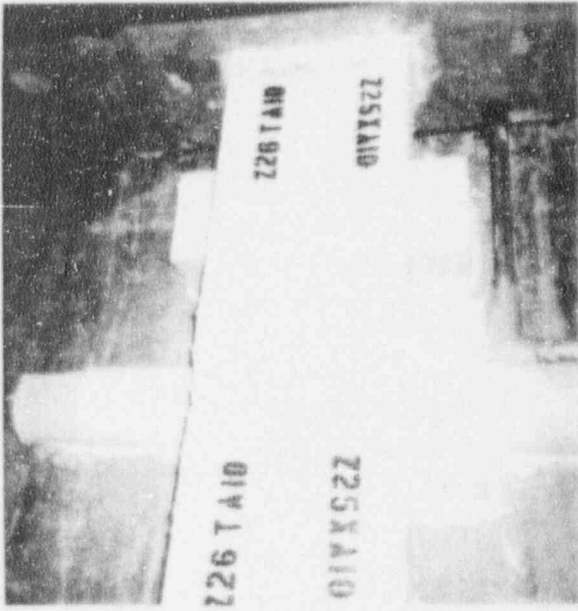
Commodity No T-9-1

<u>Raceway #</u>	<u>Type of Raceway</u>	<u>Cable Fill</u>	<u>Cable Distribution</u>	<u>Air Drop Y/N</u>	<u>Type of Thermolag</u>		
Z25XA10	6"x6"WRWY	26%	Random	N	1"		
<u>Cable #</u>	<u>Cable Size</u>	<u>Cable Type</u>	<u>Cable Materl's Insul'n/Jac't</u>	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C</u>	<u>Comments</u>
			243				
Z2B6102/J	9/c	Cu	600V	<2	6.9	44	Est'd
	#14		Cntl				
Z2B6102/K	7/c	Cu	600V	<2	6.9	44	Est'd
	#14		Cntl				
Z2B6105/H	9/c	Cu	600V	<2	6.9	44	Est'd
	#14		Cntl				
Z2B6105/J	3/c	Cu	600V	<2	6.9	44	Est'd
	#14		Cntl				
Z2B6105/K	7/c	Cu	600V	<2	6.9	44	Est'd
	#14		Cntl				
Z2B6117/D	7/c	Cu	600V	<2	6.9	44	Est'd
	#14		Cntl				
Z2B6117/E	3/c	Cu	600V	<2	6.9	44	Est'd
	#14		Cntl				
Z2B6117/F	7/c	Cu	600V	<2	6.9	44	Est'd
	#14		Cntl				
Z2CH517/E	7/c	Cu	600V	<2	6.9	44	Est'd
	#14		Cntl				
Z2CH517/F	7/c	Cu	600V	<2	6.9	44	Est'd
	#14		Cntl				
Z2CH519/E	9/c	Cu	600V	<2	6.9	44	Est'd
	#14		Cntl				
Z2CH519/F	7/c	Cu	600V	<2	6.9	44	Est'd
	#14		Cntl				
Z2DV2008/A	2/c	Cu	600V	<10	11.5	78	Est'd
	#10		Pwr				
Z2HV2525/F	9/c	Cu	600V	<2	6.9	44	Est'd
	#14		Cntl				
Z2HV2525/G	7/c	Cu	600V	<2	6.9	44	Est'd
	#14		Cntl				
Z2HV2525/H	3/c	Cu	600V	<2	6.9	44	Est'd
	#14		Cntl				
Z2HV5279/S	9/c	Cu	1KV	<2	6.9	44	Est'd
	#14		Cntl				
2K01160/B	3/c	Cu	600V	<2	6.9	44	Est'd
	#14		Cntl				
Z2NF09/F	7/c	Cu	600V	<2	6.9	44	Est'd
	#14		Cntl				
Z2NF09/G	7/c	Cu	600V	<2	6.9	44	Est'd
	#14		Cntl				

<u>Cable #</u>	<u>Cable Size₁</u>	<u>Cable Type₁</u>	<u>Cable Materl's Insul'n/Jac't</u> 243	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C₁</u>	<u>Comments</u>
Z2HV5279/P	3/cCu	600V		<6	8.3	66	Est'd
	#12	Cntl					
Z2HV5279/R	3/cCu	600V		<6	8.3	66	Est'd
	#12	Cntl					
Z2HV5279/T	2/cCu	1KV		<2	5.2	47.4	Est'd
	#16	Cntl					
Z2HV5279/U	2/cCu	600V		<2	5.2	47.4	Est'd
	#16	Cntl					
Z2SV4188/J	7/cCu	600V		<6	8.3	66	Est'd
	#12	Cntl					
Z2SV4188/L	2/cCu	600V		<10	11.5	78	Est'd
	#10	Pwr					
Z2MCV04/J	3/c Cu	600V		<2	6.9	44	Est'd
	#14	Cntl					
Z2SV4188/K	7/cCu	600V		<6	8.3	66	Est'd
	#12	Cntl					
Z2SV4188/M	2/cCu	600V		<10	11.5	78	Est'd
	#10	Cntl					
Z2VA2004/A	2/cCu	600V		<10	11.5	78	Est'd
	#10	Pwr					

 All raceways, and wireways such as E26TA10 6"x6" WRWY, 4% Fill,
 with Instrument Cables or Wiring have no heat generated in them
 and are not a concern.

Millstone Unit Two



Junction Box J602/6" Tray Z25XA10 and J603/Z26TA10
Power and Instrumentation to Shutdown Panels C09 & C10

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone Two	Fire Area/Elevation	A-24/ 25' - 6"
Building	Aux. Building	Commodity No.	A-24-1

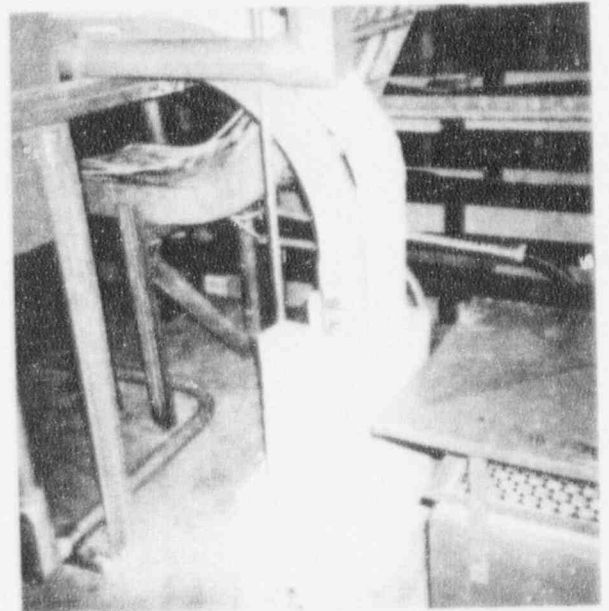
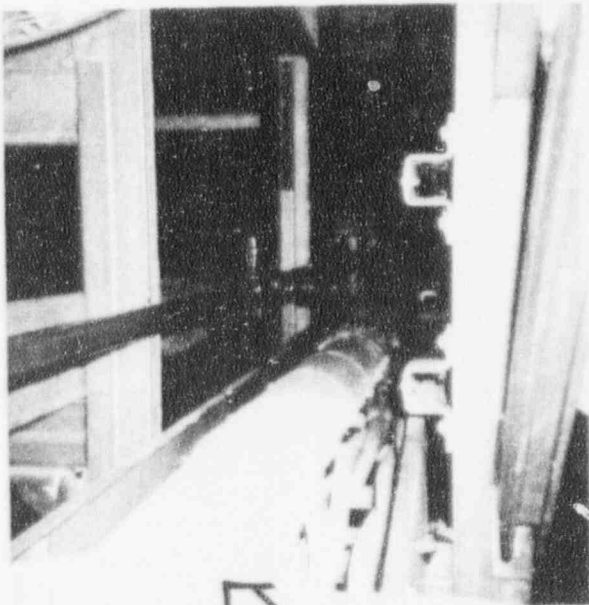
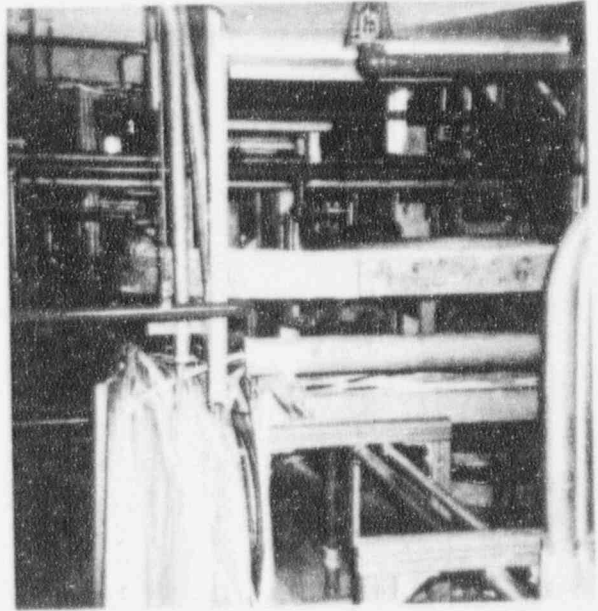
Commodity Description: **AIR DROP** - Cable Z2B0607/A is wrapped using two five inch conduit sections. This wrapped cable is laid in a 12" tray (Z23FA30) and 24" tray (Z23FA25). This cable is wrapped totally inside area from concrete floor penetration to wrapped tray.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a one hour rated enclosure around this cable.
Design Fire Rating	3 Hours (One hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	One cable wrapped using two half conduit sections, cable laid in tray. Tray not wrapped.
I. B. 2 Total Linear Feet	Approximately 74 feet
Total Square Feet	N/A
II. A. Raceway Orientation (Hori./Vert.)	Mostly horizontal - minor vertical run.
Raceway Material (AL/Steel)	None
Tray Type (Solid/Ladder)	N/A
Thermal Short Protection (Hanger/Exc.)	None
Air Drop	This installation is similar to an air drop. One cable is wrapped separately, in tray. Wrapped commodity is laid in the tray.
Unsupported Span (Tray/Box)	N/A
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 100% wire ties. Banding is spaced approximately 11" apart. Banding is not covered with trowel grade material.
Joint Description (Gap size/Buttend/Ties)	Joints are pre-buttended and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/16" to 1/8" with the average gap size being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	Yes
Cable Type/Size	3/C Cu 250 MCM 1kV power
Jacket Type	Hypalon

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Conductor Insulator Type	EPR
Cable Fill %	N/A (Both)
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with wrap material .
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	Max ampacity for this circuit is 230 amps.** which is more than the 213.2 amps. the cable is derated for.
Within Industry Ampacity Rating Testing?	N/A
Further Ampacity Study Required?	Yes - Actual derating value of 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results. Area is protected by early warning smoke detection and TWO automatic sprinkler sprinkler systems. Very limited fire loading with limited direct fire exposure to wrapped component. Large open area precludes heat build-up around wrapped commodity.
VI. B Proposed Schedule	Final disposition can not be determined until NUMARC publishes final test report.

**230 amps based upon normal 60 amp load plus short term initial battery charger operation, gives short term cable temperature of 98° C. As battery recharges, current drops to below the derating limit of 213.2 amps.

Millstone Unit Two



24" Tray Z23FA25 and 12" Tray Z23FA30,
Power to Z2 Battery Charger

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone Two	Fire Area/Elevation	A-24/ 25' - 6"
Building	Aux. Building	Commodity No.	A-24-2

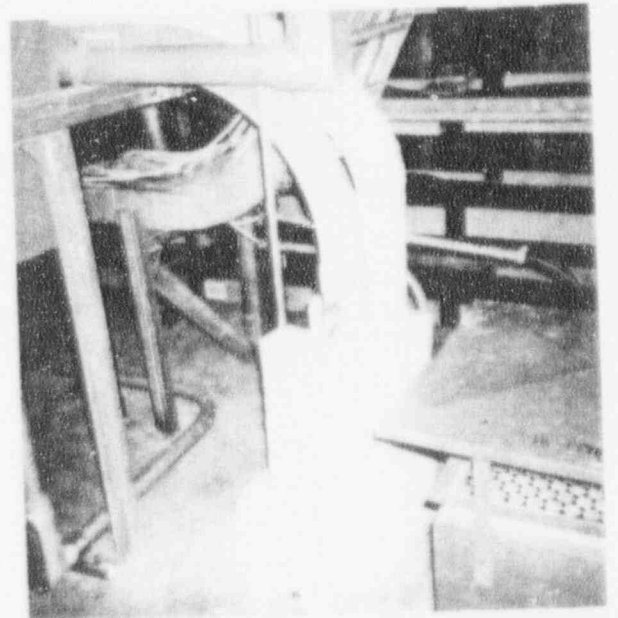
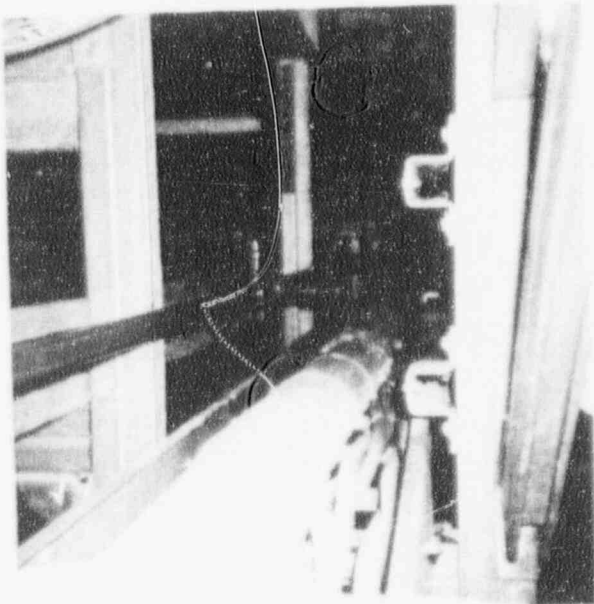
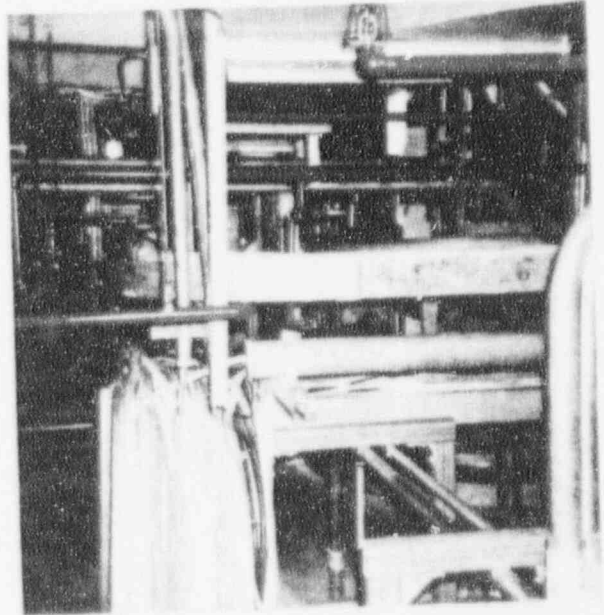
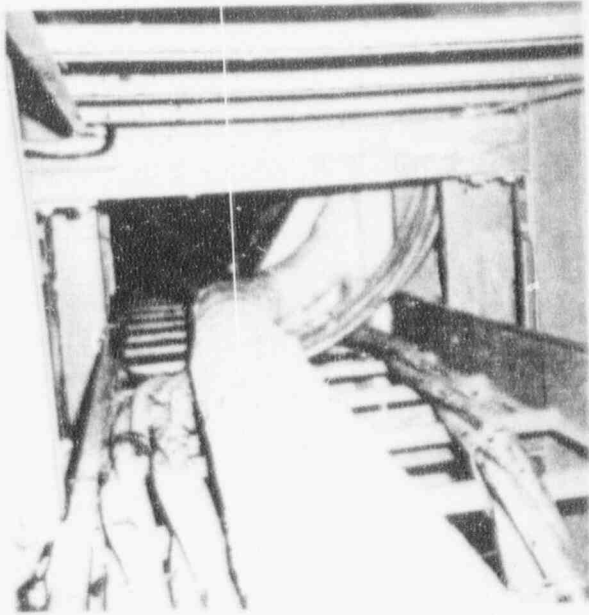
Commodity Description: **TRAY** - Cable Z2B0607/A is wrapped using two five inch conduit sections. This wrapped cable penetrates the floor of the Cable Vault. At this penetration, the wrap is flaired out around the cable tray (and penetration). This commodity is a box around the cable, tray and penetration at the floor. This is a continuation of Commodity No. A-24-1

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a one hour rated enclosure around this cable.
Design Fire Rating	3 Hours (One hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	Cable tray at floor penetration.
I. B. 2 Total Linear Feet	Approximately 2 feet
Total Square Feet	N/A
II. A. Raceway Orientation (Hort./Vert.)	Vertical
Raceway Material (AL/Steel)	Steel
Tray Type (Solid/Ladder)	Ladder type tray
Thermal Short Protection (Hanger/Etc.)	Thermal short protection provided for 18".
Air Drop	N/A
Unsupported Span (Tray/Box)	N/A
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 100% wire ties. Banding is spaced approximately 12" apart. Banding is not covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/16" to 1/8" with the majority being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	No
Cable Type/Size	3/C Cu 250 MCM 1kV power.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Jacket Type	Hypalon
Conductor Insulator Type	EPR
Cable Fill %	65%
Other Materials Present	None
Cable Contact with Barrier Material	Cable is laid in tray. Tray is in contact with wrap material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	Max ampacity for this circuit is 230 amps.**which is more than the 213.2 amps. the cable is derated for.
Within Industry Ampacity Rating Testing?	N/A
Further Ampacity Study Required?	Yes - Actual derating value of 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results. Area is protected by early warning smoke detection and TWO automatic sprinkler sprinkler systems. Very limited fire loading with limited direct fire exposure to wrapped component. Large open area precludes heat build-up around wrapped commodity.
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC publishes final test report.

**230 amps based upon normal 60 amp load plus short term initial battery charger operation, gives short term cable temperature of 98° C. As battery recharges, current drops to below the derating limit of 213.2 amps.

Millstone Unit Two



24" Tray Z23FA25 and 12" Tray Z23FA30,
Power to Z2 Battery Charger

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone Two	Fire Area/Elevation	A-24/ 25' - 6"
Building	Aux. Building	Commodity No.	A-24-3

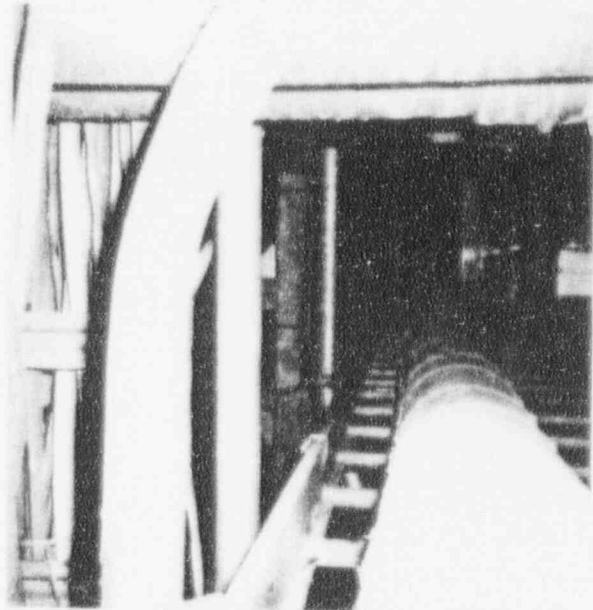
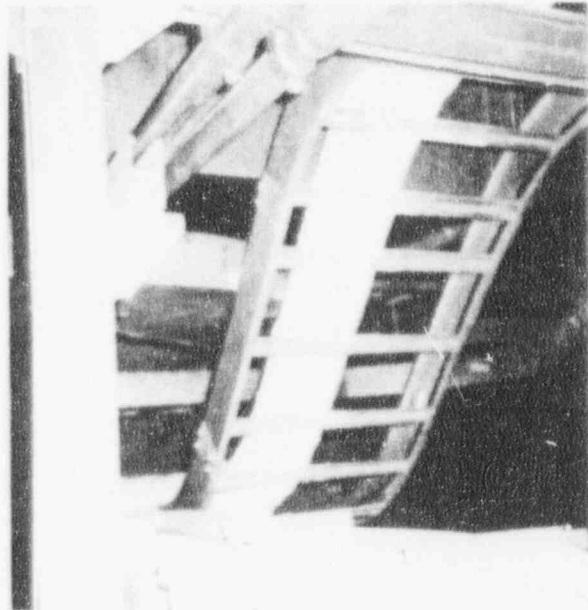
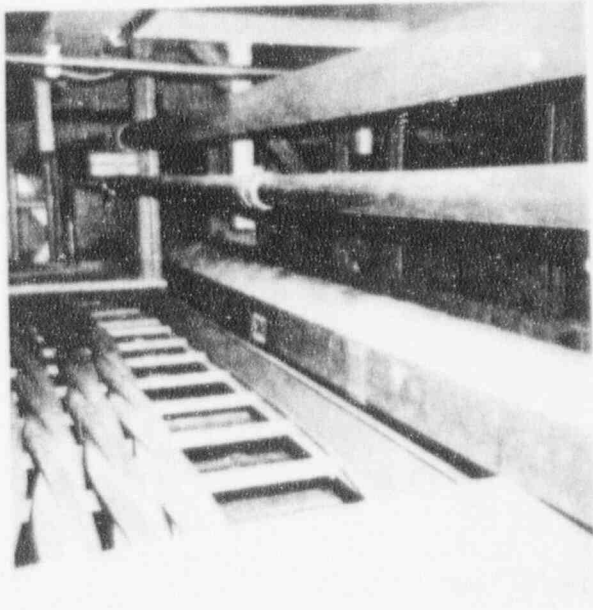
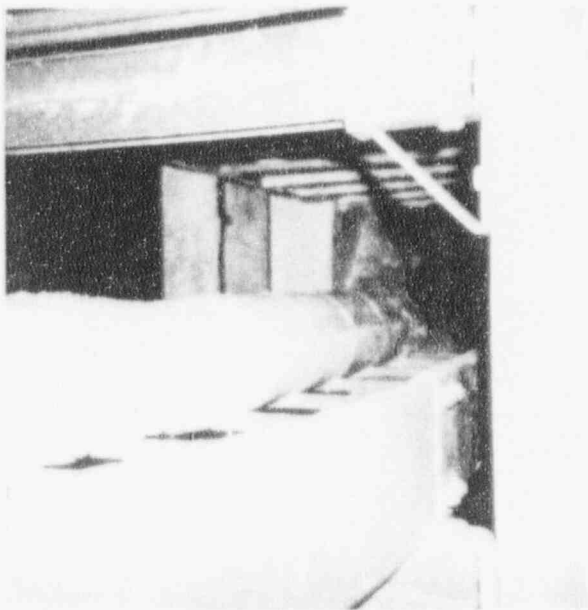
Commodity Description: **AIR DROP** - Cables Z2B0610/A&B are wrapped using two seven inch conduit sections. These wrapped cables are laid in a 24" tray (Z23HA10). These cables are wrapped totally inside this area from Tray Z23GE10 to Tray Z23HB10.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a one hour rated enclosure around these cables.
Design Fire Rating	3 Hours (One hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	Two cables wrapped using conduit half sections laid inside the tray.
I. B. 2 Total Linear Feet	Approximately 88 feet
Total Square Feet	N/A
II. A. Raceway Orientation (Hori/Vert.)	Mostly horizontal, minor vertical run.
Raceway Material (AL/Steel)	N/A
Tray Type (Solid/Ladder)	N/A
Thermal Short Protection (Hanger/Etc.)	N/A
Air Drop	This installation is similar to an air drop. Two cables are wrapped together in a tray. Wrap commodity is laid in tray
Unsupported Span (Tray/Box)	N/A
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 100% wire ties. Banding is spaced approximately 10" apart. Banding is not covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size range from 1/16" to 1/4" with the majority being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	No
Cable Type/Size	Two 3/C Cu 500 MCM Triplexed 1kV power
Jacket Type	Hypalon
Conductor Insulator Type	EPR

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Cable Fill %	N/A
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with wrap material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	Max derated ampacity for these circuits are 505.8 amps. which is less than the 531.4 amps. the cables are capable of carrying.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value of 1" material is needed.
V. B. Proposed Resolution	<p>Waiting for NUMARC testing results.</p> <p>Area is protected by early warning smoke detection and two automatic sprinkler sprinkler systems.</p> <p>Very limited fire loading with limited direct fire exposure to wrapped component. Large open area precludes heat build-up around wrapped commodity.</p>
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

