GPU Nuclear

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March 29, 1995
C311-95-2119

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

Dear Sir:

Subject: Three Mile Island Nuclear Station, Unit I (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
Response to the Follow-up to the Request for Additional Information Regarding Generic Letter 92-08 Issued Pursuant to 10 CFR 50.54(f) dated December 29, 1994.

The purpose of this letter is to provide, as Attachment 1, the GPU Nuclear response to the Request for Additional Information (RAI) Regarding Generic Letter 92-08 "Thermo-Lag 330-1 Fire Barriers," Pursuant to 10 CFR 50.54(f) for TMI-1.

GPU Nuclear will be participating in the Nuclear Energy Institute (NEI) coordinated effort to assess the chemical composition of Thermo-Lag. Through a comparison of the TMI-1 Thermo-Lag material samples with those provided by the other participating utilities, it is expected that a consistency of material chemical composition will be demonstrated.

Because of issues arising from the March 14, 1995 meeting with the staff regarding the referenced RAI, a response to sections 1.a.(1), (5),(6),(7) and (9) cannot be provided without agreement between NEI and the NRC staff and subsequent guidance. A response addressing these sections will be submitted within 30 days of notification that agreement was reached.

A029 1/1

Also as requested verbally by the TMI Senior NRC Project Manager on March 21, 1995 a copy of the ampacity derating test results are being included with this submittal as Attachment 2.

Sincerely,

T. G. Broughton
Vice President and Director, TMI

WGH
Attachments
cc: Administrator, Region I
TMI Senior Resident Inspector
TMI Senior NRC Project Manager
NEI - Alex Marion
File 94032

METROPOLITAN EDISON COMPANY
JERSEY CENTRAL POWER AND LIGHT COMPANY
PENNSYLVANIA ELECTRICAL COMPANY
GPU NUCLEAR CORPORATION

Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289

Response to "Follow-up to the Request for Additional Information Regarding Generic Letter 92-08 Issued Pursuant to 10 CFR 50.54(f) on February 10, 1994 - Three Mile Island Nuclear Station, Unit 1"

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF DAUPHIN)

This letter is submitted in response to the follow-up to the request for additional information regarding Generic Letter 92-08 issued pursuant to 10 CFR 50.54(f) on February 10, 1994 for Three Mile Island Nuclear Station, Unit 1. All statements contained in this response have been reviewed, and all such statements made and matters set forth therein are true and correct to the best of my knowledge.

T. G. Broughton
Vice President and Director, TMI

Signed and sworn before me this
29th day of March, 1995.

Melody Kim Kulp
Notary Public

Notarial Seal
Melody Kim Kulp, Notary Public
Londonderry Twp., Dauphin County
My Commission Expires Aug. 21, 1997
Member, Pennsylvania Association of Notaries

1. Thermo-Lag Materials

a. Describe the specific tests and analyses that will be performed to verify that the Thermo-Lag fire barrier materials that are currently installed at TMI-1, or that will be installed in the future, are representative of the materials that were used to address the technical issues associated with Thermo-Lag barriers and to construct the fire endurance and ampacity derating test specimens. The tests and analyses shall address the material properties and attributes that were determined or controlled by TSI during the manufacturing process and the quality assurance program. The tests and analyses shall also address the material properties and attributes that contribute to conclusions that the Thermo-Lag materials and barriers conform to NRC regulations. These include:

Response

GPU Nuclear intends to continue to use the Thermo-Lag installed at TMI-1. The Thermo-Lag materials initially installed at TMI-1 were purchased during the period between May 1986 and April 1987. Purchases made after that period were for materials used to repair barriers opened for maintenance or modifications where the original material could not be reused and to replenish warehouse stock quantities.

(1) chemical composition

As stated in the cover letter, GPU Nuclear will be participating in the Nuclear Energy Institute (NEI) coordinated effort to assess the chemical composition of Thermo-Lag and demonstrate the equivalency of the materials tested by the NEI fire barrier test program with those installed at TMI-1 as documented in NEI's letters of January 17, 1995 and February 21, 1995 to the NRC. GPUN will provide samples from TMI-1 for pyrolysis gas chromatographic analysis consistent with NEI's coordinated approach.