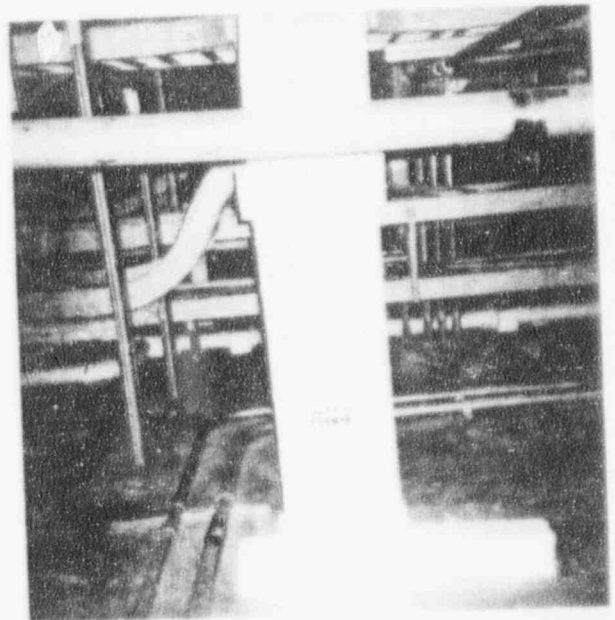
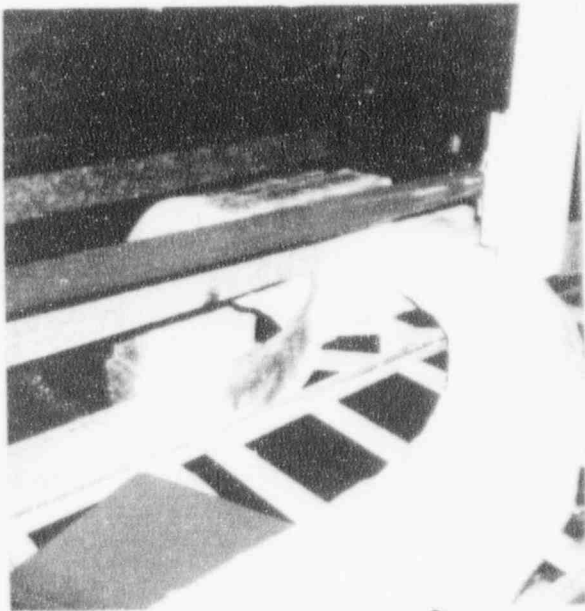
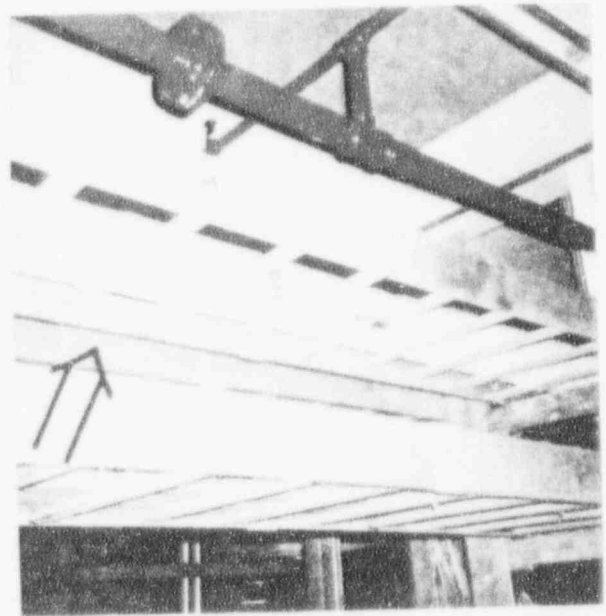
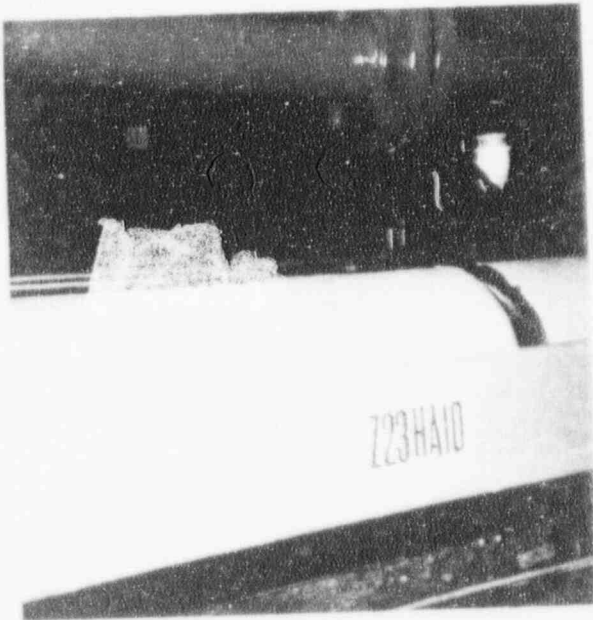
File F_A243.(f)

Millstone Unit Two



24" Cable Tray Z23HA10, Power Cables To
MCC B61

Millstone Unit Two



24" Cable Tray Z23HA10 To 12" Tray Z23HB10,
Power Cables To MCC B61

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone Two	Fire Area/Elevation	A-24/ 25' - 6"
Building	Aux. Building	Commodity No.	A-24-4

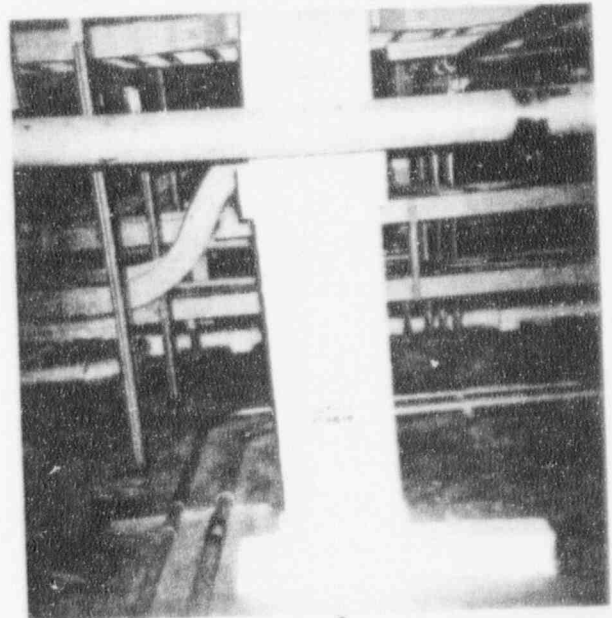
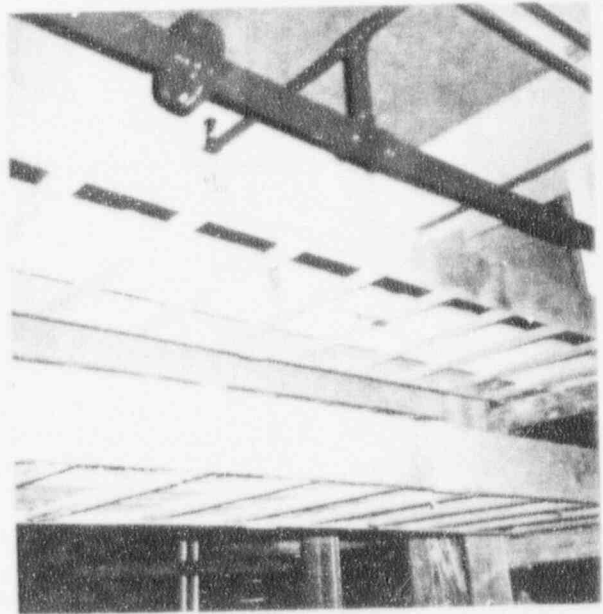
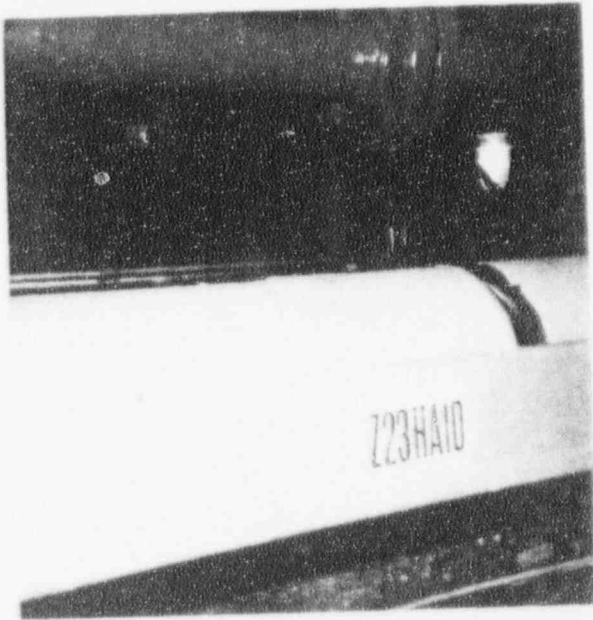
Commodity Description: **TRAY** - Cables Z2B0610/A&B are wrapped in a 12" tray (Z23HB10). These cables are wrapped totally inside this area from concrete floor to Tray Z23HA10 in the northwest corner of the Cable Vault.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a one hour rated enclosure around these cables.
Design Fire Rating	3 Hours (One hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	Two cables wrapped inside 12" tray.
I. B. 2 Total Linear Feet	Approximately 8 feet
Total Square Feet	Approx. 32 sq. feet
II. A. Raceway Orientation (Hort./Vert.)	Mostly Vertical, minor horizontal.
Raceway Material (Al/Steel)	Steel
Tray Type (Solid/Ladder)	Ladder type tray
Thermal Short Protection (Hanger/Etc.)	N/A
Air Drop	N/A
Unsupported Span (Tray/Box)	12" between steel ties.
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 100% wire ties. Banding is spaced approximately 12" apart. Banding is not covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/16" to 1/4" with the majority being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	No
Cable Type/Size	Two 3/C Cu 500 MCM Triplexed 1kV power.
Wicket Type	Hypalon
Conductor Insulator Type	EPR
Cable Fill %	19%

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with tray. Tray is in contact with wrap material.
Cable Operating Temperature	90 deg. C rating by design
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	Max derated ampacity for these circuits are 505.8 amps. which is less than the 660.8 amps. the cable is capable of carrying.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value of 1" material is needed.
V. B. Proposed Resolution	<p>Waiting for NUMARC testing results.</p> <p>Area is protected by early warning smoke detection and two automatic sprinkler sprinkler systems. Some material may not be directly covered by water spray systems.</p> <p>Very limited fire loading with limited direct fire exposure to wrapped component. Large open area precludes heat build-up around wrapped commodity.</p>
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

File F_A244(f)

Millstone Unit Two



24" Cable Tray Z23HA10 To 12" Tray Z23HB10,
Power Cables To MCC B61

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone Two	Fire Area/Elevation	A-24/ 25' - 6"
Building	Aux. Building	Commodity No.	A-24-5

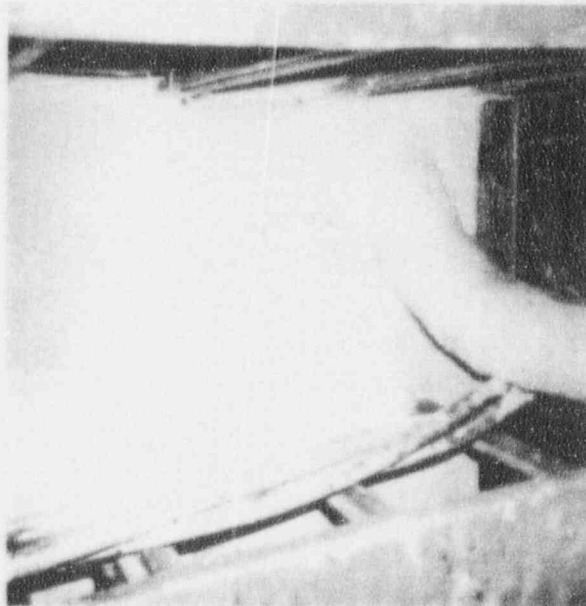
Commodity Description: **TRAY** - A 24" tray (Z23GE10) with cables Z2BO610/A&B, Z2BO606/A&B and Z2BO607/A wrapped from ceiling to lower cable trays, in the west center of Cable Spreading Area.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a one hour rated enclosure around these cables.
Design Fire Rating	3 Hours (One hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	24" cable tray. 8" deep x 29" wide x 8' long. (Cable Z2BO606A/B is incidental)
I. 3. 2 Total Linear Feet	Approximately 8 feet
Total Square Feet	Approximately 50.6 sq. feet
II. A. Raceway Orientation (Horiz./Vert.)	Vertical
Raceway Material (AL/Steel)	Steel
Tray Type (Solid/Ladder)	Ladder Type Tray
Thermal Short Protection (Hanger/Etc.)	N/A
Air Drop	N/A
Unsupported Span (Tray/Box)	29" (10" between wire ties).
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 100% wire ties. Banding is spaced approximately 10" apart. Banding is not covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-battered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/32" to 1/8" with the majority being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	No
Cable Type/Size	Six 3/C Cu 500 MCM Triplexed 1kV power 3/C Cu 250 MCM 1kV power
Jacket Type	Hypalon
Conductor Insulator Type	EPR

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Cable Fill %	22%
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with tray. Tray is in contact with wrap material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	Max derated ampacity for circuit Z2BO610/A&B is 505.8 amps, which is less than the 660.8 amps, the cable is capable of carrying. Max derated ampacity for circuit Z2BO606/A&B is 656 amps, which is less than the 660.8 amps, the cable is capable of carrying. Max ampacity for circuit Z2BO607A is 230 amps. **which is more than the 213.2 amps, the cable is capable of carrying.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value of 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results. Area is protected by early warning smoke detection and two automatic sprinkler sprinkler systems. Some material may not be directly covered by water spray systems. Very limited fire loading with limited direct fire exposure to wrapped component. Large open area precludes heat build-up around wrapped commodity.
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

**230 amps based upon normal 60 amp load plus short term initial battery charger operation, gives short term cable temperature of 98° C. As battery recharges, current drops to below the derating limit of 213.2 amps.

Millstone Unit Two



24" Cable Tray Z23GE10, Power Cables From
B06 Load Center

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone Two	Fire Area/Elevation	A-24/ 25' - 6"
Building	Aux. Building	Commodity No.	A-24-6

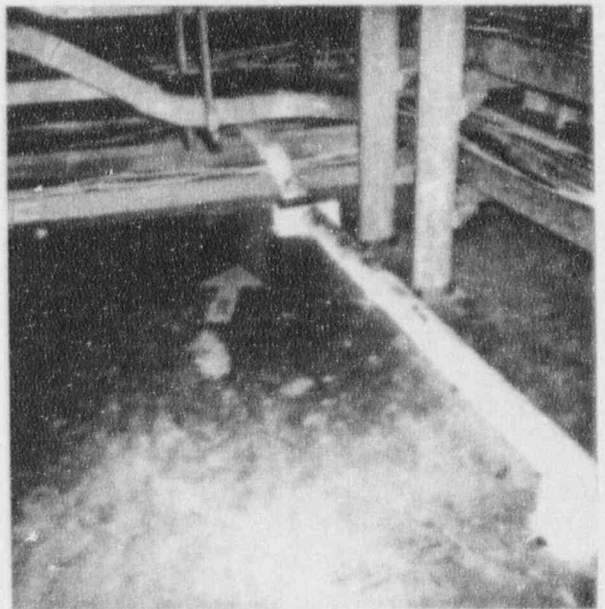
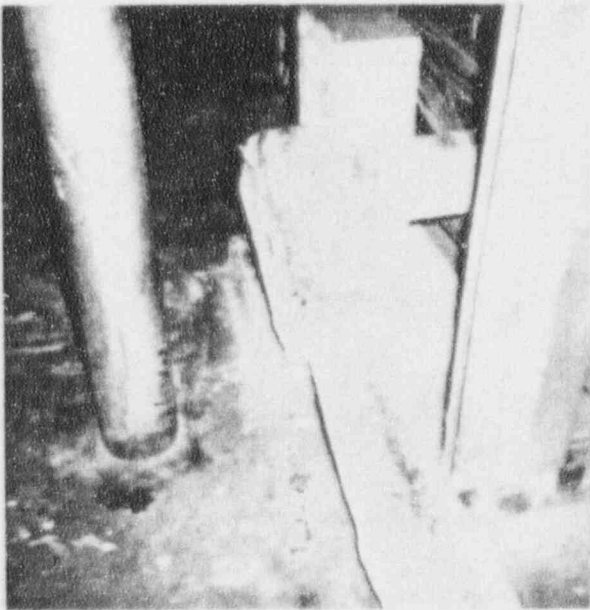
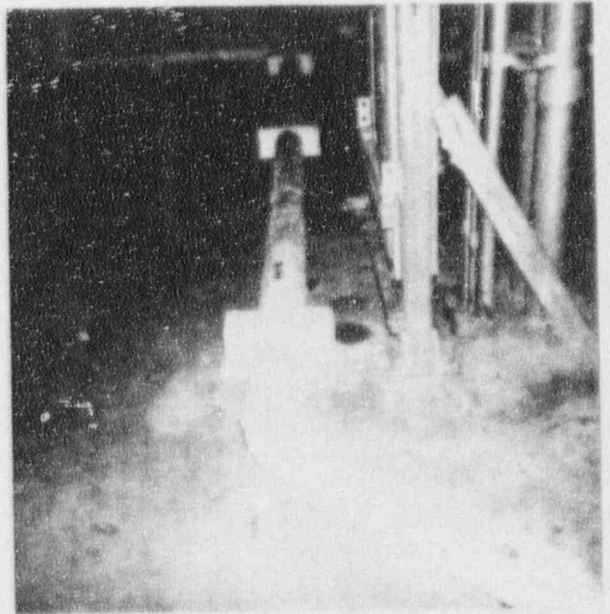
Commodity Description: **CONDUIT** - 2" Conduit Z2A1078 with cables Z2VA2004/A and Z2DV2008/A runs along the floor from the outer cable vault wall to a floor penetration.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a one hour rated enclosure around these cables.
Design Fire Rating	3 Hours (One hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	2" conduit wrapped with two half round conduit sections.
I. B. 2 Total Linear Feet	Approximately 130 feet.
Total Square Feet	N/A
II. A. Raceway Orientation (Hort./Vert.)	Horizontal
Raceway Material (AL/Steel)	Steel
Tray Type (Solid/Ladder)	N/A
Thermal Short Protection (Hanger/Etc.)	N/A
Air Drop	N/A
Unsupported Span (Tray/Box)	None
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 100% wire ties. Banding is spaced approximately 11" apart. Banding is not covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/32" to 1/8" with the majority being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	No
Cable Type/Size	Two 2/C Cu #10 600V power cables
Jacket Type	Unknown
Conductor Insulator Type	Unknown
Cable Fill %	15%

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with conduit. Conduit is in contact with wrap material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper. Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	Max derated ampacity for circuit Z2DV2008 is <10 amps. which is less than the 24.8 amps. the cable is capable of carrying. Max derated ampacity for circuit Z2VA2004/A is <10 amps. which is less than the 24.8 amps. the cable is capable of carrying.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value of 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results. Area is protected by early warning smoke detection and two automatic sprinkler sprinkler systems. Very limited fire loading with limited direct fire exposure to wrapped component. Large open area precludes heat build-up around wrapped commodity.
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

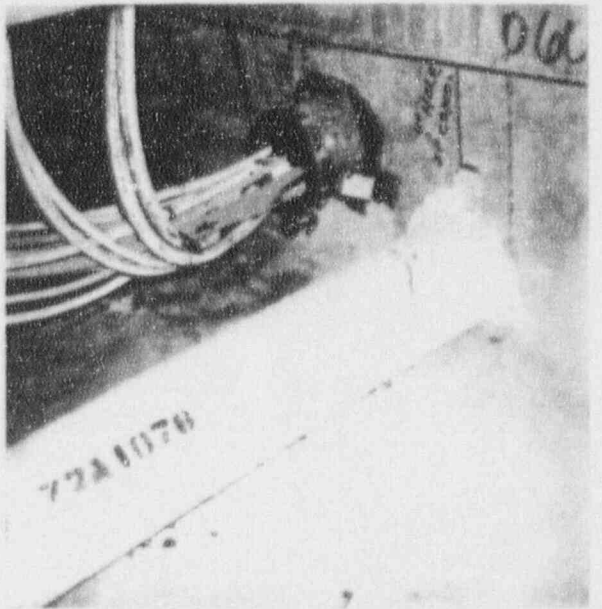
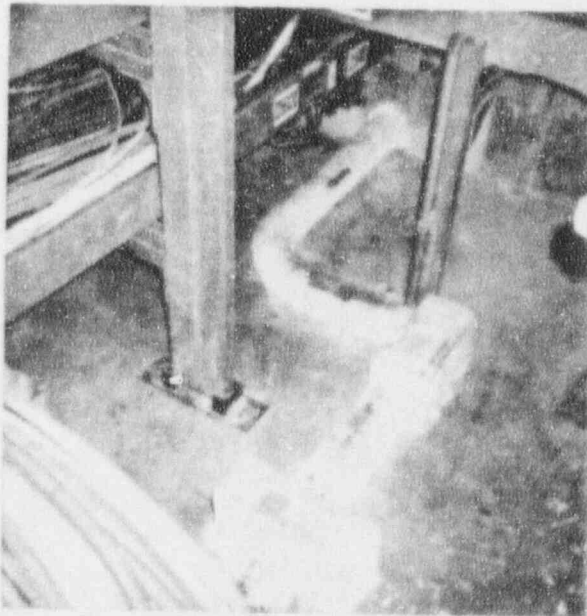
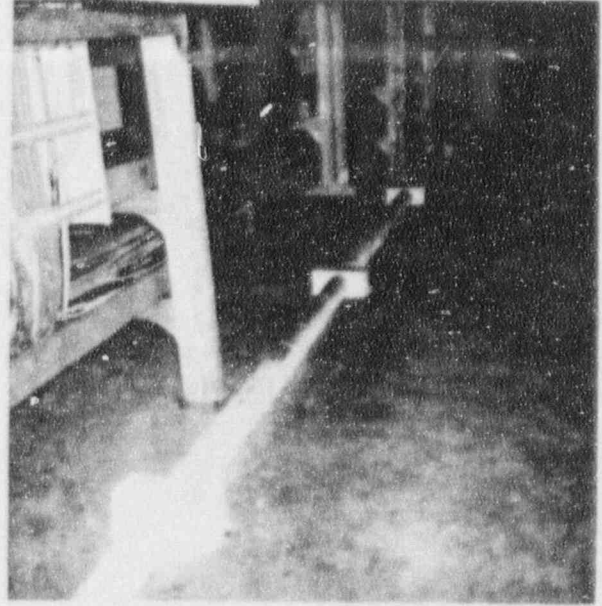
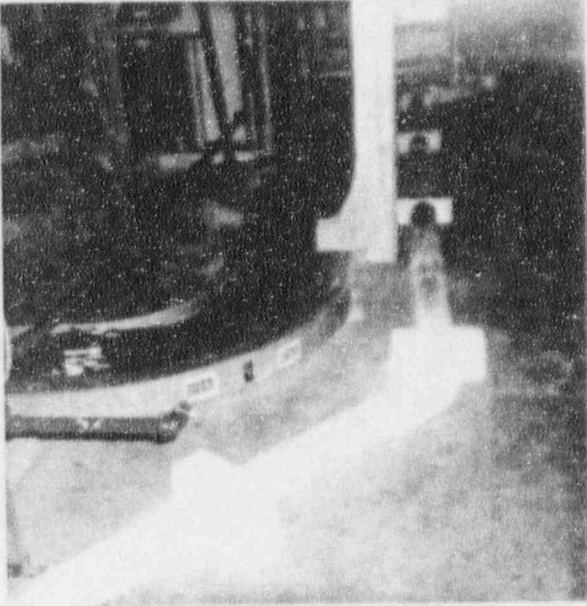
File F_A246(f)

Millstone Unit Two



2" Conduit Z2A1078, AC & DC Power to
Shutdown Panels CO9 And C10

Millstone Unit Two



2" Conduit Z2A1078, AC & DC Power to
Shutdown Panels CO9 And C10

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone Two	Fire Area/Elevation	A-24/ 25' - 6"
Building	Aux. Building	Commodity No.	A-24-7

Commodity Description: **CONDUIT** - 4" Conduit Z2A1073 with cables Z2B6102/J/H, Z2B6105/F/G/H and Z2B6117/D/E, runs from the outer cable vault wall to a floor penetration.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a one hour rated enclosure around these cables.
Design Fire Rating	3 Hours (One hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	4" conduit wrapped with two half round conduit sections.
I. B. 2 Total Linear Feet	Approximately 10 feet.
Total Square Feet	N/A
II. A. Raceway Orientation (Hori./Vert.)	Horizontal and vertical
Raceway Material (AL/Steel)	Steel
Tray Type (Solid/Ladder)	N/A
Thermal Short Protection (Hangers/Etc.)	N/A
Air Drop	N/A
Unsupported Span (Tray/Box)	None
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 100% wire ties. Banding is spaced approximately 11" apart. Banding is not covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/32" to 1/2" with the majority being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	No
Cable Type/Size	See Attached Cable Sheet.
Jacket Type	Unknown
Conductor Insulator Type	Unknown
Cable Fill %	39%

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with conduit. Conduit is in contact with wrap material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	See attached cable data sheet.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value of 1" material is needed.
V. B. Proposed Resolution	<p>waiting for NUMARC testing results.</p> <p>Area is protected by early warning smoke detection and two automatic sprinkler sprinkler systems.</p> <p>Very limited fire loading with limited direct fire exposure to wrapped component.</p> <p>Large open area precludes heat build-up around wrapped commodity.</p>
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

File F_A247(f)

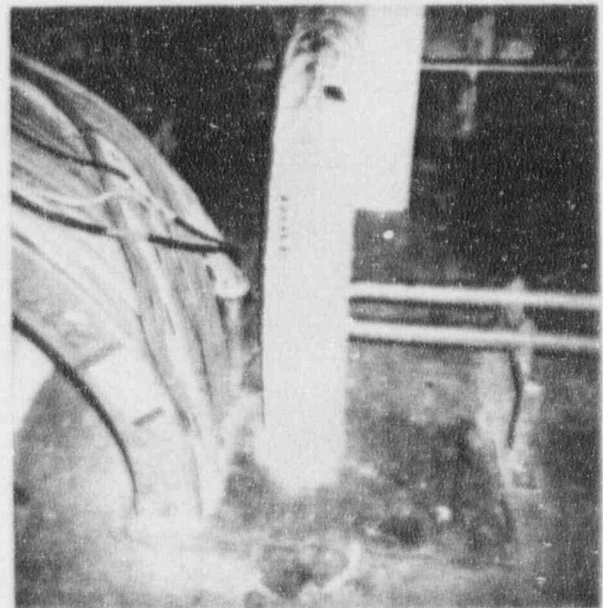
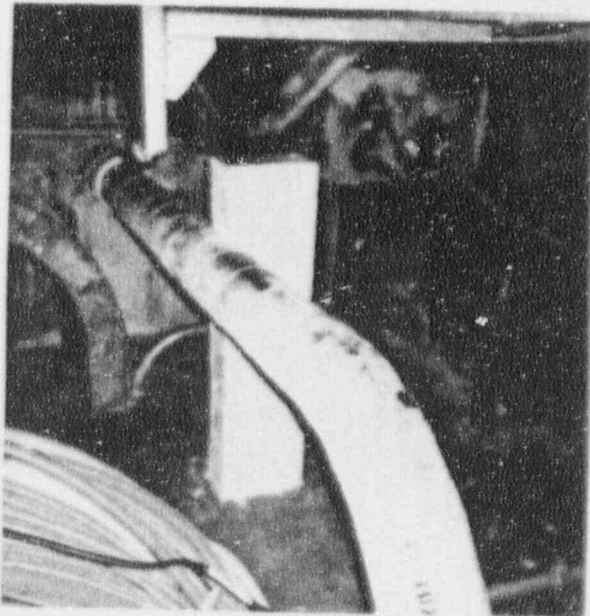
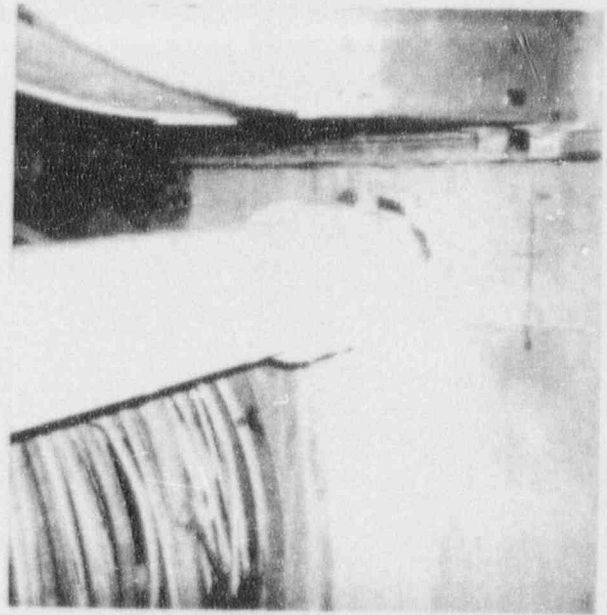
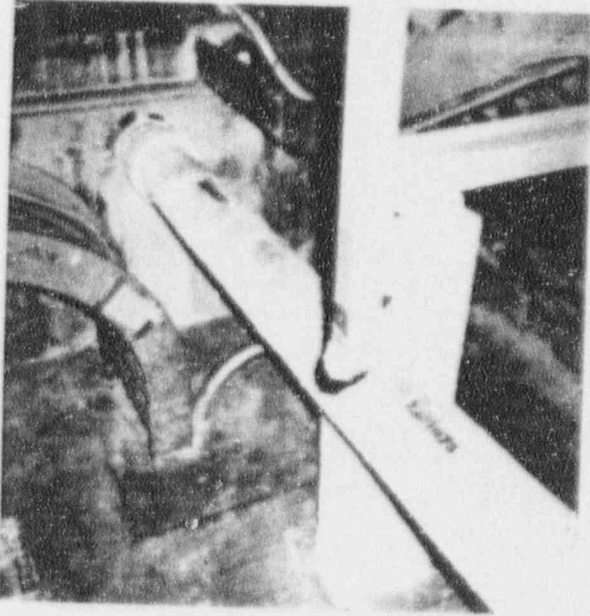
Cable Data Sheet

Commodity No. A-24-7

<u>Raceway #</u>	<u>Type of Raceway</u>	<u>Cable Fill,</u>	<u>Cable Distribution,</u>	<u>Air Drop Y/N</u>	<u>Type of Thermolaq</u>
Z2A1073	4"RSG	39%	Random	N	1"

<u>Cable #</u>	<u>Cable Size,</u>	<u>Cable Type,</u>	<u>Cable Materl's Insul'n/Jac't</u> 243	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C, Comments</u>
Z2B6102/J	9/c	Cu	600V	<2	9.6	42.1 Est'd
	#14	Cntl				
Z2B6105/G	7/c	Cu	600V	<2	9.6	42.1 Est'd
	#14	Cntl				
Z2B6105/H	9/c	Cu	600V	<2	9.6	42.1 Est'd
	#14	Cntl				
Z2B6117/D	7/c	Cu	600V	<2	9.6	42.1 Est'd
	#14	Cntl				
Z2B6117/E	3/c	Cu	600V	<2	9.6	42.1 Est'd
	#14	Cntl				
Z2B6102/H	3/c	Cu	1KV	122.3	118	93.7 Based on 414V Min. Motor Voltage which is a temporary condition
	4/0	Pwr				
Z2B6105/F	3/c	Cu	1KV	122.3	118	93.7 Based on 414V Min. Motor Voltage which is a temporary condition
	4/0	Pwr				

Millstone Unit Two



4" Conduit Z2A1073, Power Cable to Charging Pumps MP-18B and MP-18C

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone Two	Fire Area/Elevation	T-1A/ 14' 6"
Building	Turbine Building	Commodity No.	T-1A-1

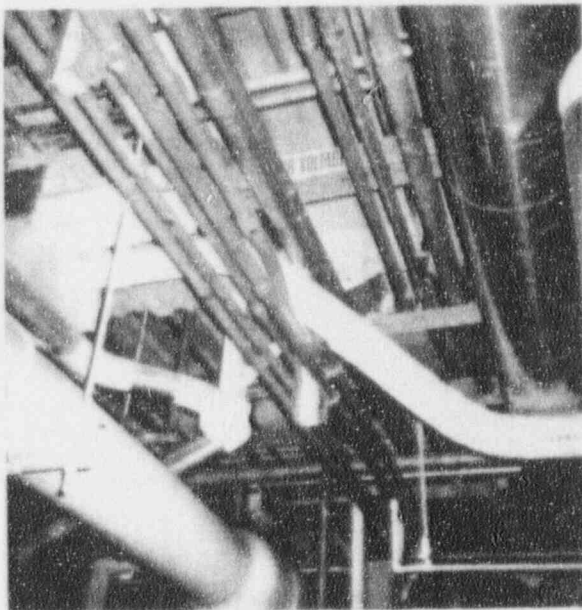
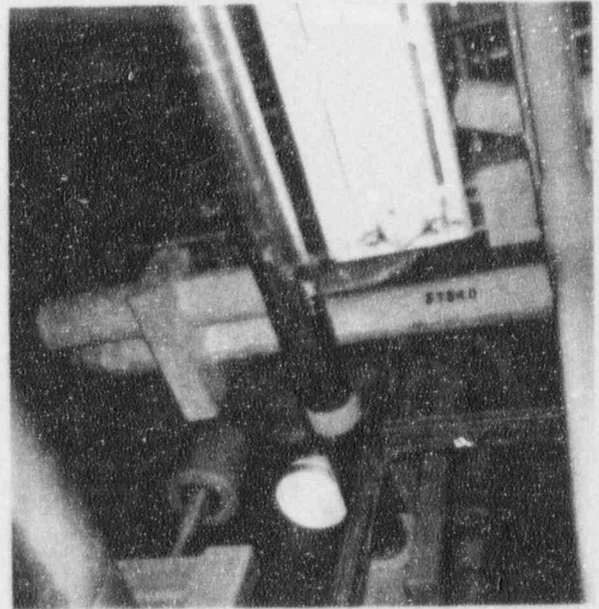
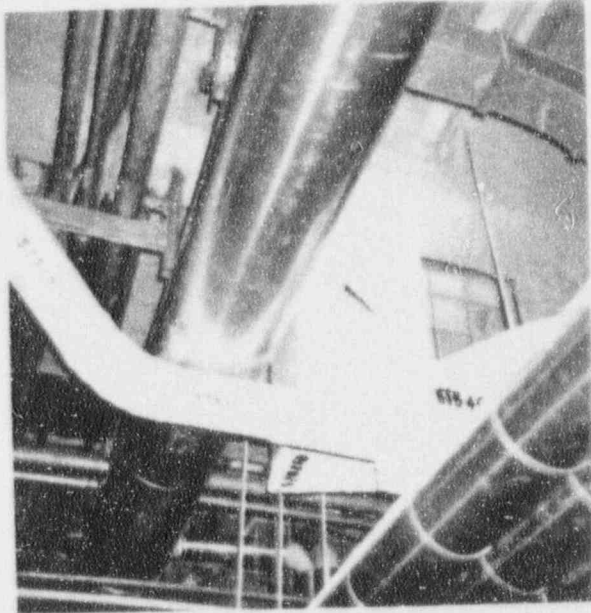
Commodity Description: CONDUIT - 5" conduit 5T540 (Cable 5A602/C), runs from concrete duct bank up to the area above. Commodity consists mostly of conduit sections with some flat boards used around obstructions.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a three hour rated enclosure around these cables.
Design Fire Rating	3 Hours (three hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	5" conduit sections applied to conduit and flat panels to form a box around conduit and obstructions.
I. B. 2 Total Linear Feet	Approximately 33 feet
Total Square Feet	N/A
II. A. Raceway Orientation (Hort./Vert.)	Vertical, minor horizontal.
Raceway Material (AL/Steel)	Steel
Tray Type (Solid/Ladder)	N/A
Thermal Short Protection (Hanger/Etc.)	Thermal short protection provided for 18 "
Air Drop	N/A
Unsupported Span (Tray/Box)	N/A
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 85% wire ties and 15% steel bands. Banding is spaced approximately 10" apart. Banding is not covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/16" to 3/4" with majority being 1/8".
Does Internal Banding Exist	No
Addition Trowel Material	No
Cable Type/Size	5A602/C 3/C Cu #6 1kV power
Jacket Type	Hypalon
Conductor Insulator Type	EPR
Cable Fill %	10%

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with conduit. Conduit is in contact with wrap material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper. Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	Max derated ampacity for circuit 5A602/C is less than 30 amps. which is less than the 57.9 amps. the cable is capable of carrying.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value of 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results. Very limited fire loading, with no limited direct fire exposure to wrapped component. Large open area precludes heat build-up around wrapped commodity.
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

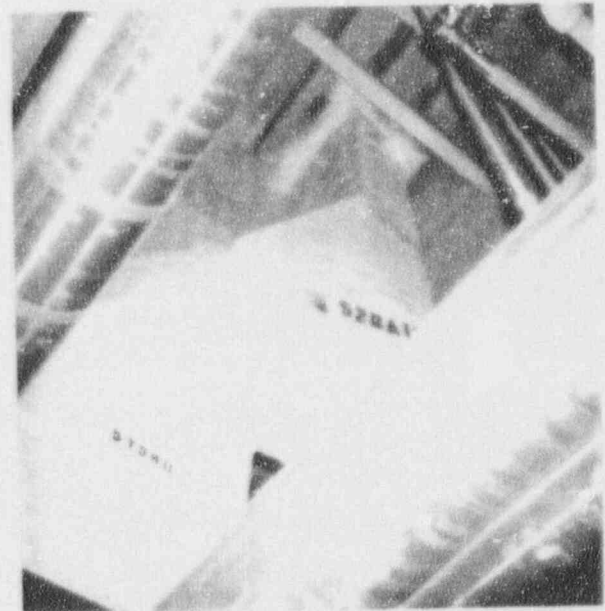
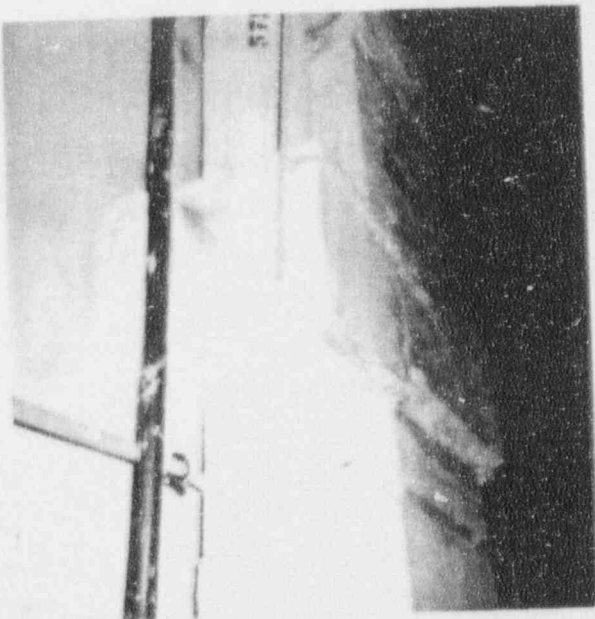
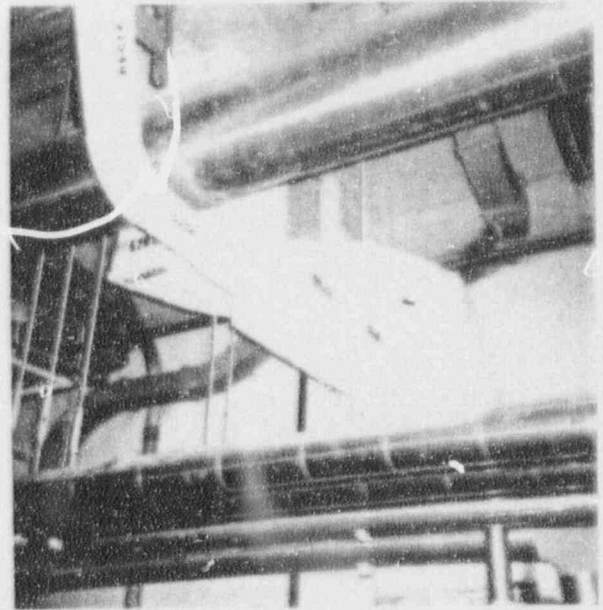
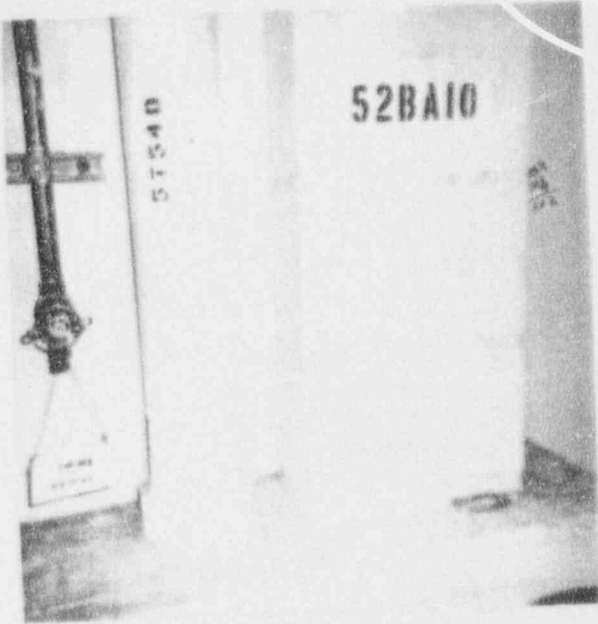
File F_T1A1(f)

Millstone Unit Two



3" Conduit 5T540, Backfeed Control, and 12" Tray 52BA10
Backfeed Power

Millstone Unit Two



3" Conduit 5T540, Backfeed Control, and 12" Tray 52BA10
Backfeed Power

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone Two	Fire Area/Elevation	T-1A/ 14' 6"
Building	Turbine Building	Commodity No.	T-1A-2

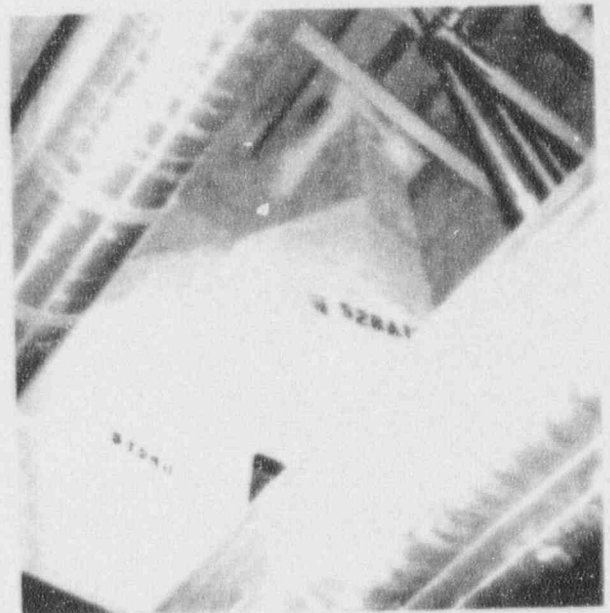
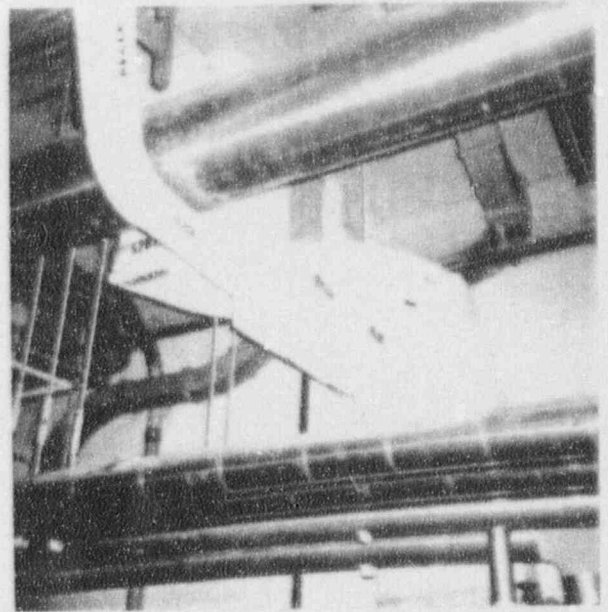
Commodity Description: **TRAY** - 12" cable tray (52BA10) runs from duct bank to area above.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a three hour rated enclosure around these cables.
Design Fire Rating	3 Hours (three hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	Cable tray enclosure. 8" deep x 16" wide x 28" long
I. B. 2 Total Linear Feet	Approximately 28 feet.
Total Square Feet	Approximately 129.2 sq. feet.
II. A. Raceway Orientation (Hort./Vert.)	Vertical & horizontal.
Raceway Material (AL/Steel)	Steel
Tray Type (Solid/Ladder)	Ladder Type Tray
Thermal Short Protection (Hanger/Etc.)	Thermal short protection provided for 18 "
Air Drop	N/A
Unsupported Span (Tray/Box)	16" (10" between ties and bands)
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 10% wire ties and 90% steel bands. Banding is spaced approximately 10" apart. Banding is not covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/32" to 1/8" with the majority being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	No
Cable Type/Size	5A505/A/P 3/C AJ 750 MCM 5KV power
Jacket Type	Hypalon
Conductor Insulator Type	EPR
Cable Fill %	38%
Other Materials Present	None

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Cable Contact with Barrier Material	Cable is in contact with tray. Tray is in contact with wrap material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	Max derated ampacity for circuit 5A505/A/P is 396.9 amps. which is less than the 672.2 amps. the cable is capable of carrying.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value of 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results. Very limited fire loading with no direct fire exposure to wrapped component. Large open area precludes heat build-up around wrapped commodity.
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC testing is completed and publishes the final test report.

File F_T1A2(f)

Millstone Unit Two



3" Conduit 5T540, Backfeed Control, and 12" Tray 52BA10
Backfeed Power

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone Two	Fire Area/Elevation	T-1A/ 14' 6"
Building	Turbine Building	Commodity No.	T-1A-3

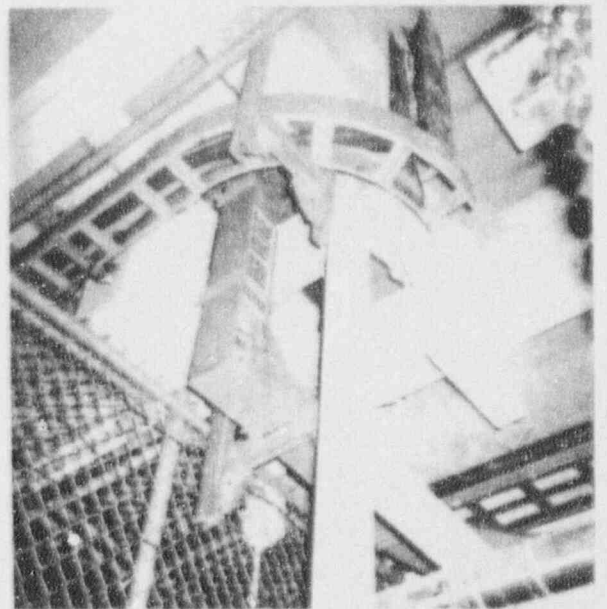
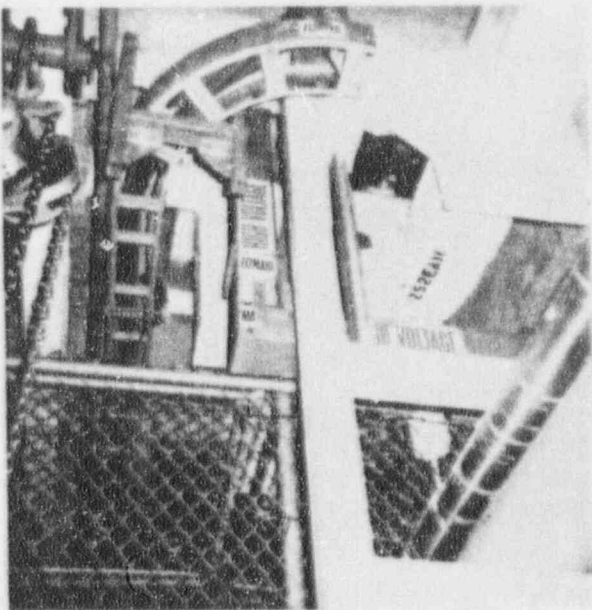
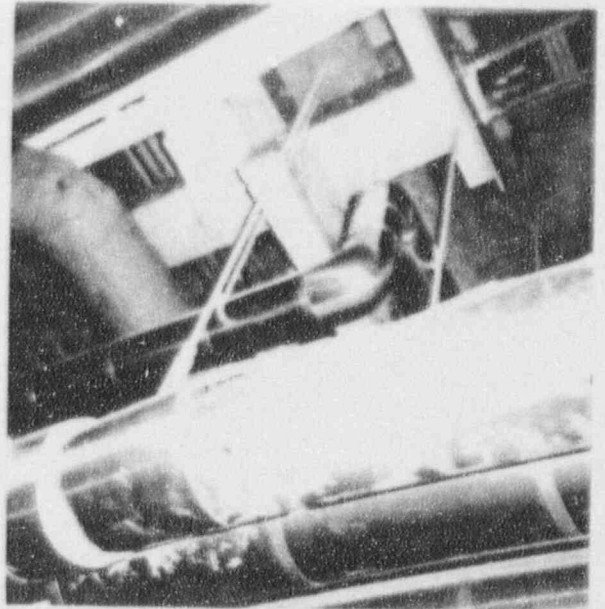
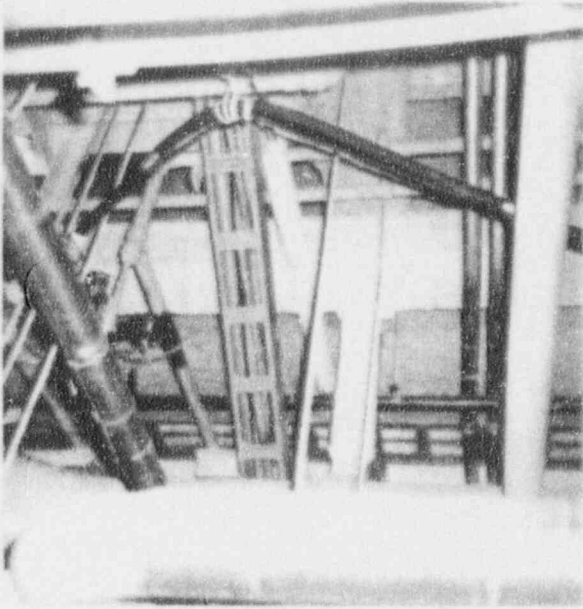
Commodity Description: **TRAY** - 6" cable tray (Z52EA10), runs down from concrete ceiling along ceiling of Turbine Building up to another area.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a three hour rated enclosure around these cables.
Design Fire Rating	3 Hours (three hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	Cable tray enclosure. 12" deep x 15" wide x 77 long
I. B. 2 Total Linear Feet	Approximately 77 feet
Total Square Feet	Approximately 346.5 sq. feet
II. A. Raceway Orientation (Hori./Vert.)	Horizontal, minor vertical.
Raceway Material (AL/Steel)	Steel
Tray Type (Solid/Ladder)	Ladder type tray
Thermal Short Protection (Hanger/Etc.)	Thermal short protection provided for 18".
Air Drop	N/A
Unsupported Span (Tray/Box)	15" (12" between ties and banding).
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 20% wire ties and 80% steel bands. Banding is spaced approximately 12" apart. Some banding (20%) is covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/32" to 1/4" with the majority gap being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	No
Cable Type/Size	Z5A501A/A 3/C Al 750 MCM 5kV power
Jacket Type	Hypalon
Conductor Insulator Type	EPR
Cable Fill %	38%
Other Materials Present	None

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Cable Contact with Barrier Material	Cable is in contact with tray. Tray is in contact with wrap material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	Max derated ampacity for circuit Z5A501A/A is 198.5 amps. which is less than the 336.0 amps. the cable is capable of carrying.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value of 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results. Very limited fire loading with no limited direct fire exposure to wrapped component. Large open area precludes heat build-up around wrapped commodity.
VI. B Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

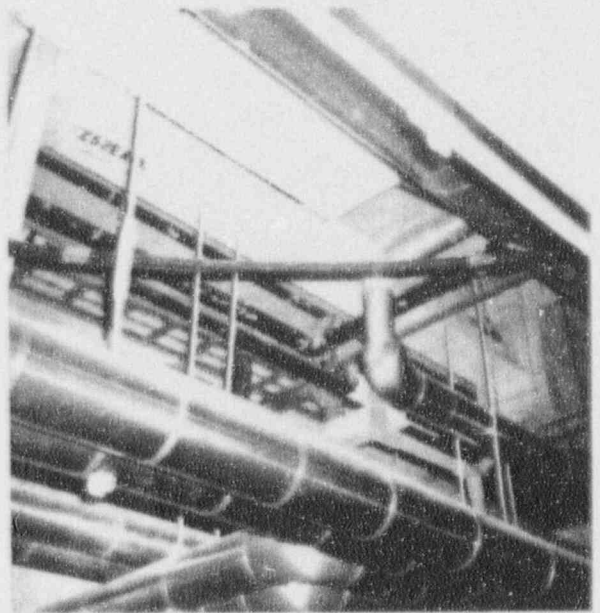
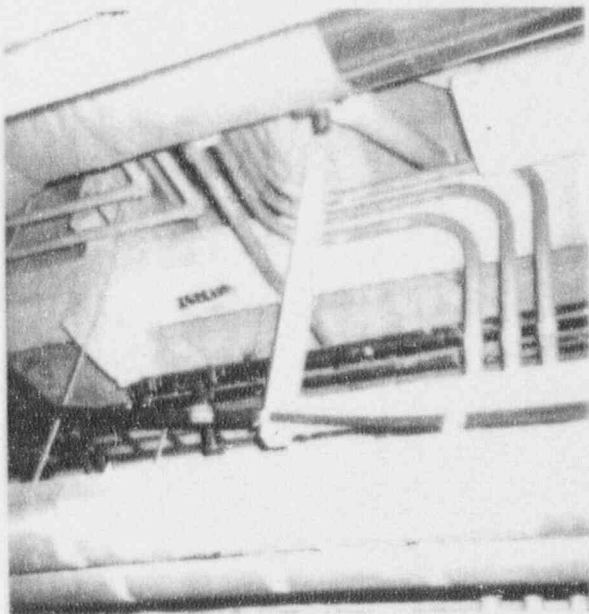
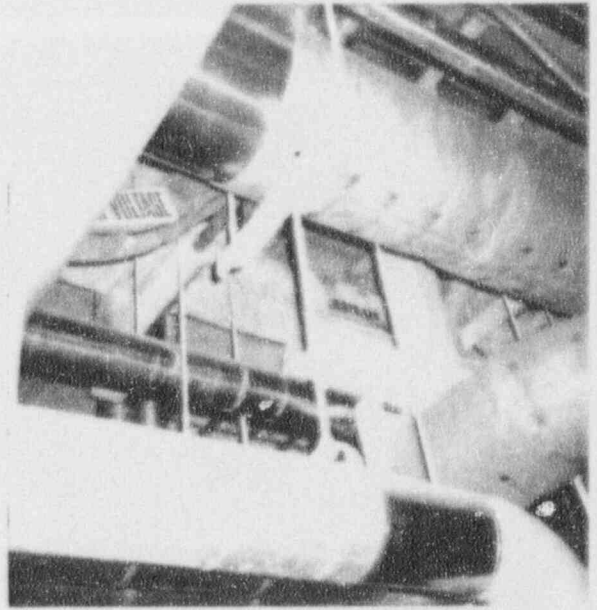
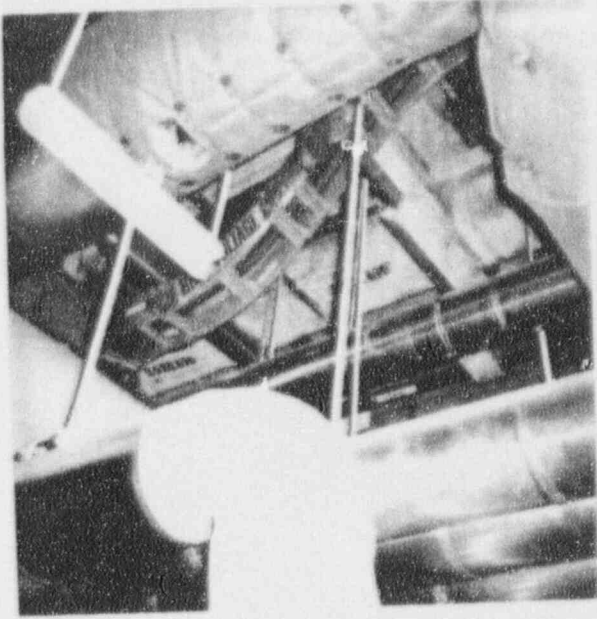
File F_T1A3(f)