(2) material thickness

Thermo-Lag one and three hour barrier material contained in the initial shipments to TMI-1 was found deficient during receipt inspection activities. Thickness was verified by GPU Nuclear Receipt Inspectors, who took numerous readings on each board. They were concerned with material that was excessively thick because of its adverse effect on hanger loading and cable derating and material failing to meet minimum thickness requirements because of its impact on the rating of the barrier. If any piece had more than a few deviations that could not be economically repaired, it was returned to TSI. Thorough receiving inspection check documentation was maintained.

In one instance, an entire shipment was returned because inadequately cured material was stood on edge causing it to slump: leaving the upper edge too thin and the lower edge too thick. Following that material return, to insure receipt of consistent quality material, GPU Nuclear assigned a Manufacturing Assurance representative to the TSI factory. The individual was committed to perform physical and dimensional QC checks of material designated for GPU Nuclear prior to its release for shipment. No additional consideration need be given to material thickness.

(3) material weight and density

Prior to and after assignment of the Manufacturing Assurance (MA) representative to the TSI factory, on-site QC receipt inspection was relied upon to verify that material weight and density specifications were met. No additional consideration need be given to material weight and density.

(4) the presence of voids, cracks, and delaminations

Sensitivity to material voids ensued from difficulties experienced at GPU Nuclear's Oyster Creek plant during Thermo-Lag installation. As a result, thickness and weight criteria were applied to verify material density. Since the material was subject to considerable field work (cut and fit) small voids were filled with TSI trowel grade material when exposed during installation. Material which was cracked or had severe porosity was returned. Little problem with delamination was identified. The effort made to assure weight and thickness assured material density and its quality where voids were concerned. No additional consideration need be given to the presence of voids, cracks or delaminations.

(5) fire endurance capabilities, (6) combustibility and (7) flame spread rating

GPU Nuclear is evaluating the results of the NEI fire barrier testing program and is utilizing the information in the NEI Application Guide to establish fire endurance ratings for Thermo-Lag cable raceway systems. This is considered adequate for establishing fire endurance capabilities (pending evaluation of chemical testing results). These properties have been established for materials involved in the NEI fire barrier test program. The NEI program is considered adequate for establishing combustibility and flame spread ratings (pending evaluation of additional chemical testing results). The issue will be addressed later in greater detail consistent with the time frame identified in the response to 1.c.

(8) ampacity derating

As provided in response to the Follow-up to the Request for Additional Information Regarding Generic Letter 92-08 Issued Pursuant to 10 CFR 50.54(f) dated September 19, 1994 (GPUN Letter C311-94-2307) it was stated that in 1986 GPUN engineers became concerned with the heat retentive characteristics of Thermo-Lag barriers and the resultant effect on cable life and aging during normal plant operation. The low ampacity derating values used by TSI for small diameter conduit protection schemes were questioned. A field test was initiated which monitored the internal temperatures of Thermo-Lag envelopes protecting power circuits. The data obtained by this effort showed that ampacity derating applied only to cable raceways containing energized power cables and is not a concern for instrument and control circuits or for power circuits which were only intermittently energized.

GPUN found that field measured internal envelope temperatures for TMI-1 barrier configurations would <u>not</u> result in long term cable degradation. From the results obtained , GPUN was able to determine that the effects of the actual ampacity derating values for the cabling were acceptable. Therefore, GPUN need not take further action with regard to ampacity derating for the existing Thermo-Lag barrier configurations at TMI-1.

(9) mechanical properties such as tensile strength, compressive strength, shear strength, and flexural strength.

The issue will be addressed later in greater detail consistent with the time frame identified in the response to 1.c.

b. Describe the methodology that will be used to determine the sample size and demonstrate that the sample size will be large enough to ensure that the information and data obtained will be sufficient to assess the total population of the in-plant Thermo-Lag barriers and the materials that will be installed in the future. In determining the sample size, consider the time of installation and manufacture of the various in-plant materials and barrier installations. Give the number and types (e.g., panels, conduit preshapes, trowel-grade material, stress skin) of samples that will be tested and analyzed.