Millstone Unit Two



6" Tray Z52EA10, Power To Switchgear 24C

Millstone Unit Two



6" Tray Z52EA10, Power To Switchgear 24C

Thermo-Lag Fire Barrier Data Sheet
Response to NRC Request for Information

Plant	Millstone Two	Fire Area/Elevation	T-1A/ 14' 6"
Building	Turbine Building	Commodity No.	T-1A-4

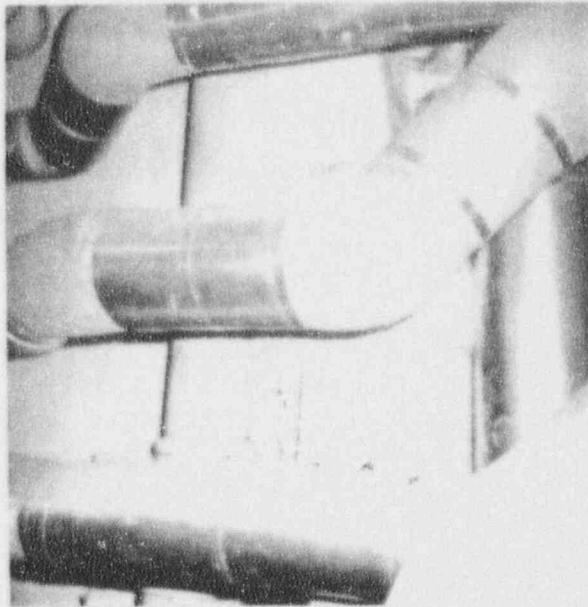
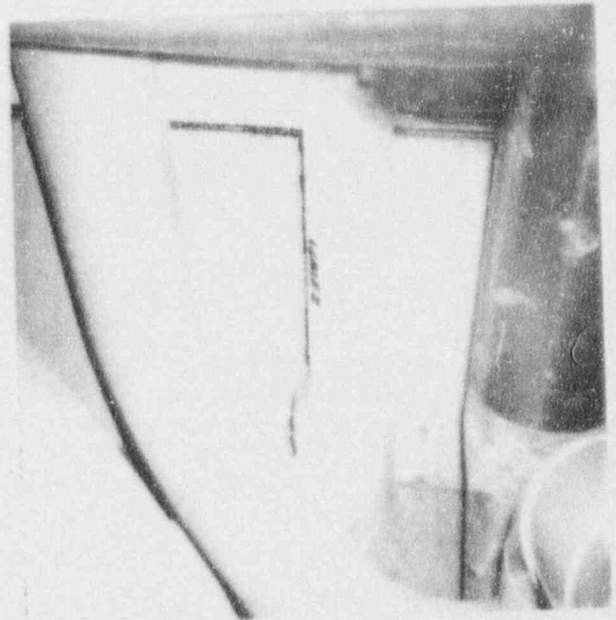
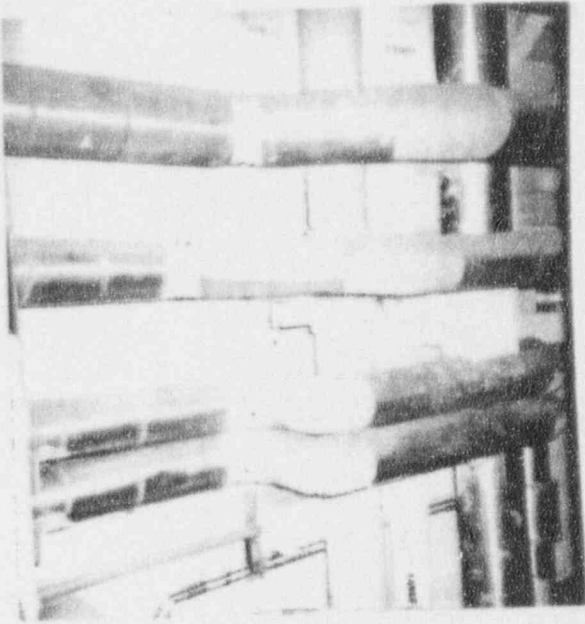
Commodity Description: **CONDUIT** - 2" conduit (Z2T871) from Turbine Building wall down to the floor. Minor box configuration at penetration.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a three hour rated enclosure around these cables.
Design Fire Rating	3 Hours (three hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	2" conduit sections.
I. B. 2 Total Linear Feet	Approximately 7 feet
Total Square Feet	Approximately 8.75 sq. feet
II. A. Raceway Orientation (Hort./Vert.)	Vertical
Raceway Material (AL/Steel)	Steel
Tray Type (Solid/Ladder)	N/A
Thermal Short Protection (Hanger/Etc.)	N/A
Air Drop	N/A
Unsupported Span (Tray/Box)	N/A
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 100% wire ties. Banding is spaced approximately 10" apart. Banding is not covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/32" to 1/4" with the majority gap being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	No
Cable Type/Size	Z2NF09/F 7/C #14 Cu 600V Z2SV4188/C 9/C #12 Cu 600V Z2SV4188/D 4/C #10 Cu 600V
Jacket Type	Unknown
Conductor Insulator Type	Unknown
Cable Fill %	36%

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with conduit. Conduit is in contact with wrap material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	Max derated ampacity for circuit Z2NF09/F is <2 amps. which is less than the 9.6 amps. the cable is capable of carrying. Max derated ampacity for circuit Z2SV4188/C is <6 amps. which is less than the 11.7 amps. the cable is capable of carrying. Max derated ampacity for circuit Z2SV4188/CD is <10 amps. which is less than the 15.6 amps. the cable is capable of carrying.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value of 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results. Very limited fire loading with no limited direct fire exposure to wrapped component. Large open area precludes heat build-up around wrapped commodity.
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

File F_T1A4(D)

Millstone Unit Two



2" Conduit Z2T871 to Auxiliary Feedwater Pump

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone Two	Fire Area/Elevation	T-1C/31' - 6"
Building	Turbine Building	Commodity No.	T-1C-1

Commodity Description: **GROUPED TRAY/CONDUIT** - 6" cable tray Z52FA10 runs from the concrete floor up the wall to the concrete ceiling. This enclosure also includes a wrapped I beam, tray Z22EA10 (4" x 6") and 3" conduit 5T540 (see commodity T-1C-2 for cable 5A602/C information).

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a three hour rated enclosure around these cables.
Design Fire Rating	3 Hours (three hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	6" cable tray wrapped against concrete wall. 26" wide x 17" deep x 9.5' long
I. B. 2 Total Linear Feet	Approximately 9.5 feet.
Total Square Feet	Approximately 47.5sq. feet.
II. A. Raceway Orientation (Hort./Vert.)	Vertical
Raceway Material (AL/Steel)	Steel
Tray Type (Solid/Ladder)	Ladder
Thermal Short Protection (Hanger/Etc.)	Thermal protection provided for 18".
Air Drop	N/A
Unsupported Span (Tray/Box)	26" (10.5" between banding).
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 100% steel bands. Banding is spaced approximately 10.5" apart. Banding is not covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/16" to 0" with the majority being 1/32".
Does Internal Banding Exist	No
Addition Trowel Material	No
Cable Type/Size	Z5A505A/B - 3/C Al 750 MCM 5 kV Power also see commodity T-1C-2. ** See note on next page for tray Z22EA10.
Jacket Type	Hypalon

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Conductor Insulator Type	EPR
Cable Fill %	38%
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with tray. Tray is in contact with wrap material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related failure.
II. B. 1 Verified By (Walkdowns/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	Max derated ampacity for circuit Z5A505A/B is 198.5 amps, which is less than the 336.5 amps. the cable is capable of carrying.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value of 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results. Very limited fire loading with no direct fire exposure to wrapped component. Large open area precludes heat build-up around wrapped commodity.
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

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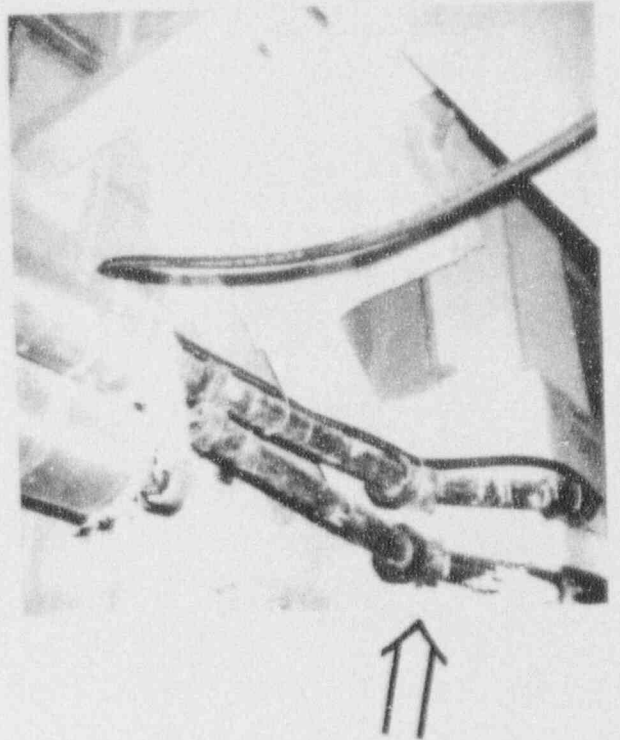
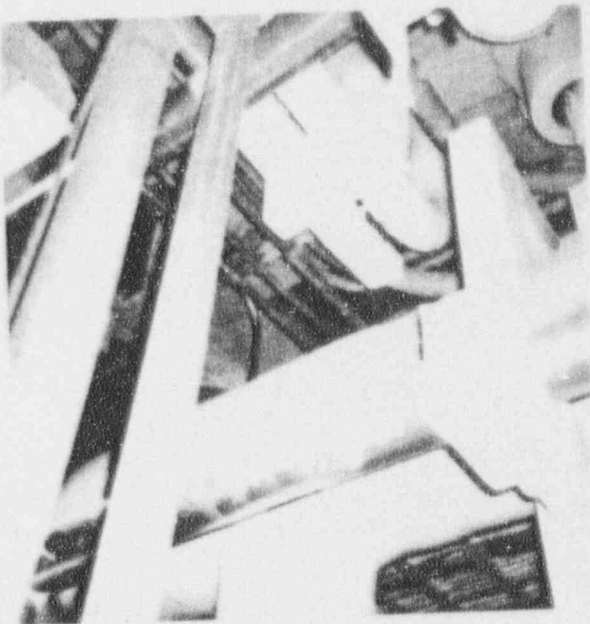
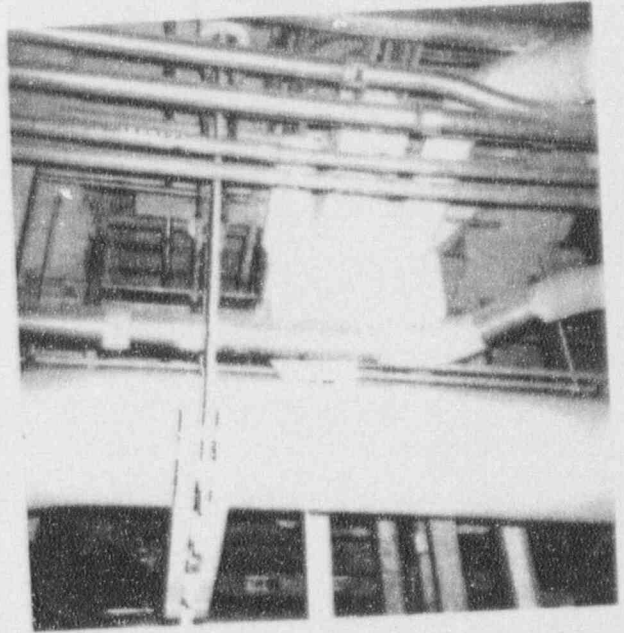
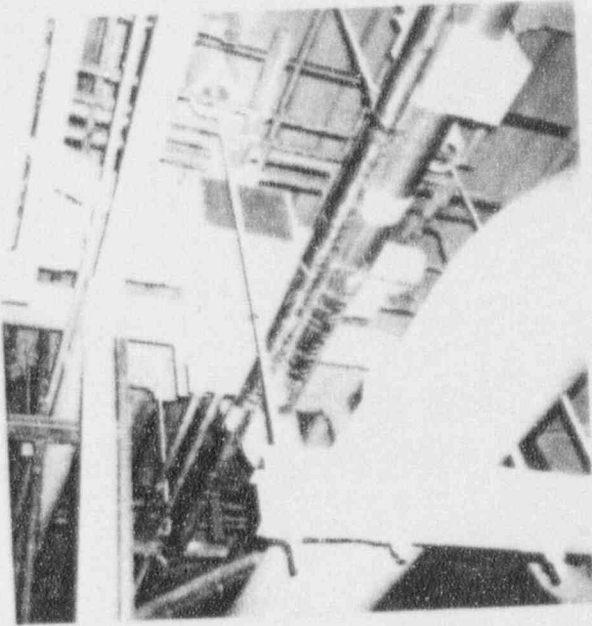
<u>Raceway #</u>	<u>Type of Raceway</u>	<u>Cable Fill,</u>	<u>Cable Distribution,</u>	<u>Air Drop Y/N</u>	<u>Type of Thermolag</u>
Z22EA10	4"x6" TRLG	38%	Maintained	N	1"

<u>Cable #</u>	<u>Cable Size,</u>	<u>Cable Type,</u>	<u>Cable Materl's Insul'n/Jac't</u>	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C,</u>	<u>Comments</u>
Z2A407/A	3/c Al 5KV	EPR/Hypalon	90deg.C	63	210.6	45	Est'd

243

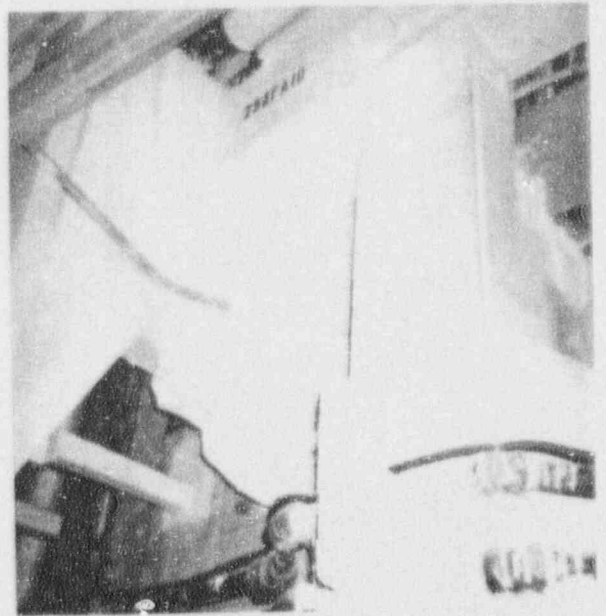
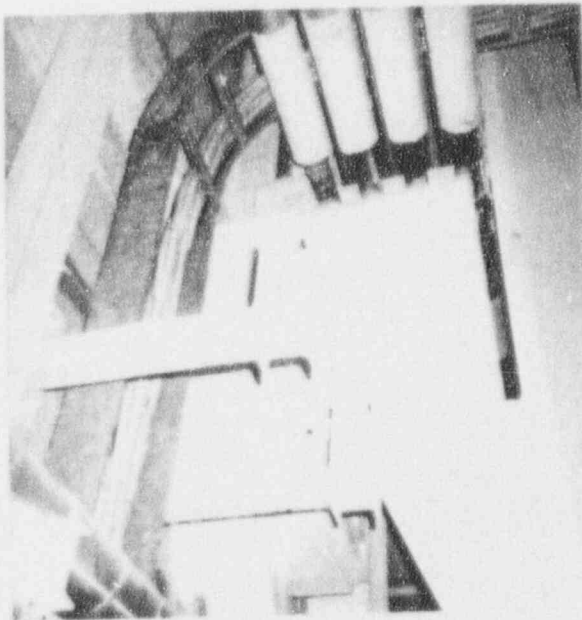
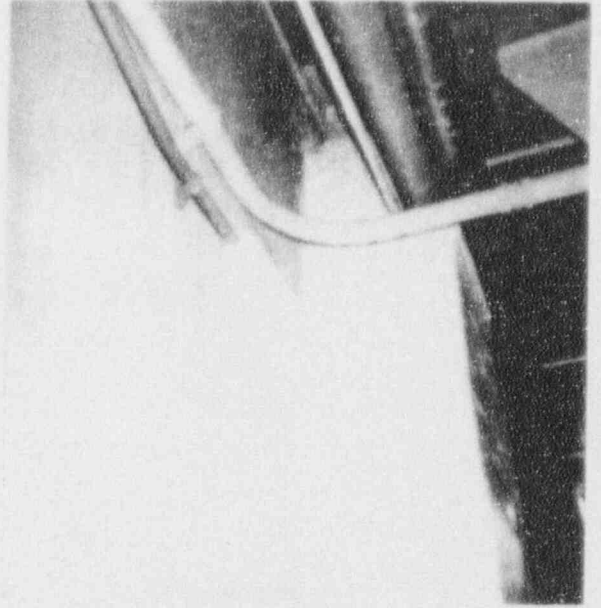
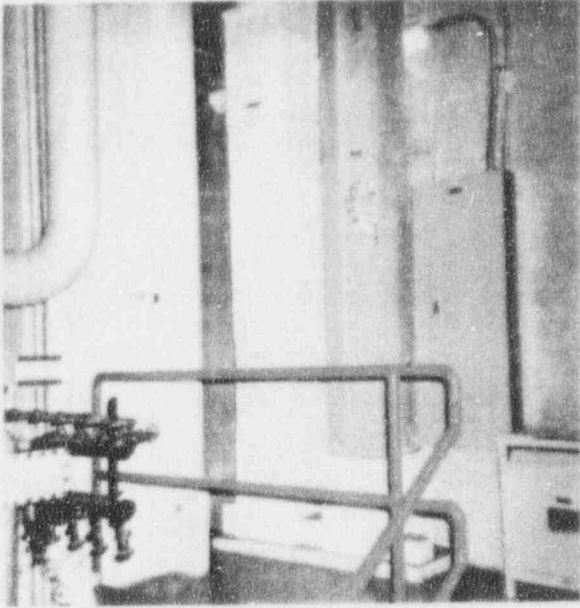
Note: Z22EA10 tray system and its cable Z2A407/A was wrapped with the same Thermo-Lag envelope as the tray system Z52FA10 due to the physical difficulty of just wrapping the required tray system Z52FA10 and its cable. The trays are on either side of an 'I' column and they are separated by the steel of the 'I' column, therefore each cable has been rated in isolation of the other cable. This cable Z2A407/A has only been included to show that the wrap has not degraded the cable.

Millstone Unit Two



3" Conduit 5T540 to Backfeed Control & 6" Tray Z52FA10,
Power to Switchgear 24D

Millstone Unit Two



6" Tray 7[^] 2FA10, Power to Switchgear 24D

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone Two	Fire Area/Elevation	T-1C/31' - 6"
Building	Turbine Building	Commodity No.	T-1C-2

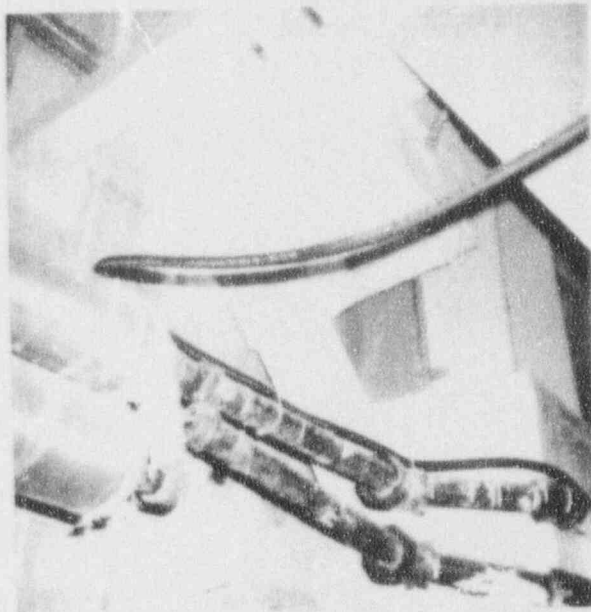
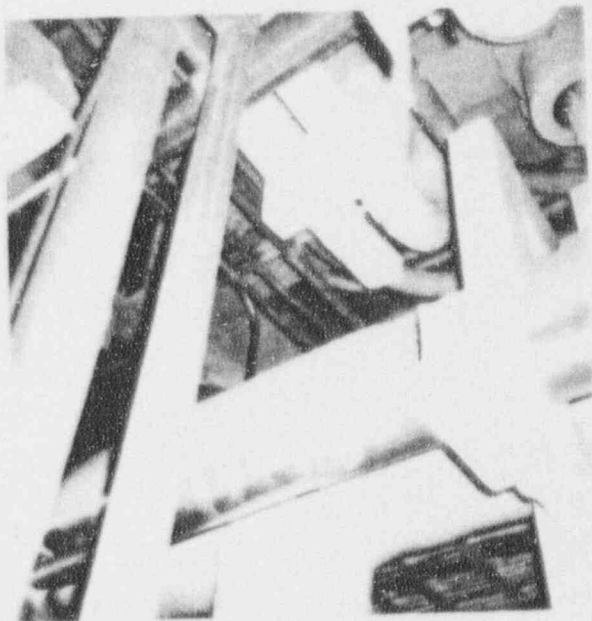
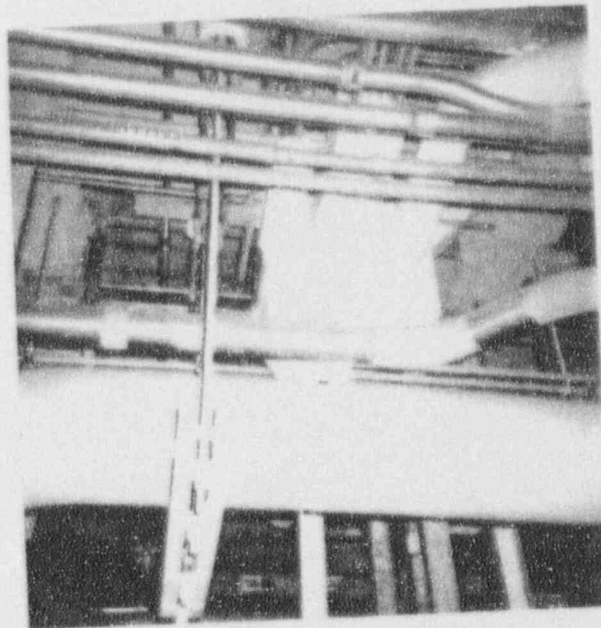
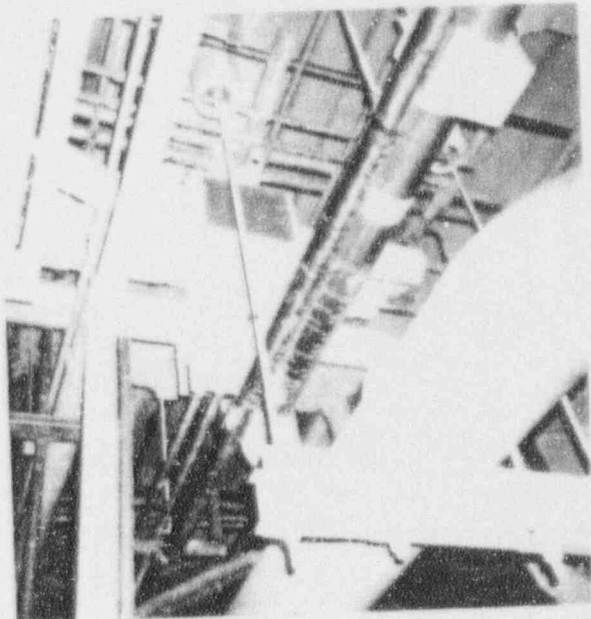
Commodity Description: **CONDUIT** - 5" conduit 5T540 (Cable 5A602/C, runs from the cable tray enclosure (commodity T-1C-1) to the concrete wall.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a three hour rated enclosure around these cables.
Design Fire Rating	3 Hours (three hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	5" conduit sections applied to conduit with flat panels used to form a box around conduit and obstructions.
I B. 2 Total Linear Feet	Approximately 3 feet.
Total Square Feet	N/A
II A. Raceway Orientation (Hort./Vert.)	Vertical
Raceway Material (AL/Steel)	Steel
Tray Type (Solid/Ladder)	N/A
Thermal Short Protection (Hanger/Etc.)	Thermal protection provided for 18 "
Air Drop	N/A
Unsupported Span (Tray/Box)	N/A
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 30% wire ties and 70% steel bands. Banding is spaced approximately 10.5" apart. Banding is not covered with trowel grade material.
Joint Description (Gap size/Butter-d/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/16" to 0" with the majority being 1/32".
Does Internal Banding Exist	No
Addition Trowel Material	No
Cable Type/Size	5A602/C 3/C Cu #6 1kV power
Jacket Type	Hypalon
Conductor Insulator Type	EPR
Cable Fill %	10%
Other Materials Present	None

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Cable Contact with Barrier Material	Cable is in contact with conduit. Conduit is in contact with wrap material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	Max derated ampacity for circuit 5A602/C is less than 30 amps. which is less than the 57.9 amps. the cable is capable of carrying.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value for 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results. Very limited fire loading with no direct fire exposure to wrapped component. Large open area precludes heat build-up around wrapped commodity.
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

File F_T1C2(f)

Millstone Unit Two



3" Conduit 5T540 to Backfeed Control & 6" Tray Z52FA10,
Power to Switchgear 24D

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone Two	Fire Area/Elevation	T-1F/54' - 6"
Building	Turbine Building	Commodity No.	T-1F-1

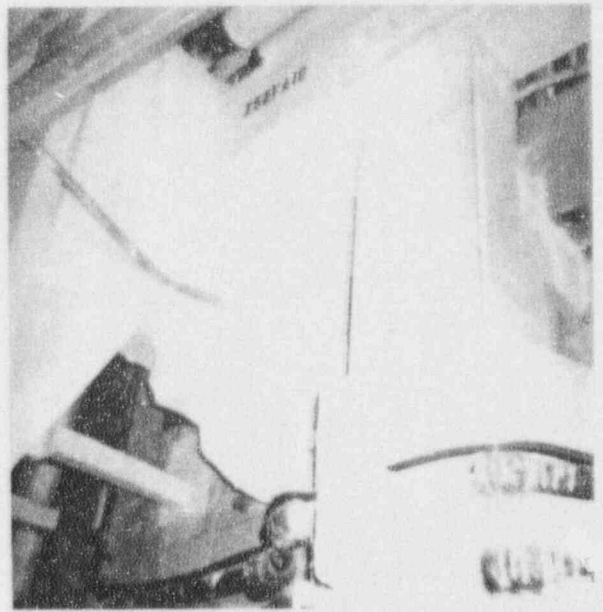
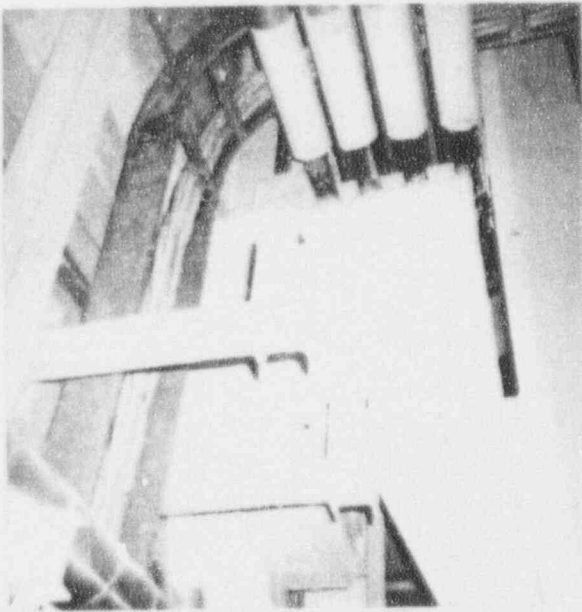
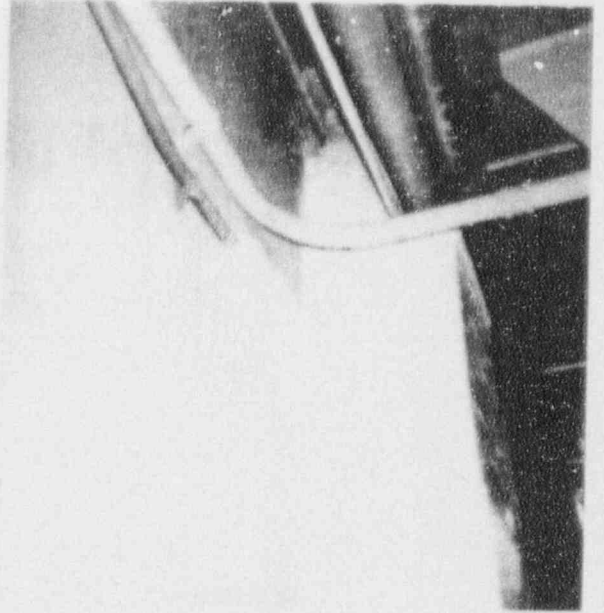
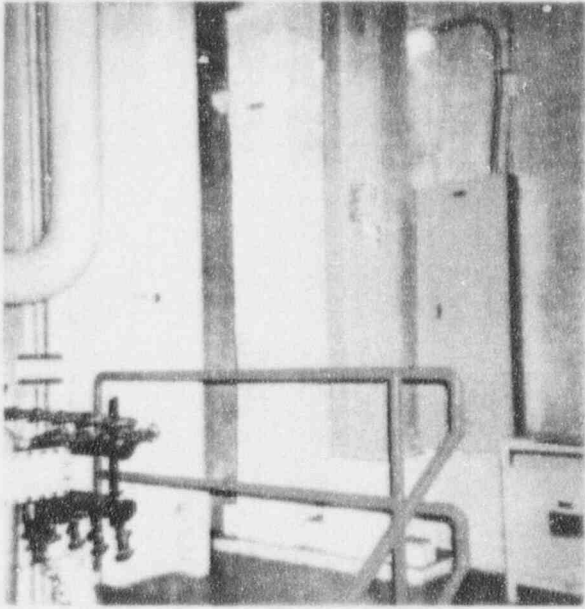
Commodity Description: **TRAY** - 6" cable tray Z52FA10 runs from the concrete floor up the wall into the switchgear room thru a wall penetration.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a three hour rated enclosure around these cables.
Design Fire Rating	3 Hours (three hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	6" cable tray wrapped against concrete wall.
I. B. 2 Total Linear Feet	Approximately 14 feet
Total Square Feet	Approximately 58.3 sq. feet
II. A. Raceway Orientation (Hori./Vert.)	Vertical
Raceway Material (Al/Steel)	Steel
Tray Type (Solid/Ladder)	Ladder
Thermal Short Protection (Hanger/Etc.)	Thermal protection provided for 18".
Air Drop	N/A
Unsupported Span (Tray/Box)	17" (10.5" between banding).
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 100% steel bands. Banding is spaced approximately 10.5" apart. Banding is not covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/16" to 0" with the majority being 1/32".
Does Internal Banding Exist	No
Addition Trowel Material	No
Cable Type/Size	Z5A505A/B - 3/C Al 750 MCM 5 kV Power
Jacket Type	Hypalon
Conductor Insulator Type	EPR
Cable Fill %	38%
Other Materials Present	None

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Cable Contact with Barrier Material	Cable is in contact with tray. Tray is in contact with wrap material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	Max derated ampacity for circuit Z5A505A/B is 198.5 amps. which is less than the 336.5 amps. the cable is capable of carrying.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value for 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results. Very limited fire loading with no direct fire exposure to wrapped component. Large open area precludes heat build-up around wrapped commodity.
VI. B Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

File F_T1F1(f)

Millstone Unit Two



6" Tray Z52FA10, Power to Switchgear 24D

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone Two	Fire Area/Elevation	A-6A & B/-25' - 6"
Building	Aux. Building	Commodity No.	A-6A&B-1

Commodity Description: **CONDUIT** - 3" conduits (Z1A636, Z2A201, Z2A209 & Z2A1074) in the Charging Pump Area.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a three hour rated enclosure around these cables.
Design Fire Rating	3 Hours (three hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	3" conduit half round sections.
I. B. 2 Total Linear Feet	Approximately 112 feet total for all 4 runs.
Total Square Feet	N/A
II. A. Raceway Orientation (Hort./Vert.)	Vertical and horizontal.
Raceway Material (Al/Steel)	Steel
Tray Type (Solid/Ladder)	N/A
Thermal Short Protection (Hanger/Etc.)	Thermal short protection provided for 18"
Air Drop	N/A
Unsupported Span (Tray/Box)	N/A
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 100% wire ties. Banding is spaced approximately 9" apart. Banding is not covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/16" to 1/8" with the majority being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	No
Cable Type/Size	See Attached Cable Data Sheets.
Jacket Type	See Attached Cable Data Sheets.
Conductor Insulator Type	See Attached Cable Data Sheets.
Cable Fill %	35%, 9%, 21% & 54%, respectively.
Other Materials Present	None

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Cable Contact with Barrier Material	Cable is in contact with conduit. Conduit is in contact with wrap material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	See Attached Cable Data Sheets.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value for 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results.
VI B Proposed Schedule	Final disposition can not be determined until NUMARC testing is completed and publishes the final test report.

File F_A6A1(f)

Cable Data Sheet

Commodity No. A-6A&B -1

<u>Raceway #</u>	<u>Type of Raceway</u>	<u>Cable Fill,</u>	<u>Cable Distribution,</u>	<u>Air Drop Y/N</u>	<u>Type of Thermolag</u>
Z1A636	3"RSG	35%	Random	N	1"

<u>Cable #</u>	<u>Cable Size,</u>	<u>Cable Type,</u>	<u>Cable Materl's Insul'n/Jac't</u>	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C,</u>	<u>Comments</u>
Z1MCO2/B	2/c Cu #14	1KV Cntl	FR/FR 90deg.C	<2	13.4	41.1	Est'd
Z1VA1010/A	2/cCu #10	1KV Cntl	FR/FR 90deg.C	<10	21.8	50.5	Est'd
Z1B5103/A	3/c Cu 4/0	1KV Pwr	EPR/Hypalon 90deg.C	122.3	164	67.8	Based on 414V Min. Motor Voltage which is a temporary condition

<u>Raceway #</u>	<u>Type of Raceway</u>	<u>Cable Fill,</u>	<u>Cable Distribution,</u>	<u>Air Drop Y/N</u>	<u>Type of Thermolag</u>
Z2A1074	3"RSG	54%	Random	N	1"

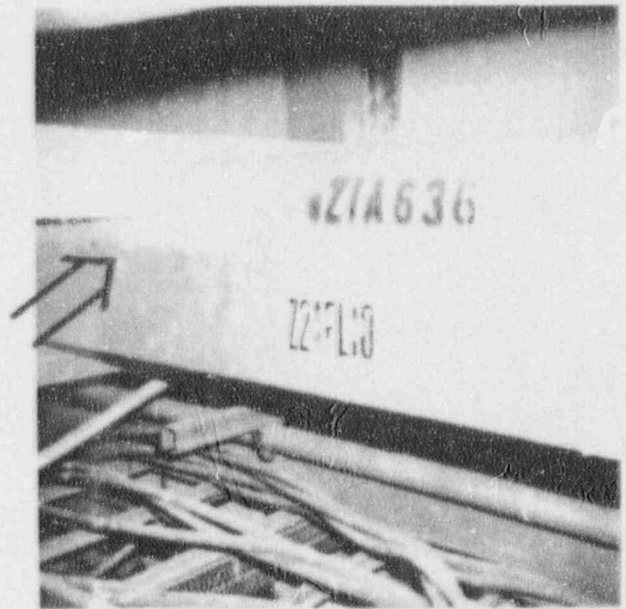
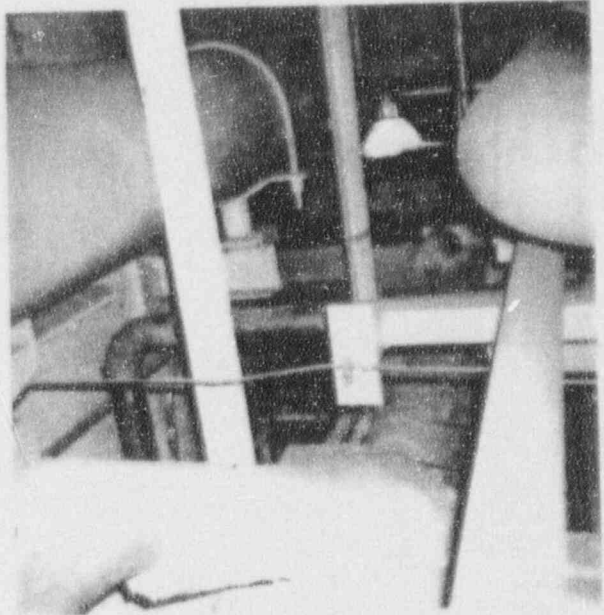
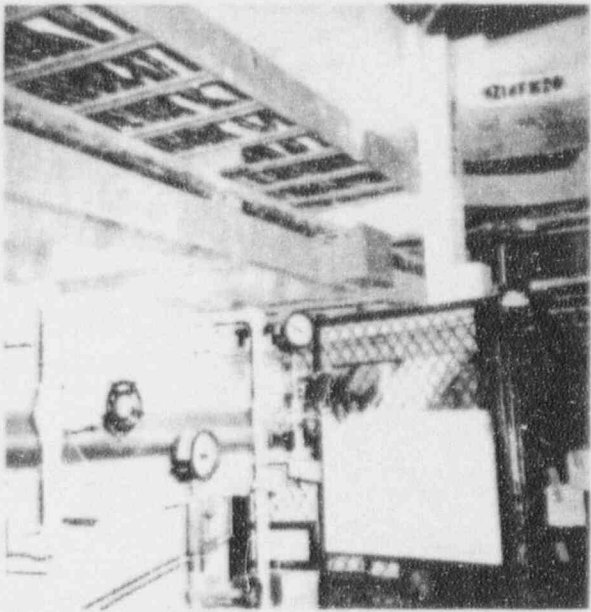
<u>Cable #</u>	<u>Cable Size,</u>	<u>Cable Type,</u>	<u>Cable Materl's Insul'n/Jac't</u>	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C,</u>	<u>Comments</u>
Z2B6105/G	7/c Cu #14	600V Cntl		<2	9.6	42.1	Est'd
Z2B6105/K	7/c Cu #14	600V Cntl		<2	9.6	42.1	Est'd
Z2B6102/H	3/c Cu	1KV		122.3	118	93.7	Based on 414V Min. Motor Voltage which is a temporary condition
Z2B6105/F	3/c Cu	1KV		122.3	118	93.7	Based on 414V Min. Motor Voltage which is a temporary condition
Z2MCO4/J	3/c Cu #14	600V Cntl		<2	9.6	42.1	Est'd

<u>Raceway #</u>	<u>Type of Raceway</u>	<u>Cable Fill,</u>	<u>Cable Distribution,</u>	<u>Air Drop Y/N</u>	<u>Type of Thermolag</u>	
Z2A209	3"RSG	21%	Random	N	1"	
<u>Cable #</u>	<u>Cable Size,</u>	<u>Cable Type,</u>	<u>Cable Materl's Insul'n/Jac't</u> 243	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C, Comments</u>
Z2B6102/H	3/c Cu 4/0	1KV Pwr		122.3	234	53.6 Based on 414V Min. Motor Voltage which is a temporary condition. Verify 90°C & Mater'ls.

<u>Raceway #</u>	<u>Type of Raceway</u>	<u>Cable Fill,</u>	<u>Cable Distribution,</u>	<u>Air Drop Y/N</u>	<u>Type of Thermolag</u>	
Z2A201	3"RSG	9%	Random	N	1"	
<u>Cable #</u>	<u>Cable Size,</u>	<u>Cable Type,</u>	<u>Cable Materl's Insul'n/Jac't</u> 243	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C, Comments</u>
Z2B6105/G	7/c Cu #14	600V Pwr		<2	9.6 42	Est'd
Z2B6105/K	7/c Cu #14	600V Pwr		<2	9.6 42	Est'd
Z2B6105/F	1/c Cu #14	1KV Pwr		122.3	118 93.7	**

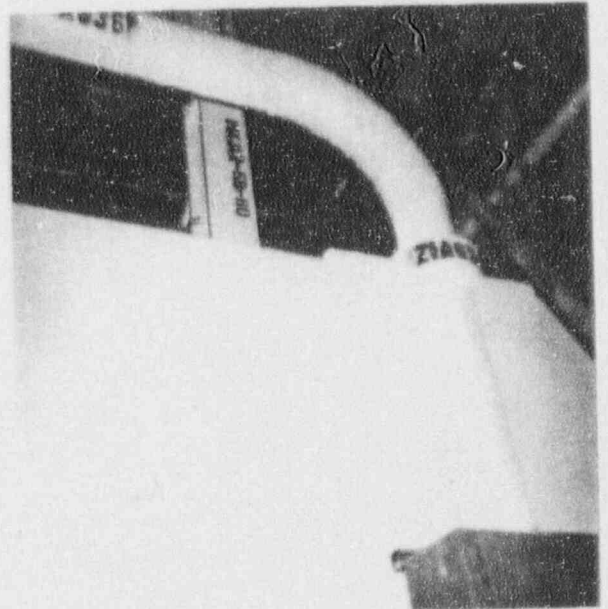
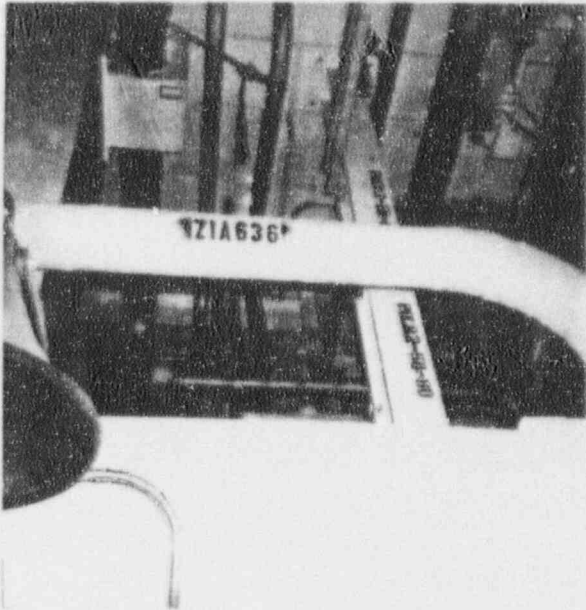
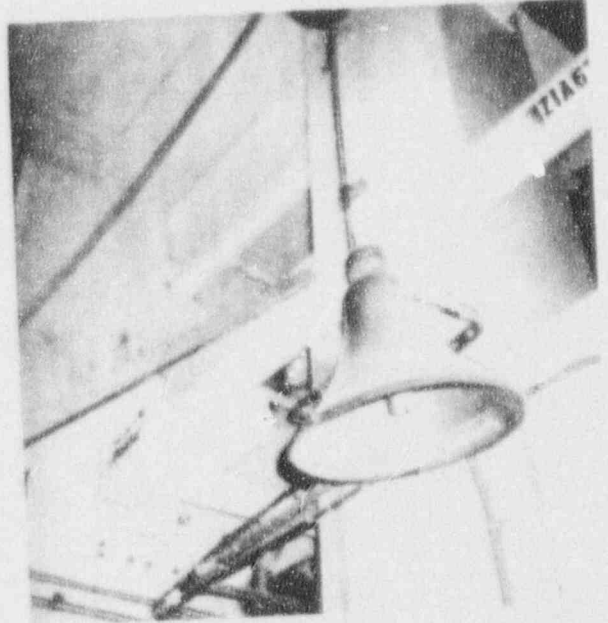
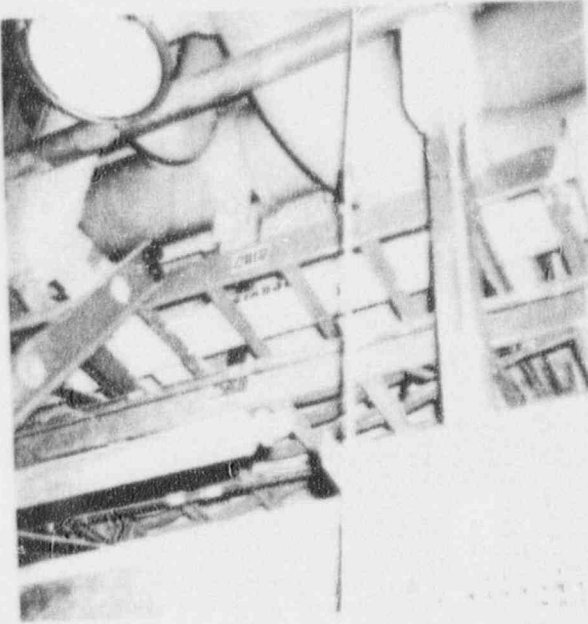
** 93.7° C Based upon 414V minimum motor voltage which is a temporary condition.

Millstone Unit Two



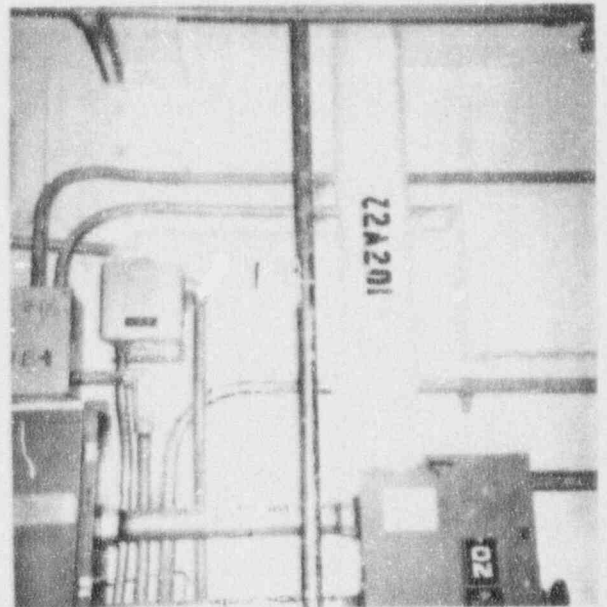
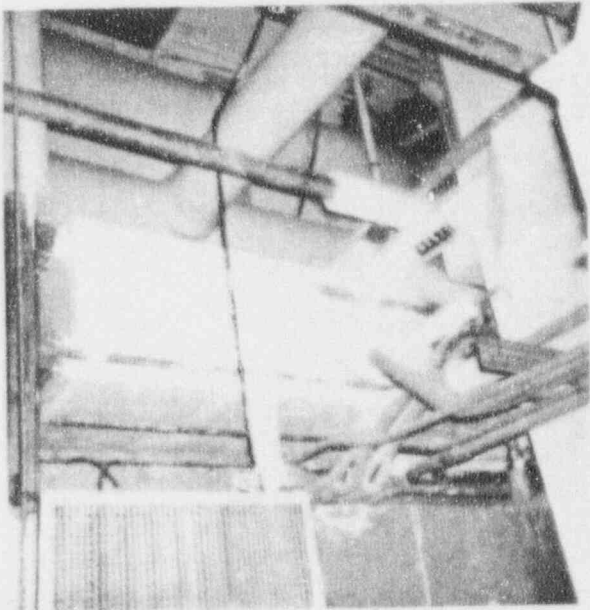
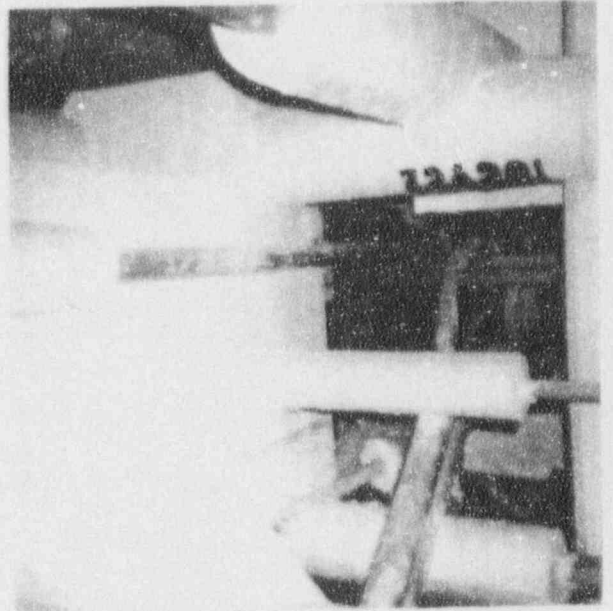
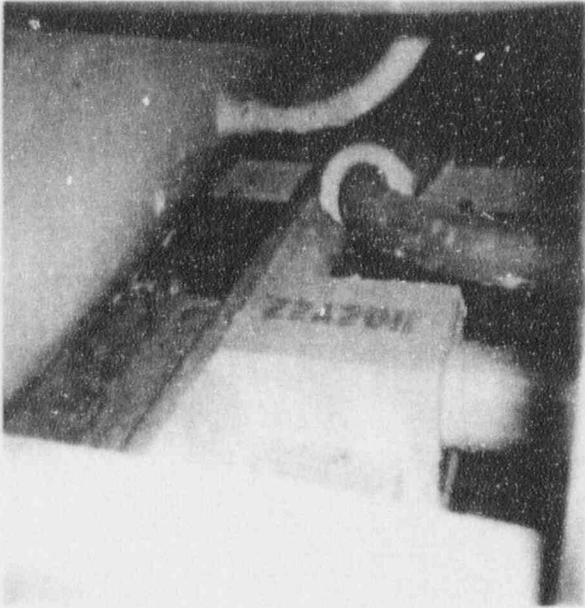
3" Conduit Z1A636 to Charging Pump MP18A