<u>Response</u>

As stated above, GPU Nuclear is currently planning to participate in the NEI sponsored chemical test program intended to establish the similarity between the materials previously tested as part of the NEI fire barrier test program and the materials installed at operating plants and those specifically in use at TMI-1. Because of the open issues arising from the March 14 meeting which require resolution between NEI and the NRC, with respect to increasing the industry sample population to support a meaningful conclusion as to the material consistency, we will not attempt to provide a plant specific program to address the question. By participating in the NEI program,

GPUN expects that the material chemical consistency issue can and will be resolved by the industry action with its sizeable sample population.

c. Submit the schedule for verifying the Thermo-Lag materials.

Response

The NRC discussion during the March 14, 1995 meeting with the four NEI pilot plants, indicates to GPUN that a generic approach to the resolution of this issue is reasonable. However, as stated in the March 14 meeting by the staff, several issues remain to be resolved between the staff and NEI. These are: determination of an adequate sample size, laboratory qualifications, establishment of a technical basis for important chemical constituents and the methodology for analyzing the test results. Because GPU Nuclear supports and intends to participate in the NEI coordinated industry chemical analysis program and because the aforementioned issues must be resolved before GPUN can proceed with plans and schedules; our actions will be limited to submitting the currently requested samples.

We will provide further information within 30 days of notification of an agreement between the NEI and the NRC on this issue to address the progress made toward development of plans and a schedule to resolve the chemical composition, fire endurance capability, combustibility and flame spread issues as they relate to TMI-1.

2. Important Barrier Parameters

a. Describe the examinations and inspections that will be performed to obtain the important barrier parameters given in Section II of the RAI of December 1993 for the Thermo-Lag barrier configurations installed at TMI-1.

Response

The submittal C311-94-2012 dated February 10, 1994 in response to Generic Letter 92-08 "Thermo-Lag 330-1 Fire Barriers," Pursuant to 10 CFR 50.54(f), provided a description of the activities to be undertaken to obtain information on the "Important Barrier Parameters" addressed by Section II. Those actions have been performed and continue in accordance with the plan described. As of this date, of the 900 elements to inspect, only six remain. All fire zones have been walked down but Auxiliary Building Fire Zone 3 which is inaccessible during plant operation. Walkdown of this Fire Zone will be completed during an opportune outage period, no later than the completion date of the 11R outage (Fall 1995).

b. Describe the methodology that will be applied to determine the number and type of representative in-plant fire barrier configurations that will be examined in detail and demonstrate that the sample size is adequate to assure that the information and the data that will be obtained are adequate to assess the total population of in-plant Thermo-Lag barriers. A large enough sample of the total population of configurations should be examined to provide reasonable assurance that the materials and important barrier parameters used to construct the in-plant barriers and any future barrier installations or modifications, are representative of the parameters used to construct the fire endurance test specimens.

Response

The methodology applied to assess the total population of in-plant Thermo-Lag barriers has also been previously provided in Section II of C311-94-2012 dated February 10, 1994 in response to Generic Letter 92-08 "Thermo-Lag 330-1 Fire Barriers," Pursuant to 10 CFR 50.54(f). In short, as stated, walkdowns of 100% of the Thermo-Lag installations are being performed and the information obtained is being documented using digital photography and walkdown data sheets. The data collected during the walkdowns will be made available for NRC review. Barrier parameters that are being verified by the walkdowns include the following:

- *Orientation*
- *Dimensions*
- *Raceway type and size*
- *Junction boxes*
- *Banding material, type, size and spacing*
- *Internal banding details*
- *Stress skin location*
- *Edge guards*
- *Exposed joints, stress skin over joints, stress skin ties and rib locations, staples*
- *Support protection*

Other parameters are being verified by the review of barrier installation documents, electrical raceway details, cable pull slips, etc. These include:

- *Conduit and tray material*
- *Tray type*
- *Cable fill*
- *Joint details (grooved and scored, butt, mitered, pre-buttered, etc.*
- *Cable details (size, type, jacket type, insulation type, cable operating temperature and cable maximum operating temperature).*

These parameters are being input to a database to permit systematic comparison with the NEI Application Guide. The cable detail information from each fire area/zone is included. GPU Nuclear does not plan to perform destructive examination of installed barriers.

No barriers are being eliminated or abandoned in place from which material could be salvaged for test samples. GPU Nuclear considers the quality controls applied to the original installation adequate assurance to permit review of installation documentation to verify relevant parameters not visible during the walkdowns.

c. Submit the schedule for obtaining and verifying all of the important barrier parameters.