Millstone Unit Two



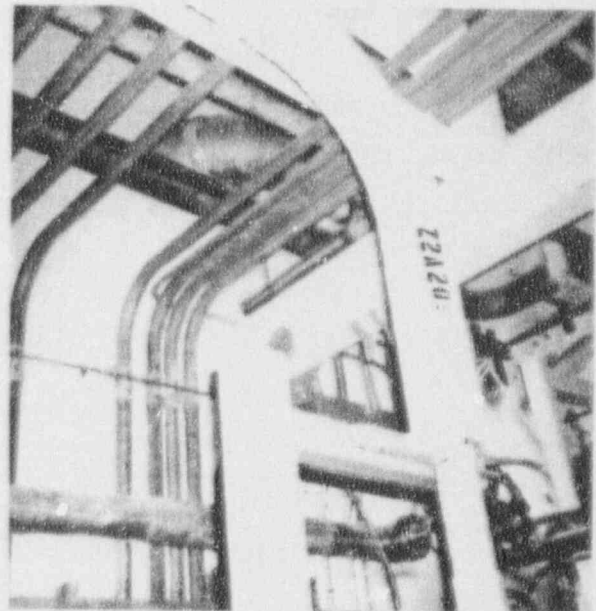
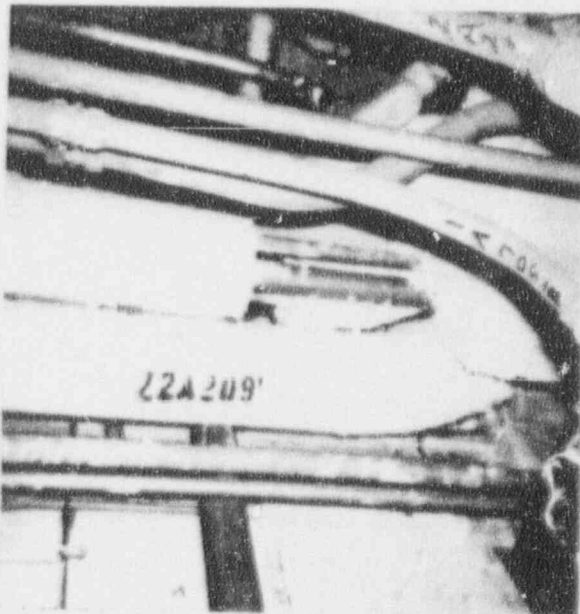
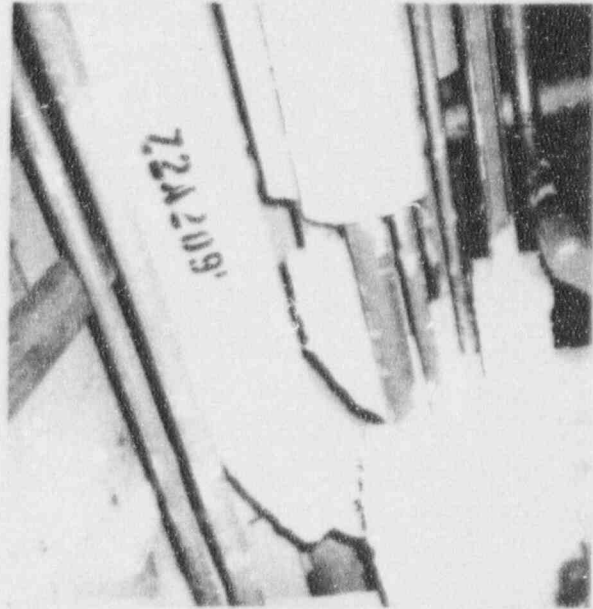
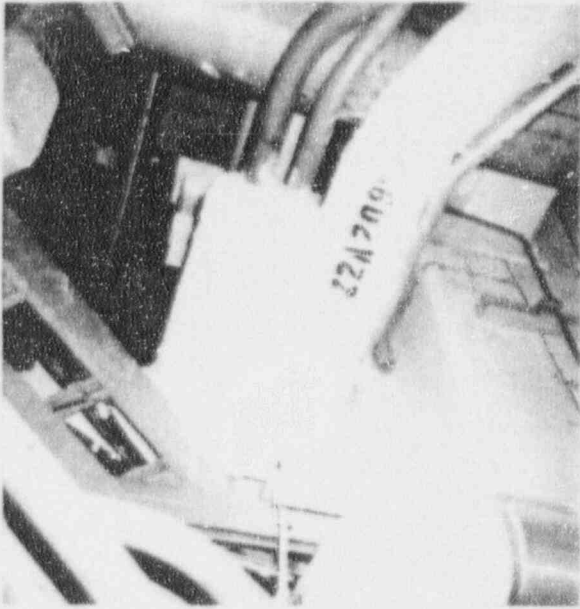
3" Conduit Z1A636 to Charging Pump MP18A

Millstone Unit Two



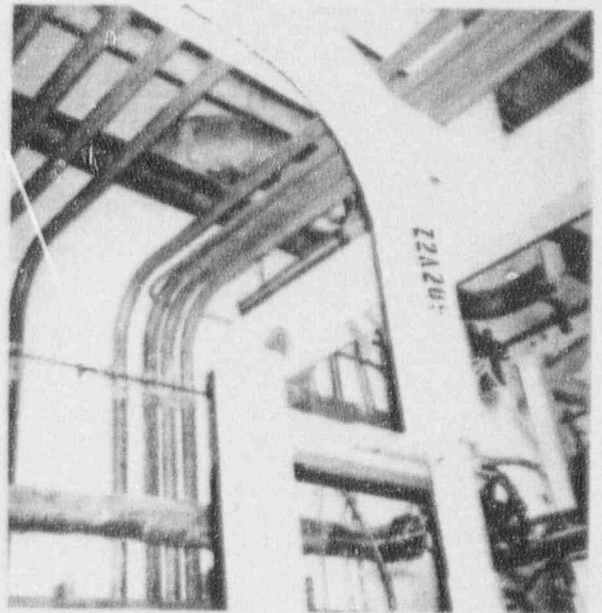
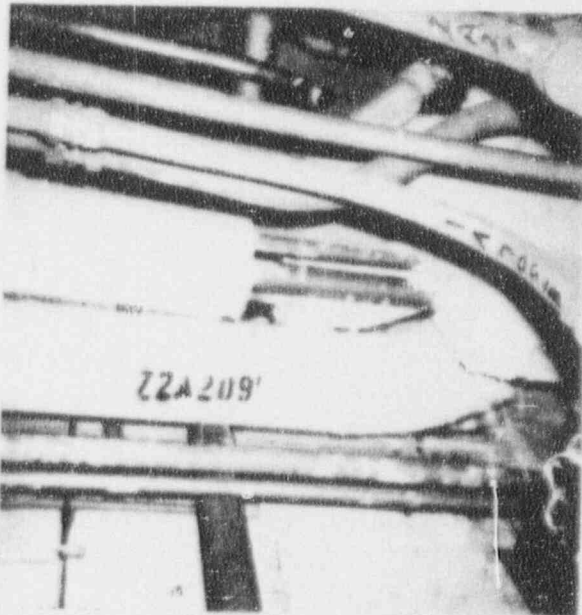
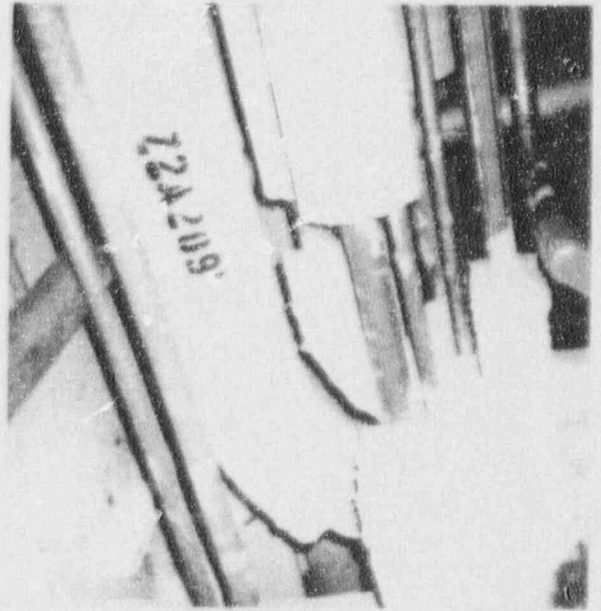
24" Tray Z24FL20, Power to Charging Pumps MP18B & MP18 C
3" Conduit Z2A201, Power to Charging Pump MP18B

Millstone Unit Two



3" Conduit Z2A209 to Charging Pump MP18C

Millstone Unit Two



3" Conduit Z2A209 to Charging Pump MP18C

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone Two	Fire Area/Elevation	A-6A & B/-25' - 6"
Building	Aux. Building	Commodity No.	A-6A&B-2

Commodity Description: TRAY - 24" Trays (Z24FL10, Z24FL20, Z25BG20 {incidental}, Z14FM10, Z14FM20) in the Charging Pump Area. Some trays are wrapped together in a group, one other is wrapped because of its close proximity to a protected conduit.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a three hour rated enclosure around these cables.
Design Fire Rating	3 Hours (three hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	Flat board sections, tray enclosures.
I. B. 2 Total Linear Feet	Approximately 35 feet total for all 5 runs.
Total Square Feet	Approximately 240 sq. feet total for all 5 runs.
II. A. Raceway Orientation (Horiz/Vert.)	Horizontal
Raceway Material (AL/Steel)	Steel
Tray Type (Solid/Ladder)	Ladder
Thermal Short Protection (Hanger/Etc.)	Thermal short protection provided for 18".
Air Drop	N/A
Unsupported Span (Tray/Box)	22" (12" between ties).
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 100% wire ties. Banding is spaced approximately 12" apart. Banding is not covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/32" to 1/8" with the majority being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	No
Cable Type/Size	See Attached Cable Data Sheets.
Jacket Type	See Attached Cable Data Sheets.
Conductor Insulator Type	See Attached Cable Data Sheets.
Cable Fill %	4% to 10%.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with tray. Tray is in contact with wrap material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	See Attached Cable Data Sheets.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value for 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results.
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

File F_A6A2(f)

Cable Data Sheet

Commodity No. A-6A&B-2

<u>Raceway #</u>	<u>Type of Raceway</u>	<u>Cable Fill.</u>	<u>Cable Distribution.</u>	<u>Air Drop Y/N</u>	<u>Type of Thermolag</u>
Z14FM20	4"x24"TRLG	9%	Random	N	1"

<u>Cable #</u>	<u>Cable Size,</u>	<u>Cable Type,</u>	<u>Cable Materl's Insul'n/Jac't</u>	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C,</u>	<u>Comments</u>
1B5103/F	3/c Cu #12	1KV Pwr	EPR/Hypalon 90deg.C	<6	8.3	66	Est'd
Z1B5105/A	3/c Cu 4/0	1KV Pwr	EPR/Hypalon 90deg.C	122.3	118	93.7	Based on 414V Min. Motor Voltage which is a temporary condition
1B5105/C	3/c Cu #12	1KV Pwr	EPR/Hypalon 90deg.C	<6	8.3	66	Est'd
Z1B5145/A	3/c Cu #12	1KV Pwr	EPR/Hypalon 90deg.C	0.52	8.3	40.2	
Z1B5145/C	3/c Cu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
1B5158/A	3/c Cu #12	1KV Pwr	EPR/Hypalon 90deg.C	<6	8.3	66	Est'd
1B5158/B	7/c Cu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
Z1CH192/B	7/c Cu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
Z1HV8247/C	2/cCu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
Z1HV8247/D	7/cCu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
Z1HV8249/C	2/cCu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
Z1HV8249/D	7/cCu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
Z1MCV02B	2/cCu #14	1KV Cntl	FR/FR 90deg.C	<2	65.9	44	Est'd
Z1VA1010/A	2/cCu #10	1KV Cntl	FR/FR 90deg.C	<10	11.5	78	Est'd
Z1B5103/A	3/cCu 4/0	1KV Pwr	EPR/Hypalon 90deg.C	122.3	118	93.7	Based on 414V Min. Motor Voltage which is a temporary condition

<u>Raceway #</u>	<u>Type of Raceway</u>	<u>Cable Fill,</u>	<u>Cable Distribution,</u>	<u>Air Drop Y/N</u>	<u>Type of Thermolag</u>
Z24FL20	4"x24"TRLG	8%	Random	N	1"

<u>Cable #</u>	<u>Cable Size,</u>	<u>Cable Type,</u>	<u>Cable Materl's Insul'n/Jac't</u>	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C,</u>	<u>Comments</u>
2B41A16/F	7/cCu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
Z2B6105/A	3/c Cu 4/0	1KV Pwr	EPR/Hypalon 90deg.C	Spare	118		
Z2B6105/G	7/c Cu #14	600V Cntl		<2	6.9	44	Est'd
Z2B6105/K	7/c Cu #14	600V Cntl		<2	6.9	44	Est'd
Z2HV8133/C	2/cCu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
Z2HV8133/D	7/cCu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
Z2HV8248/C	2/cCu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
Z2HV8248/D	7/cCu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
Z2MCOV04/B	2/cCu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
Z2VA2010/A	2/cCu #10	1KV Cntl	FR/FR 90deg.C	<10	11.5	78	Est'd
Z2B6102/H	3/c Cu 4/0	1KV Pwr		122.3	118	93.7	Based on 414V Min. Motor Voltage which is a temporary condition
Z2B6105/F	3/c Cu 4/0	1KV Pwr		122.3	118	93.7	Based on 414V Min. Motor Voltage which is a temporary condition
Z2MCOV04/J	3/c Cu #14	600V Cntl		<2	6.9	44	Est'd

<u>Raceway #</u>	<u>Type of Raceway</u>	<u>Cable Fill,</u>	<u>Cable Distribution,</u>	<u>Air Drop Y/N</u>	<u>Type of Thermolag</u>
Z24FL10	4"x24"TRLG	4%	Random	N	1"

<u>Cable #</u>	<u>Cable Size,</u>	<u>Cable Type,</u>	<u>Cable Materl's Insul'n/Jac't</u>	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C,</u>	<u>Comments</u>
Z2B6105/G	7/cCu #14	600V Cntl		<2	6.9	44	Est'd

<u>Cable #</u>	<u>Cable Size,</u>	<u>Cable Type,</u>	<u>Cable Materl's Insul'n/Jac't</u> 243	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C,</u>	<u>Comments</u>
Z2B6105/K	7/cCu #14	600V Cntl		<2	6.9	44	Est'd
Z2B6102/H	3/c Cu 4/0	1KV Pwr		122.3	118	93.7	Based on 414V Min. Motor Voltage which is a temporary condition
Z2B6105/F	3/c Cu 4/0	1KV Pwr		122.3	118	93.7	Based on 414V Min. Motor Voltage which is a temporary condition
Z2MCV04/J	3/cCu #14	600V Cntl		<2	6.9	44	Est'd

<u>Raceway #</u>	<u>Type of Raceway</u>	<u>Cable Fill,</u>	<u>Cable Distribution,</u>	<u>Air Drop Y/N</u>	<u>Type of Thermolag</u>
Z25BG20	4"x24"TRLG	10%	Random	N	1"

<u>Cable #</u>	<u>Cable Size,</u>	<u>Cable Type,</u>	<u>Cable Materl's Insul'n/Jac't</u> 243	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C,</u>	<u>Comments</u>
2B41A16/A	3/c Cu #8	1KV Pwr	EPR/Hypalon 90deg.C	20	17.2	98	Based on 414V Min. Motor Voltage which is a temporary condition
Z2B6102/A	3/c Cu 4/0	1KV Pwr		Spare			
2B6102/F	3/c Cu #12	1KV Pwr	EPR/Hypalon 90deg.C	<6	8.3	66	Est'd
Z2B6105/A	3/c Cu 4/0	1KV Pwr		Spare			
Z2HT007/C	2/c Cu #10	1KV Pwr	EPR/Hypalon 90deg.C	<10	11.5	78	Est'd
2HT007/F	2/c Cu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
Z2HT007/H	3/c Cu #8	1KV Pwr	EPR/Hypalon 90deg.C	20	17.2	98	Based on 414V Min. Motor Voltage which is a temporary condition
Z2HT028/C	2/c Cu #10	1KV Cntl	FR/FR 90deg.C	<10	11.5	78	Est'd

<u>Cable #</u>	<u>Cable Size,</u>	<u>Cable Type,</u>	<u>Cable Materl's Insul'n/Jac't</u>	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C,</u>	<u>Comments</u>
2HT028/F	2/c Cu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
Z2HT028/H	2/c Cu #10	1KV Cntl	FR/FR 90deg.C	<10	11.5	78	Est'd
Z2HT032/C	2/c Cu #10	1KV Cntl	FR/FR 90deg.C	<10	11.5	78	Est'd
2HT032/F	2/c Cu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
2HT032/H	3/c Cu #8	1KV Pwr	EPR/Hypalon 90deg.C	20	17.2	98	Based on 414V Min. Motor Voltage which is a temporary condition
2K02049/B	2/c Cu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
2K02051/B	2/c Cu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
2K02053/B	2/c Cu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
2K02055/B	2/c Cu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
2FT9860/A	3/c Cu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
2HC2152/B	3/c Cu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
2B41A55/A	3/c Cu #12	1KV Pwr	EPR/Hypalon 90deg.C	<6	8.3	66	Est'd
2CH910/B	3/c Cu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd
2CH910/C	3/c Cu #14	1KV Cntl	FR/FR 90deg.C	<2	6.9	44	Est'd

<u>Raceway #</u>	<u>Type of Raceway</u>	<u>Cable Fill,</u>	<u>Cable Distribution,</u>	<u>Air Drop Y/N</u>	<u>Type of Thermolag</u>
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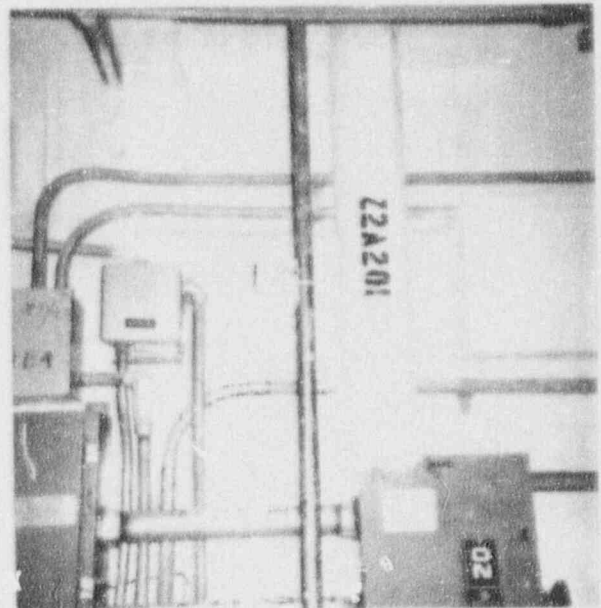
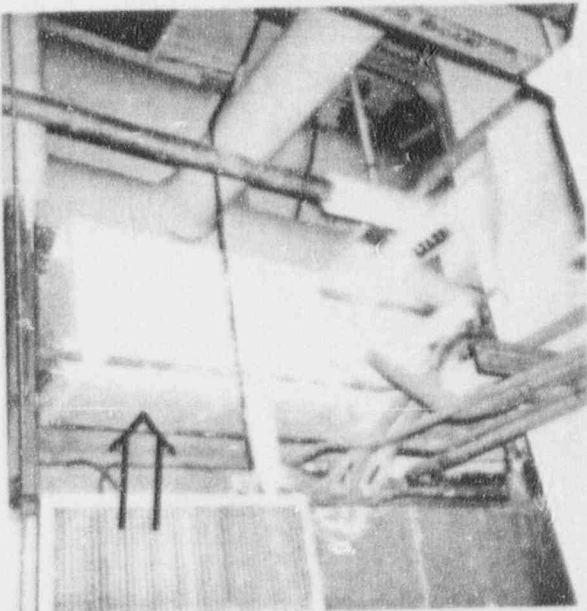
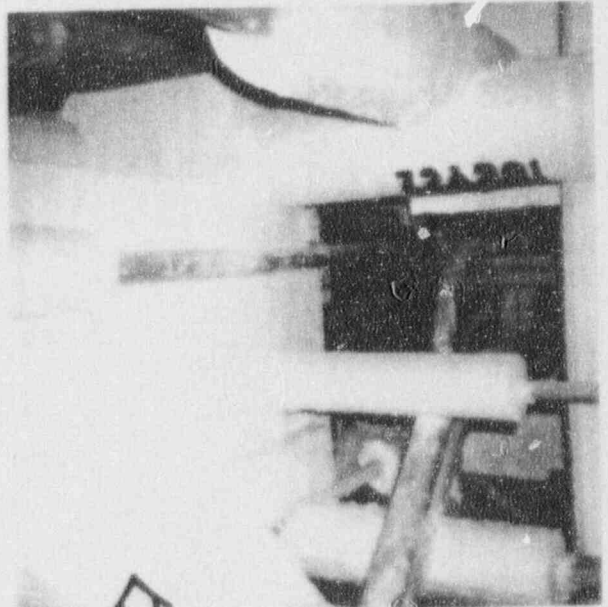
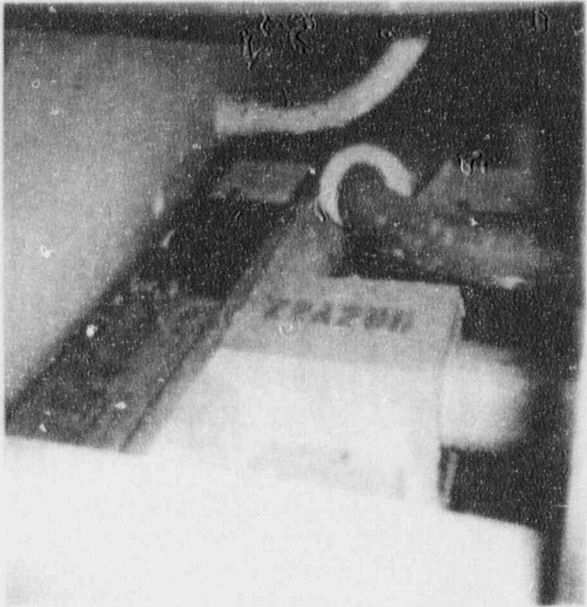
Z14FM10	4"x24"TRIG	12%	Random	N	1"
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<u>Cable #</u>	<u>Cable Size,</u>	<u>Cable Type,</u>	<u>Cable Materl's Insul'n/Jac't</u>	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C,</u>	<u>Comments</u>
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1B31A08/A	3/c Cu #10	1KV Pwr	EPR/Hypalon 90deg.C	SPARE	11.5	40	
1B31A08/F	7/c Cu #14	1KV Cntl	FR/FR 90deg.C	<2.0	6.9	44	Est'd
1B31A08/G	3/c Cu #8	1KV Pwr	EPR/Hypalon 90deg.C	17.2	18.3	84	
1B3238/B	9/c Cu #14	1KV Cntl	FR/FR 90deg.C	<2.0	6.9	44	Est'd

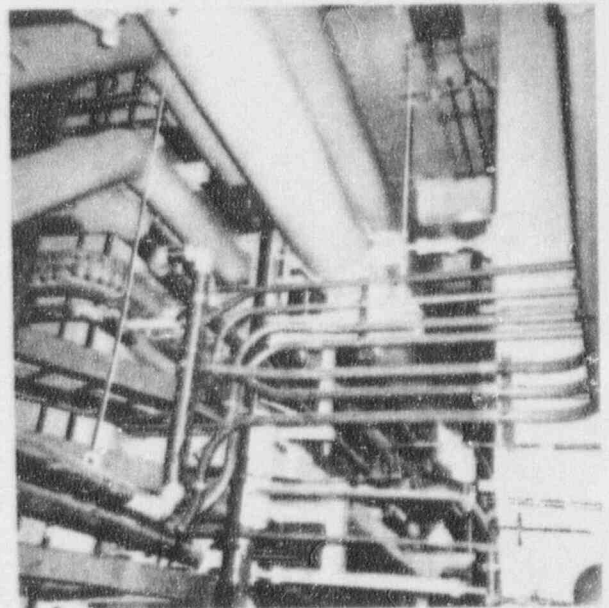
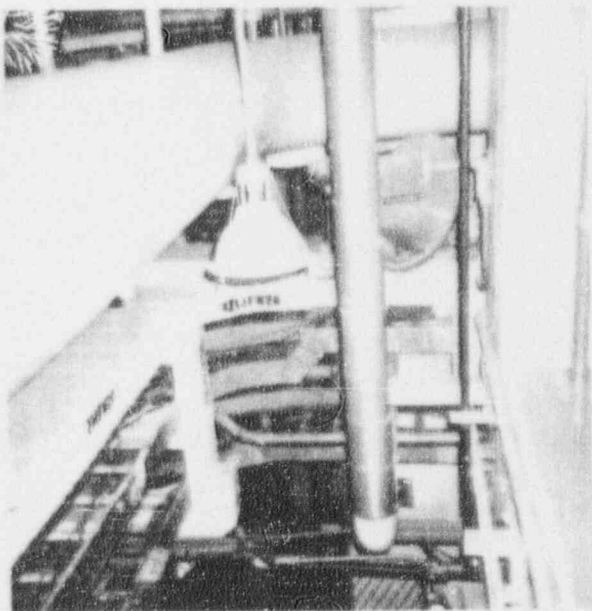
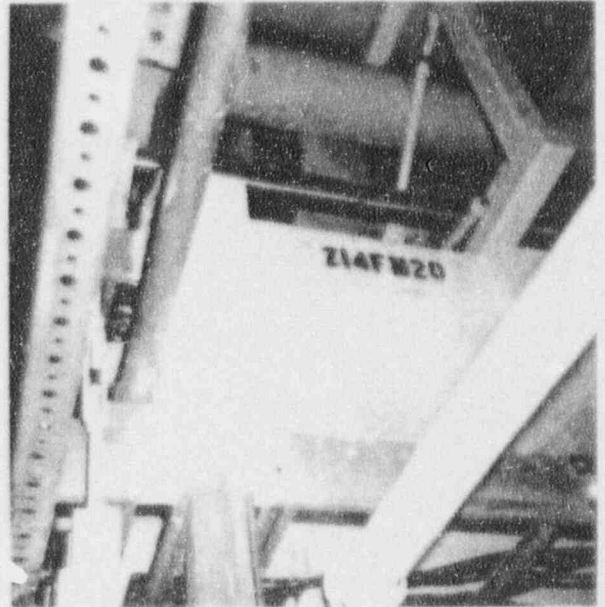
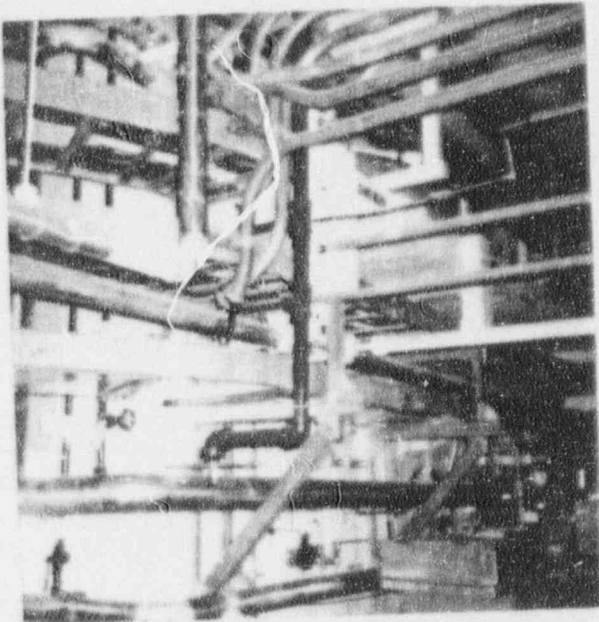
<u>Cable #</u>	<u>Cable Size,</u>	<u>Cable Type,</u>	<u>Cable Materl's Insul'n/Jac't</u>	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C,</u>	<u>Comments</u>
1B3238/C	3/c	Cu 1KV	EPR/Hypalon	1.22	8.3	41	
	#12	Pwr	90deg.C				
1B5103/F	3/c	Cu 1KV	EPR/Hypalon	<6	8.3	66	Est'd
	#12	Pwr	90deg.C				
Z1B5105/A	3/c	Cu 1KV	EPR/Hypalon	122.3	118	93.7	Based on 414V Min. Motor Voltage which is a temporary condition.
	4/0	Pwr	90deg.C				
1B5105/C	3/c	Cu 1KV	EPR/Hypalon	<6	8.3	66	Est'd
	#12	Pwr	90deg.C				
Z1B5145/A	3/c	Cu 1KV	EPR/Hypalon	0.52	8.3	40.2	Est'd
	#12	Pwr	90deg.C				
Z1B5145/C	7/c	Cu 1KV	FR/FR	<2	6.9	44	Est'd
	#14	Cntl	90deg.C				
1B5158/A	3/c	Cu 1KV	EPR/Hypalon	<6	8.3	66	Est'd
	#12	Pwr	90deg.C				
1B5158/B	7/c	Cu 1KV	FR/FR	<2	6.9	44	Est'd
	#14	Cntl	90deg.C				
Z1CH192/B	7/c	Cu 1KV	FR/FR	<2	6.9	44	Est'd
	#14	Cntl	90deg.C				
Z1HV8247/C	2/c	Cu 1KV	FR/FR	<2	6.9	44	Est'd
	#14	Cntl	90deg.C				
Z1HV8247/D	7/c	Cu 1KV	FR/FR	<2	6.9	44	Est'd
	#14	Cntl	90deg.C				
Z1HV8249/C	2/c	Cu 1KV	FR/FR	<2	6.9	44	Est'd
	#14	Cntl	90deg.C				
Z1HV8249/D	7/c	Cu 1KV	FR/FR	<2	6.9	44	Est'd
	#14	Cntl	90deg.C				
1K96001/B	2/c	Cu 1KV	FR/FR	<2	6.9	44	Est'd
	#14	Cntl	90deg.C				
1K96002/B	2/c	Cu 1KV	FR/FR	<2	6.9	44	Est'd
	#14	Cntl	90deg.C				
Z1MCV02/B	2/c	Cu 1KV	FR/FR	<2	6.9	44	Est'd
	#14	Cntl	90deg.C				
1RM8997/D	2/c	Cu 1KV	FR/FR	<2	6.9	44	Est'd
	#14	Cntl	90deg.C				
1VAAS/E	2/c	Cu 1KV	FR/FR	<2	6.9	44	Est'd
	#14	Cntl	90deg.C				
1VAAS/EE	2/c	Cu 1KV	FR/FR	<2	6.9	44	Est'd
	#14	Cntl	90deg.C				
Z1VA1010/A	2/c	Cu 1KV	FR/FR	<10	11.5	78	Est'd
	#10	Cntl	90deg.C				
Z1B5103/A	3/c	Cu 1KV	EPR/Hypalon	122.3	118	93.7	Based on 414V Min. Motor Voltage which is a temporary condition
	4/0	Pwr	90deg.C				

Millstone Unit Two



24" Tray Z24FL20, Power to Charging Pumps MP18B & MP18 C
3" Conduit Z2A201, Power to Charging Pump MP18B

Millstone Unit Two



24" Tray Z14FM20, Power Cable To Charging Pump MP18A

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone Two	Fire Area/Elevation	A-6A & B/-25' - 6"
Building	Aux. Building	Commodity No.	A-6A&B-3

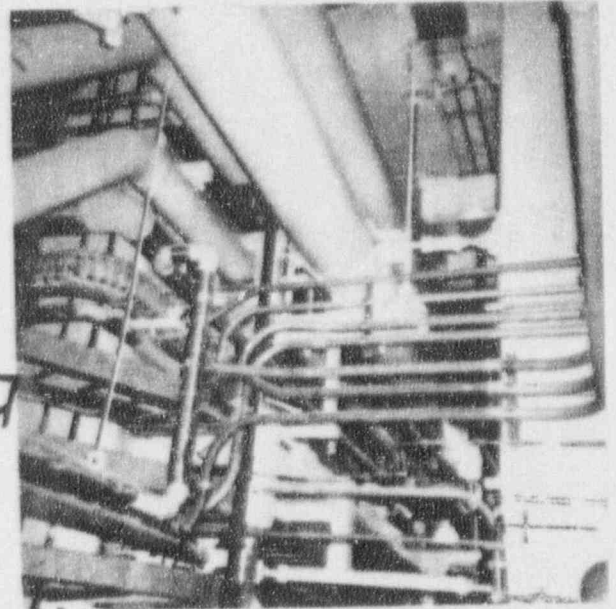
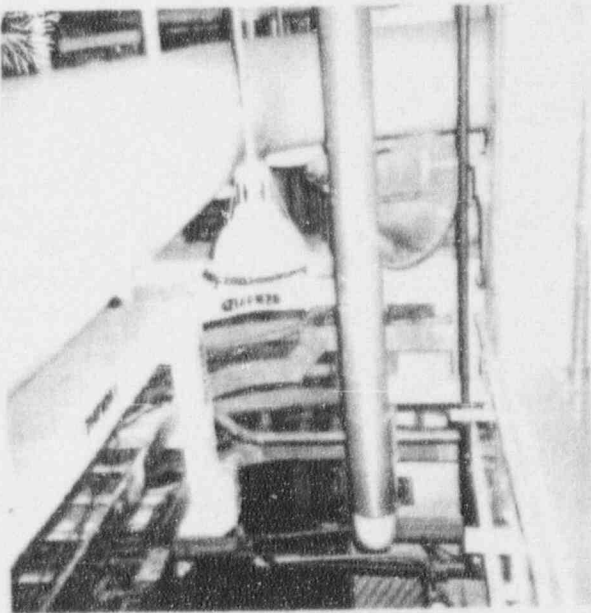
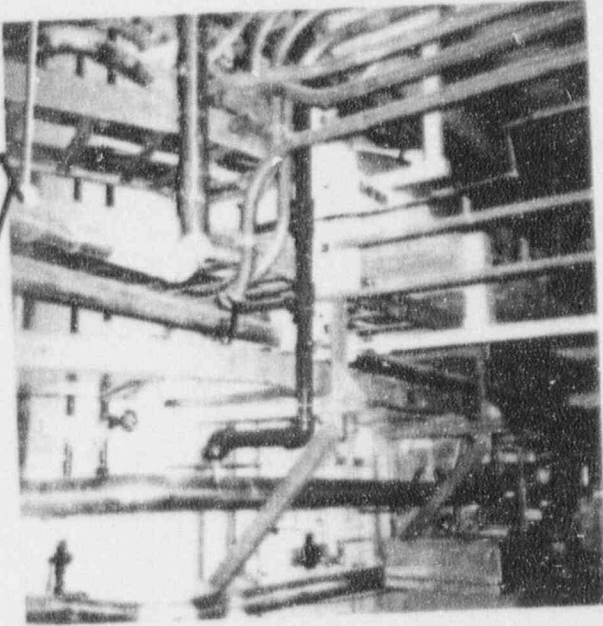
Commodity Description: **AIR DROP** - 3" Conduit halves section applied to a single cable (Z1B5103/A) in a tray (Z14FM10). This is similar to an Air Drop design. Cable runs from tray Z14FM10 to outside water curtain protected area.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a three hour rated enclosure around these cables.
Design Fire Rating	3 Hours (three hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	Conduit sections applied to cable, no conduit.
I. B. 2 Total Linear Feet	Approximately 10 feet.
Total Square Feet	N/A
II. A. Raceway Orientation (Hori./Vert.)	Horizontal
Raceway Material (Al/Steel)	N/A
Tray Type (Solid/Ladder)	N/A
Thermal Short Protection (Hanger/Etc.)	N/A
Air Drop	Yes
Unsupported Span (Tray/Box)	N/A
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 100% wire ties. Banding is spaced approximately 12" apart. Banding is not covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/32" to 1/8" with the majority being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	No
Cable Type/Size	Z1B5103/A - 3/C Cu 4/o 1kV power
Jacket Type	Hypalon
Conductor Insulator Type	EPR
Cable Fill %	N/A

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with material.
Cable Operating Temperature	90 deg. C n. ag by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	Max. derated ampacity is 122.3, which is less than the 157.5 amps. the cable is capable of carrying.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value for 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results.
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC testing is completed and publishes the final test report.

File F_A6A3(f)

Millstone Unit Two



24" Tray Z14FM20, Power Cable To Charging Pump MP18A

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Mistone Two	Fire Area/Elevation	T-7/ 31' - 6"
Building	Turbine Building	Commodity No	T-7-1

Commodity Description: TRAY - Two 6" wire ways (Z26TA10 and Z25XA10) run from two separate junction boxes, joint together and exit the area above.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a three hour enclosure around these cables.
Design Fire Rating	3 Hours (Three hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	Two 6" cable tray wrapped with flat board sections. 10" deep x 18" wide x 23' long
I. B. 2 Total Lines: Feet	Approximately 23 feet
Total Square Feet	Approximately 72.8 sq. feet
II. A. Raceway Orientation (Hori./Vert.)	Horizontal and vertical
Raceway Material (Al/Steel)	Steel
Tray Type (Solid/Ladder)	Wire Way
Thermal Short Protection (Hanger/Etc.)	N/A
Air Drop	N/A
Unsupported Span (Tray/Box)	18" (10.5" between wire ties).
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 100% wire ties. Banding is spaced approximately 10.5" apart. Banding is not covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-battered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/16" to 1/4" with the majority being 1/8".
Does Internal Banding Exist	No
Addition Trowel Material	No
Cable Type/Size	See Attached Cable Sheet.
Jacket Type	See Attached Cable Sheet.
Conductor Insulator Type	See Attached Cable Sheet.
Cable Fill %	26%

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with tray. Tray in contact with wrap material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdowns/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	None
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	See Attached Cable Data Sheets.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value for 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results. Area is protected by early warning smoke detection. Very limited fire loading with limited direct fire exposure to wrapped component.
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

File F_171.(f)

Cable Data Sheet

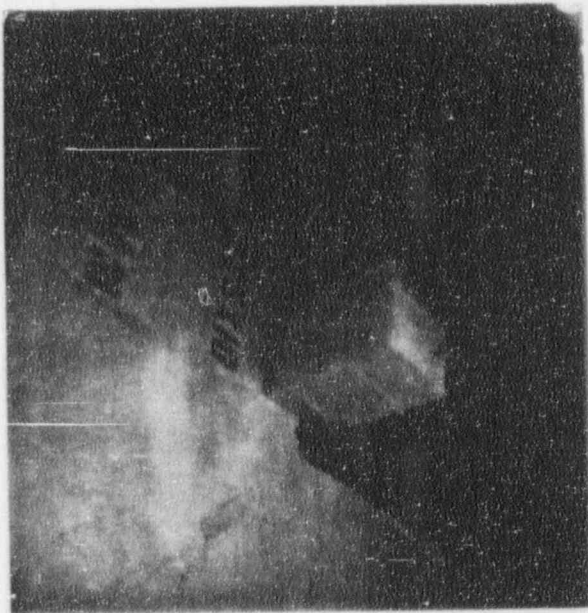
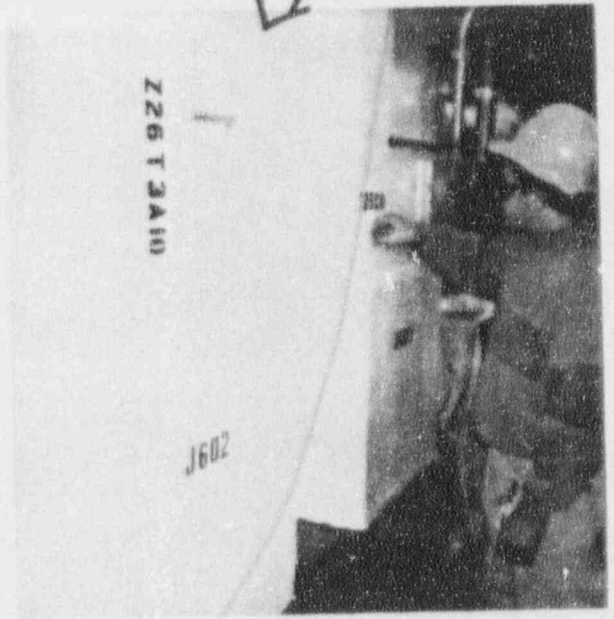
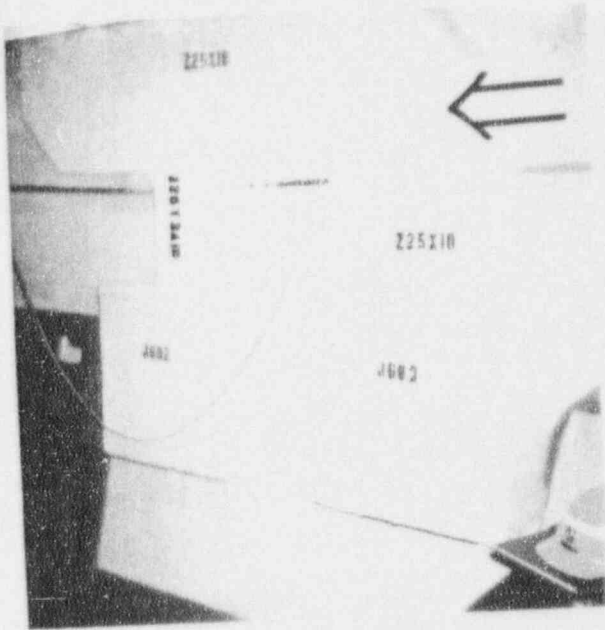
Commodity No T-7-1

<u>Raceway #</u>	<u>Type of Raceway</u>	<u>Cable Fill,</u>	<u>Cable Distribution,</u>	<u>Air Drop Y/N</u>	<u>Type of Thermolag</u>		
Z25XA10	6"x6"WRWY	26%	Random	N	1"		
<u>Cable #</u>	<u>Cable Size,</u>	<u>Cable Type,</u>	<u>Cable Materl's Insul'n/Jac't</u>	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C,</u>	<u>Comments</u>
			243				
Z2B6102/J	9/c	Cu	600V	<2	6.9	44	Est'd
	#14	Cntl					
Z2B6102/K	7/c	Cu	600V	<2	6.9	44	Est'd
	#14	Cntl					
Z2B6105/H	9/c	Cu	600V	<2	6.9	44	Est'd
	#14	Cntl					
Z2B6105/J	3/c	Cu	600V	<2	6.9	44	Est'd
	#14	Cntl					
Z2B6105/K	7/c	Cu	600V	<2	6.9	44	Est'd
	#14	Cntl					
Z2B6117/D	7/c	Cu	600V	<2	6.9	44	Est'd
	#14	Cntl					
Z2B6117/E	3/c	Cu	600V	<2	6.9	44	Est'd
	#14	Cntl					
Z2B6117/F	7/c	Cu	600V	<2	6.9	44	Est'd
	#14	Cntl					
Z2CH517/E	7/c	Cu	600V	<2	6.9	44	Est'd
	#14	Cntl					
Z2CH517/F	7/c	Cu	600V	<2	6.9	44	Est'd
	#14	Cntl					
Z2CH519/E	9/c	Cu	600V	<2	6.9	44	Est'd
	#14	Cntl					
Z2CH519/F	7/c	Cu	600V	<2	6.9	44	Est'd
	#14	Cntl					
Z2DV2008/A	2/c	Cu	600V	<10	11.5	78	Est'd
	#10	Pwr					
Z2HV2525/F	9/c	Cu	600V	<2	6.9	44	Est'd
	#14	Cntl					
Z2HV2525/G	7/c	Cu	600V	<2	6.9	44	Est'd
	#14	Cntl					
Z2HV2525/H	3/c	Cu	600V	<2	6.9	44	Est'd
	#14	Cntl					
Z2HV5279/S	9/c	Cu	1KV	<2	6.9	44	Est'd
	#14	Cntl					
2K01160/B	3/c	Cu	600V	<2	6.9	44	Est'd
	#14	Cntl					
Z2NF09/F	7/c	Cu	600V	<2	6.9	44	Est'd
	#14	Cntl					

<u>Cable #</u>	<u>Cable Size,</u>	<u>Cable Type,</u>	<u>Cable Materl's Insul'n/Jac't</u>	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C,</u>	<u>Comments</u>
Z2NF09/G	7/c Cu	600V	263	<2	6.9	44	Est'd
	#14	Cntl					
Z2HV5279/P	3/cCu	600V		<6	8.3	66	Est'd
	#12	Cntl					
Z2HV5279/R	3/cCu	600V		<6	8.3	66	Est'd
	#12	Cntl					
Z2HV5279/T	2/cCu	1KV		<2	5.2	47.4	Est'd
	#16	Cntl					
Z2HV5279/U	2/cCu	600V		<2	5.2	47.4	Est'd
	#16	Cntl					
Z2SV4188/J	7/cCu	600V		<6	8.3	66	Est'd
	#12	Cntl					
Z2SV4188/L	2/cCu	600V		<10	11.5	78	Est'd
	#10	Pwr					
Z2MCV04/J	3/c Cu	600V		<2	6.9	44	Est'd
	#14	Cntl					
Z2SV4188/K	7/cCu	600V		<6	8.3	66	Est'd
	#12	Cntl					
Z2SV4188/M	2/cCu	600V		<10	11.5	78	Est'd
	10	Cntl					
Z2VA2004/A	2/cCu	600V		<10	11.5	78	Est'd
	#10	Pwr					

CABLE TRAY Z26TA10 cables not listed - Instrumentation Cables

Millstone Unit Two



Junction Box J602/6" Tray Z25XA10 and J603/Z26TA10
Power and Instrumentation to Shutdown Panels C09 & C10

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Millstone Two	Fire Area/Elevation	T-7/ 31' - 6"
Building	Turbine Building	Commodity No	T-7-2

Commodity Description: **JUNCTION BOX** - Two 14" deep x 27" wide x 27" high junction boxes (J-602, J603) mounted to the wall.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a three hour enclosure around these cables.
Design Fire Rating	3 Hours (Three hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	2 junction boxes covered with board material. 14" deep x 27" wide x 27" high each
I. B. 2 Total Linear Feet	N/A
Total Square Feet	Approximately 15.56 sq. feet each, 31.1 sq. feet total.
II. A. Raceway Orientation (Hort./Vert.)	N/A
Raceway Material (AL/Steel)	Steel junction boxes
Tray Type (Solid/Ladder)	N/A
Thermal Short Protection (Hanger/Etc.)	N/A
Air Drop	N/A
Unsupported Span (Tray/Box)	Approximately 27" (12" between banding and ties).
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 50% wire ties and 50% banding. Banding is spaced approximately 12" apart. Banding is not covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/32" to 1/8" with the majority being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	No
Cable Type/Size	See Attached Cable Sheet.
Jacket Type	See Attached Cable Sheet.
Conductor Insulator Type	See Attached Cable Sheet.
Cable Fill %	N/A

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Other Materials Present	None
Cable Contact with Barrier Material	Cable may be in contact with junction box. Junction boxes in contact with wrap material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	None
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	See Attached Cable Data Sheets.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value for 1" material is needed.
V. B. Proposed Resolution	Waiting for NUMARC testing results. Area is protected by early warning smoke detection. Very limited fire loading with no direct fire exposure to wrapped component.
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

File F_172.(f)

Cable Data Sheet

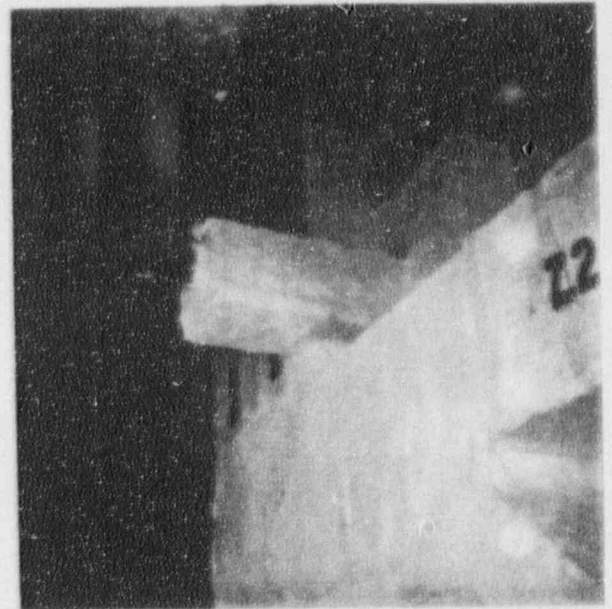
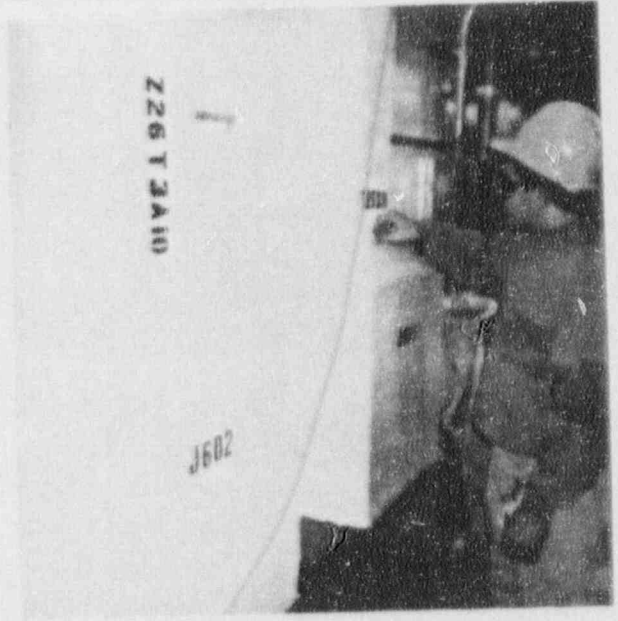
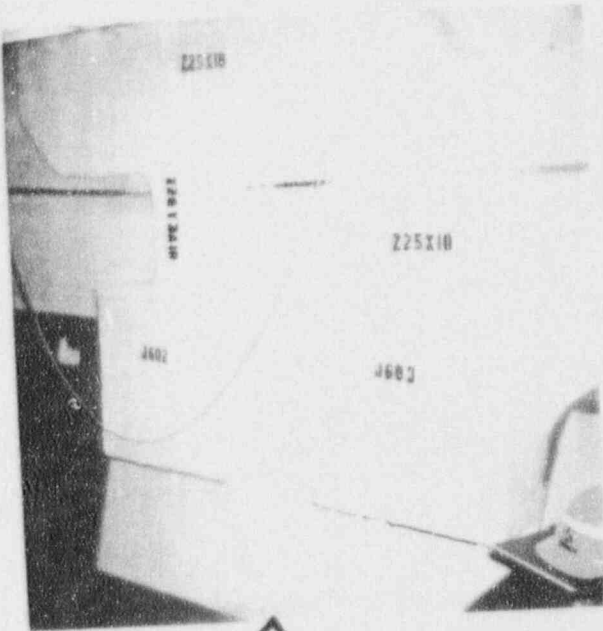
Commodity No T-7-2

<u>Raceway #</u>	<u>Type of Raceway</u>	<u>Cable Fill</u>	<u>Cable Distribution</u>	<u>Air Drop Y/N</u>	<u>Type of Thermolag</u>		
Z25XA10	6"x6"WRWY	26%	Random	N	1"		
<u>Cable #</u>	<u>Cable Size</u>	<u>Cable Type</u>	<u>Cable Materl's Insul'n/Jac't</u>	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C</u>	<u>Comments</u>
			243				
Z2B6102/J	9/c #14	Cu Cntl	600V	<2	6.9	44	Est'd
Z2B6102/K	7/c #14	Cu Cntl	600V	<2	6.9	44	Est'd
Z2B6105/H	9/c #14	Cu Cntl	600V	<2	6.9	44	Est'd
Z2B6105/J	3/c #14	Cu Cntl	600V	<2	6.9	44	Est'd
Z2B6105/K	7/c #14	Cu Cntl	600V	<2	6.9	44	Est'd
Z2B6117/D	7/c #14	Cu Cntl	600V	<2	6.9	44	Est'd
Z2B6117/E	3/c #14	Cu Cntl	600V	<2	6.9	44	Est'd
Z2B6117/F	7/c #14	Cu Cntl	600V	<2	6.9	44	Est'd
Z2CH517/E	7/c #14	Cu Cntl	600V	<2	6.9	44	Est'd
Z2CH517/F	7/c #14	Cu Cntl	600V	<2	6.9	44	Est'd
Z2CH519/E	9/c #14	Cu Cntl	600V	<2	6.9	44	Est'd
Z2CH519/F	7/c #14	Cu Cntl	600V	<2	6.9	44	Est'd
Z2DV2008/A	2/c #10	Cu Pwr	600V	<10	11.5	78	Est'd
Z2HV2525/F	9/c #14	Cu Cntl	600V	<2	6.9	44	Est'd
Z2HV2525/G	7/c #14	Cu Cntl	600V	<2	6.9	44	Est'd
Z2HV2525/H	3/c #14	Cu Cntl	600V	<2	6.9	44	Est'd
Z2HV5279/S	9/c #14	Cu Cntl	1KV	<2	6.9	44	Est'd
2K01160/B	3/c #14	Cu Cntl	600V	<2	6.9	44	Est'd
Z2NF09/F	7/c #14	Cu Cntl	600V	<2	6.9	44	Est'd
Z2NF09/G	7/c #14	Cu Cntl	600V	<2	6.9	44	Est'd

<u>Cable #</u>	<u>Cable Size</u>	<u>Cable Type</u>	<u>Cable Materl's Insul'n/Jac't</u>	<u>Cable Load Amps</u>	<u>Cable Derate Amps</u>	<u>Wire Temp °C</u>	<u>Comments</u>
Z2HV5279/P	3/cCu	600V		<6	8.3	66	Est'd
	#12	Cntl					
Z2HV5279/R	3/cCu	600V		<6	8.3	66	Est'd
	#12	Cntl					
Z2HV5279/T	2/cCu	1KV		<2	5.2	47.4	Est'd
	#16	Cntl					
Z2HV5279/U	2/cCu	600V		<2	5.2	47.4	Est'd
	#16	Cntl					
Z2SV4188/J	7/cCu	600V		<6	8.3	66	Est'd
	#12	Cntl					
Z2SV4188/L	2/cCu	600V		<10	11.5	78	Est'd
	#10	Pwr					
Z2MCV04/J	3/c Cu	600V		<2	6.9	44	Est'd
	#14	Cntl					
Z2SV4188/K	7/cCu	600V		<6	8.3	66	Est'd
	#12	Cntl					
Z2SV4188/M	2/cCu	600V		<10	11.5	78	Est'd
	#10	Cntl					
Z2VA2004/A	2/cCu	600V		<10	11.5	78	Est'd
	#10	Pwr					

Instrumentation Cables Not Listed for Tray Z26TA10.

Millstone Unit Two



Junction Box J602/6" Tray Z25XA10 and J603/Z26TA10
Power and Instrumentation to Shutdown Panels C09 & C10

Haddam Neck

Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Haddam Neck	Fire Area/Elevation	A-1E/F - (-) 19'-0"
Building	Pri. Aux. Building	Commodity No.	A-1EF-1

Commodity Description: CONDUIT - One 4" conduit (RHR Pump B Power Cable) wrapped with three hour rated conduit sections. This commodity runs from the RHR Pump B cubicle to the outer PAB wall.

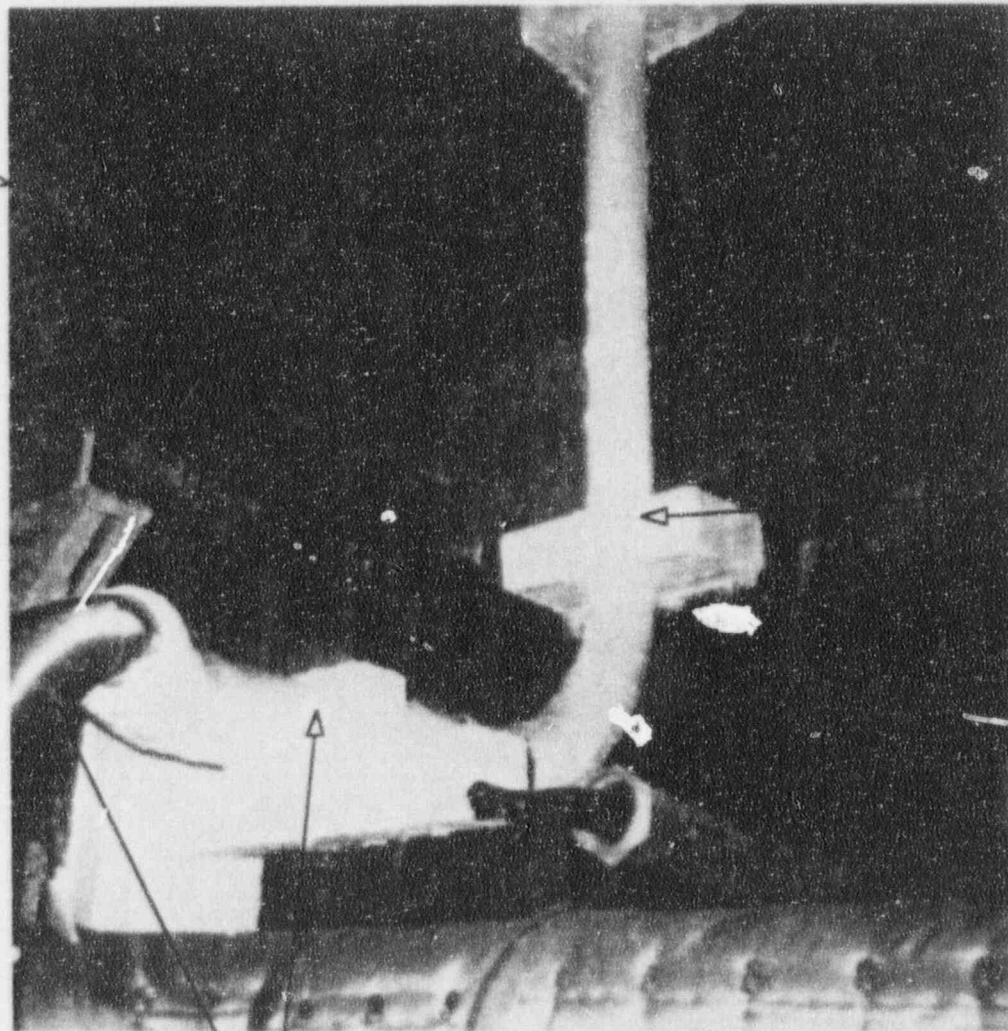
50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material originally installed to meet Appendix R requirements. Repair procedure in place - removed dependence upon Thermo-Lag.
Intended Purpose of Barrier	Provides a three hour rated enclosure around this conduit.
Design Fire Rating	3 Hours (Not required at this time due to repair procedure).
Type of Enclosure (Conduit/Trey/Air Drop/Wall/function box)	One 4" conduit wrapped using two half conduit sections
I. B. 2 Total Linear Feet	Approximately 80 feet.
Total Square Feet	N/A
II. A. Raceway Orientation (Hori./Vertical)	Horizontal and vertical run.
Raceway Material (AL/Steel)	Steel
Trey Type (Solid/Ladder)	N/A
Thermal Short Protection (Hanger/Etc.)	Thermal short protection for 18".
Air Drop	N/A
Unsupported Span (Trey/Box)	N/A
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of steel bands. Banding is spaced approximately 10" - 12" apart. Some banding is covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/32" to 1/2" (at bends) with the majority being 1/16".
Does Internal Banding Exist	No
Addition of Seal Material	Yes
Cable Type/Size	3-1/C Triplexed 500 Cu. 1 kV.
Jacket Type	Hypalon
Conductor Insulator Type	XLPE

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Cable Fill %	39%
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with steel conduit, wrap material surrounds conduit.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	Repair procedure has been developed - removed dependence on wrap.
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Densiting a Concern	No - Max capacity for this cable is 477 amps. With a derate applied, the ampacity rating is reduced to 407 amps. The required load for this cable is 221 amps at normal voltage & 319 amps. at minimum degraded voltage for a 440v motor.
Within Industry Ampacity Rating Testing?	Unknown
Further Ampacity Study Required?	Yes - Actual derating value of 1" material is needed.
V. B. Proposed Resolution	Repair procedure has been developed. Area is protected by early warning smoke detection. Very limited fire loading with no direct fire exposure to wrapped component. High ceiling with large open area precludes heat build-up around wrapped commodity.
VI. B Proposed Schedule	Completed

File f_a1e1.(f)

View of Thermo-Lag Protected Conduit
Photo # 1

RHR Pit
Wall



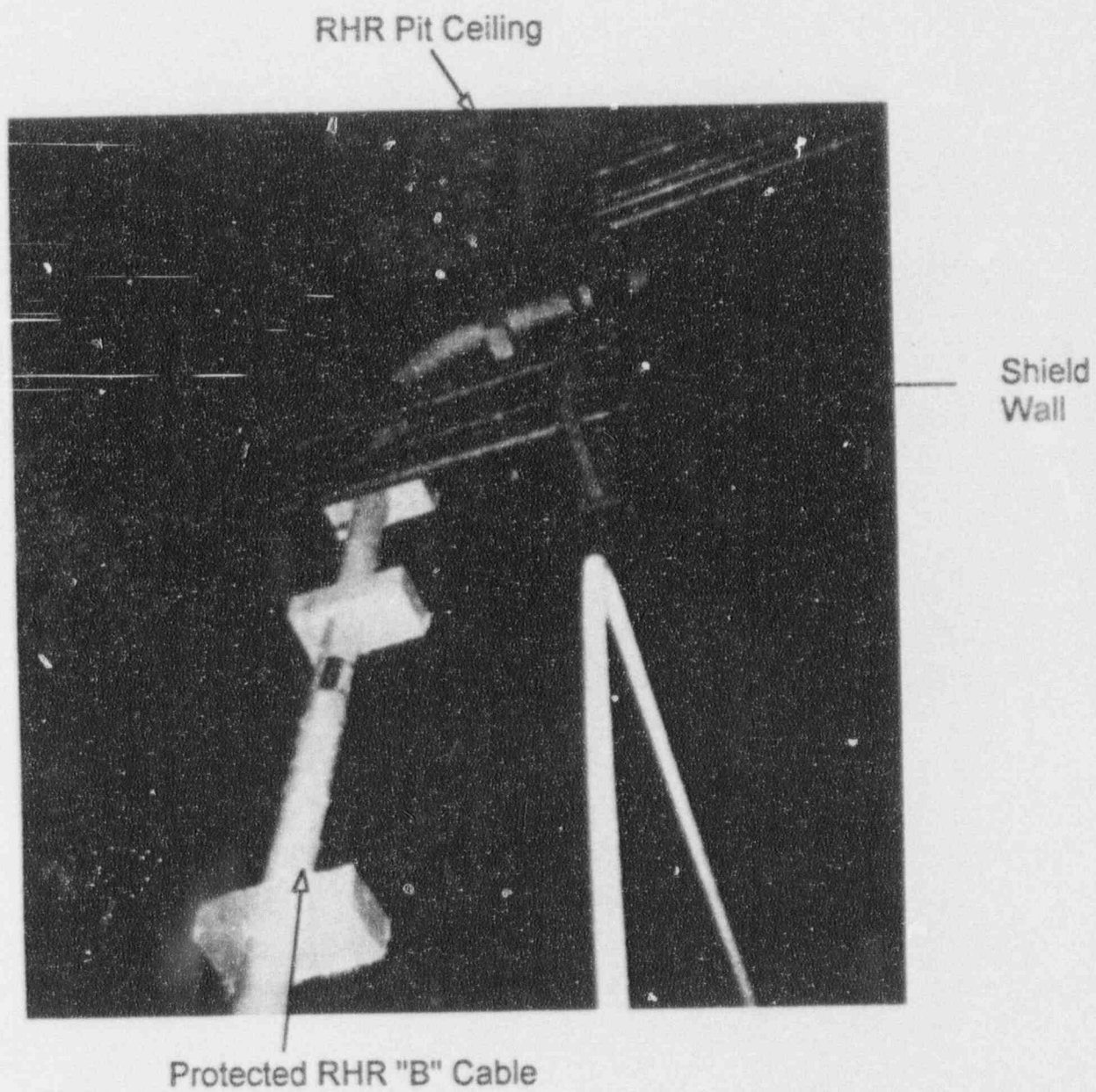
Protected
Conduit
Support



Transition from Flex Conduit inside Cubicle
To Protected Rigid Conduit On West Wall

RHR Pit West Wall/Conduit Run

Photo # 2



Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Haddam Neck	Fire Area/Elevation	R-1/ 5' -6"
Building	Cable Vault	Commodity No.	R-1-1

Commodity Description: **JUNCTION BOX** - One (3.5' long x 2.5' high x 1' deep) junction box mounted to the wall of the cable vault.

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R.
Intended Purpose of Barrier	Provide a one hour rated enclosure around cables in a junction box.
Design Fire Rating	3 Hours (One hour rating needed per Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	Box enclosure 3.5' long x 2.5' high x 1' deep.
I. B. 2 Total Linear Feet	N/A
Total Square Feet	Approximately 20.75 sq. feet.
II. A. Raceway Orientation (Hort./Vert.)	N/A
Raceway Material (AL/Steel)	Steel - Hoffman Junction Box
Tray Type (Solid/Ladder)	N/A
Thermal Short Protection (Hanger/Etc.)	Thermal short protection provided for 9".
Air Drop	N/A
Unsupported Span (Tray/Box)	3.5' (12" between steel banding).
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of 100% steel bands. Banding is spaced approximately 10" - 12" apart. Some banding is covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-buttered and are butt together. Joints are covered with trowel grade material. Gap size ranges from 1/16" to 1/4" with the majority being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	Yes
Cable Type/Size	4 S.G. Wide Range - 2/C #16 Cu 2 Pressurizer Pressure/Level - 2/C #16 Cu 4 S. G. Pressure - 2/C #16 Cu 4 RCS Pressure - 2/C #16 Cu 1 Wide Range Nuclear Instr. - 2/C #16 Cu 4 Core Exit Thermal coupler - 2/C thermal couple cable
Jacket Type	Hypalon

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Conductor Insulator Type	XLPE
Cable Fill %	N/A
Other Materials Present	None
Cable Contact with Barrier Material	Items are enclosed in Junction box, junction box wrapped with material.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	No
Within Industry Ampacity Rating Testing?	N/A
Further Ampacity Study Required?	No
V. B. Proposed Resolution	Waiting for NUMARC testing results. Area is protected by automatic CO ₂ system and detection system.
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

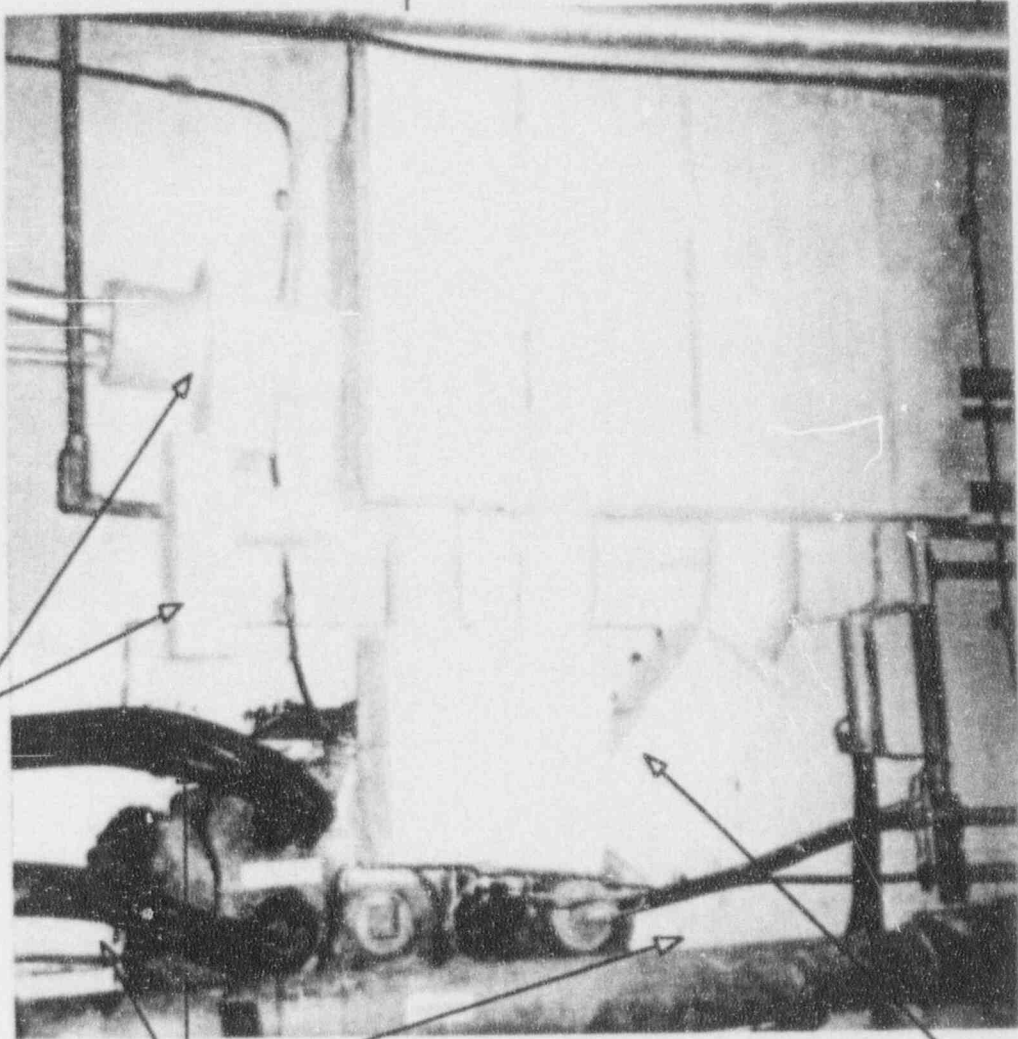
F_R1 : (f)

View of Wrap Material

Photo # 1

3.5'

2.5'

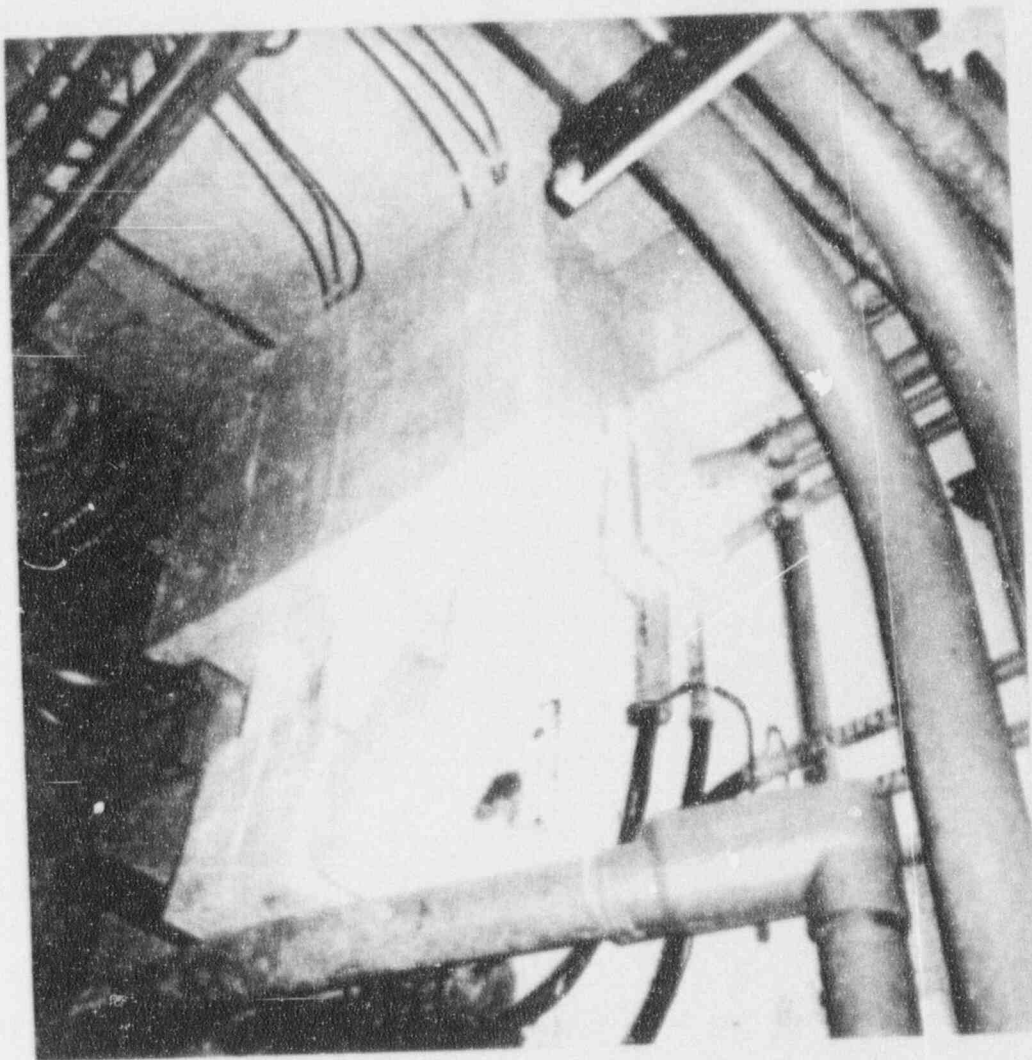


Conduit Interferences That Were Wrapped

Limited Exposed Cables

Conduits From Ductbank To Protective Box

Angle View Of Protective Box
Photo # 5



Thermo-Lag Fire Barrier Data Sheet

Response to NRC Request for Information

Plant	Haddam Neck	Fire Area/Elevation	R-1/ 5"-6"
Building	Cable Vault	Commodity No.	R-1-2

Commodity Description: **CONDUIT** - One 3"conduit and two 2" conduit wrapped with three hour rated conduit sections. These commodities runs from the Cable Vault duct bank to the junction box above.

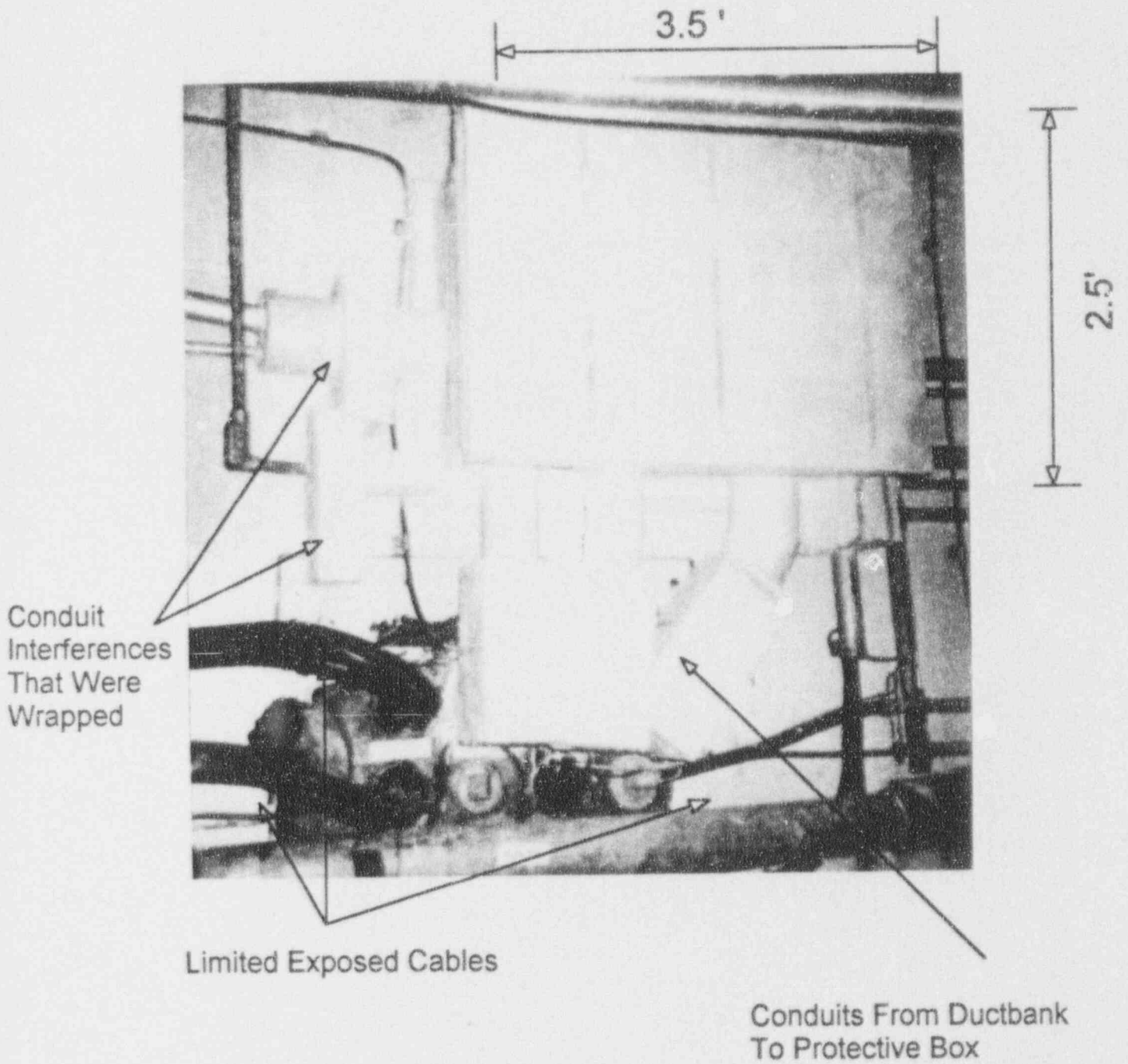
50.54(f) REQUESTED INFORMATION	RESPONSE DATA
I. B. 1 Purpose of Thermo-Lag Installation - Licensing Basis	Material installed to meet Appendix R requirements.
Intended Purpose of Barrier	Provides a one hour rated enclosure around this conduit.
Design Fire Rating	3 Hours (One hour rating required to meet Appendix R).
Type of Enclosure (Conduit/Tray/Air Drop/Wall/Junction box)	2" and 3" conduit wrapped using conduit sections.
I. B. 2 Total Linear Feet	Approximately 6 feet total.
Total Square Feet	N/A
II. A. Raceway Orientation (Hort./Vertical)	Horizontal and vertical run.
Raceway Material (AL/Steel)	Steel
Tray Type (Solid/Ladder)	N/A
Thermal Short Protection (Hanger/Etc.)	N/A
Air Drop	N/A
Unsupported Span (Tray/Box)	N/A
Stress Skin Orientation (Inside/Outside)	Stress Skin applied inside and outside by the factory.
Banding Description (size/type/spacing)	Banding consists of steel bands. Banding is spaced approximately 10" - 12" apart. Some banding is covered with trowel grade material.
Joint Description (Gap size/Buttered/Ties)	Joints are pre-butteted and joined end to end. Joints are covered with trowel grade material. Gap size ranges from 1/32" to 1/2" (at bends) with the majority being 1/16".
Does Internal Banding Exist	No
Addition Trowel Material	Yes
Cable Type/Size	4 S.G. Wide Range - 2/C #16 Cu 2 Pressurizer Pressure/Level - 2/C #16 Cu 4 S. G. Pressure - 2/C #16 Cu 4 RCS Pressure - 2/C #16 Cu 1 Wide Range Nuclear Instr. - 2/C #16 Cu 4 Core Exit Thermal couples - 2/C thermal couple cable
Jacket Type	Hypalon

50.54(f) REQUESTED INFORMATION	RESPONSE DATA
Conductor Insulator Type	XLPE
Cable Fill %	
Other Materials Present	None
Cable Contact with Barrier Material	Cable is in contact with steel conduit, wrap material surrounds conduit.
Cable Operating Temperature	90 deg. C rating by design.
Max. Oper.Temp. Of Cable Before Failure	Unknown, time related function.
II. B. 1 Verified By (Walkdown/Drawings/Calcs.)	Drawings, walkdowns, calc.
III. B. Is Barrier Installation Bounded By Industry Testing?	Determination can not be made until NUMARC testing is completed and the application guide is published.
Corrective Action Planned ?	No
Plant Specific Testing Proposed?	No
IV. B. Is Ampacity Derating a Concern	No
Within Industry Ampacity Rating Testing?	N/A
Further Ampacity Study Required?	No
V. B. Proposed Resolution	<p>Waiting for NUMARC testing results.</p> <p>Area is protected by early warning smoke detection and CO2 system.</p> <p>Very limited fire loading with no direct fire exposure to wrapped component.</p> <p>High ceiling with large open area precludes heat build-up around wrapped commodity.</p>
VI. B. Proposed Schedule	Final disposition can not be determined until NUMARC publishes the final test report.

File f_R1_2(f)

View of Wrap Material

Photo # 1



Millstone Unit Three

Material Removed