Response

The important barrier parameters will be obtained, verified and compiled no later than the completion date of the 11R outage (Fall 1995).

Gilbert/Commonwealth engineers and consultants

GILBERT/COMMONWEALTH, INC., P.O. Box 1498, Reading, PA 19603 / Tel. 215-775-2600 / Cable ... asoc / Telex 836-431

September 15, 1988

G/C/TMI-1CS/16503

Mr. J. W. Langenbach
TMI Director of Projects
GPU Nuclear
Morris Corporate Center
One Upper Pond Road
Parsippany, New Jersey 07054

Attention: Mr. J. Mateychick

Re: Three Mile Island Nuclear Station Unit #1
TSI Derating Check
G/C W.O. #04-5390-035
GPUN P.O. #PC-047764
GPUN B/A #412384

Dear Mr. Langenbach:

This letter documents the results of the TSI Derating Check which was funded by the above listed purchase order. The results are presented in a tabular form attached and a discussion of the results follows each section.

If you should have any questions, please contact me.

Very truly yours,

D. A. Palaferro
Electrical Project Engineer

J. H. Brendlen, Jr.
Project Manager, Continuing Services

DAP/JHB/ldf

cc: ED&CC w/original letter
J. W. Langenbach
J. Mateychick
J. H. Brendlen
D. A. Palaferro
PRA (2)

TRAY 732

DESCRIPTION:

4 KV Cable Tray #732 is located in the screen house and is wrapped with 1 Hour TSI wrap. This tray contains circuit number MD11.

DATA:

Circuit No.	Equipment	Rating	Max. Load Current/Bkr. Setting	Cable Size	Cable Ampacity (.7) (amps)	Cable Ampacity (.7) with 13% derating (amps)	Cable Ampacity (.7) with 28.04% derating (amps)
MD11	1R Transformer	1000/1333 KVA	185 amps	350 MCM	288	251	207

SUMMARY:

Cable ampacity for MD11 is acceptable at current breaker setting when applying 28.04% derating in addition to the .7 derating factor (7-24 cables and 40°C ambient temperature) utilized in Cycle 6 Cable Sizing Criteria.

TRAYS 751/756

DESCRIPTION:

4 KV Cable Trays #751 and 756 are located in FH-FZ-1 and wrapped with 1 Hour TSI wrap. Tray #751 contains circuits MA9, MB9, MB11, MB13, MC12, ME6, ME7, ME9, ME10, and ME11. Tray #756 contains circuits MA9, MB9, MB13, ME10, and ME11.

DATA:

Circuit No.	Equipment	Rating	Load Current (amps)	Load Current x 1.25 (amps)	Cable Size	Cable Ampacity (.7) (amps)	Cable Ampacity (.7) with 13% derating (amps)	Cable Ampacity (.7) with 28.04% derating (amps)
MA9	SR-P-3A	400 HP	52	65	4/0	210	183	151
MB9	SR-P-3B	400 HP	52	65	4/0	210	183	151
ME6	DH-P-1B	350 HP	44	55	4/0	210	183	151
ME7	MU-P-1C	700 HP	85	106	4/0	210	183	151
ME9	BS-P-1B	250 HP	41	51	4/0	210	183	151
ME10	RR-P-1B	400 HP	52	65	4/0	210	183	151
MB11	1H Transformer	1000/1333 KVA	185	185*	350 MCM	288	251	207

*Breaker Setting

TRAYS 751/756 (Cont'd.)

DATA (Continued):

Circuit No.	Equipment	Rating	Load Current (amps)	Load Current x 1.25 (amps)	Cable Size	Cable Ampacity (.7) (amps)	Cable Ampacity (.7) with 13% derating (amps)	Cable Ampacity (.7) with 28.04% derating (amps)
MB13	1U Transformer	1000/1333 KVA	185	185*	350 MCM	288	251	207
MC12	1M Transformer	1000/1333 KVA	185	185*	350 MCM	288	251	207
ME11	1T Transformer	1000/1333 KVA	185	185*	350 MCM	288	251	207

*Breaker Setting

SUMMARY:

Cable ampacity for the 4/0 AWG cables is acceptable for motor loads when applying 28.04% derating in addition to the .7 derating factor (7-24 cables and 40°C ambient temperature) utilized in Cycle 6 Cable Sizing Criteria.

Cable ampacity for the 350 MCM cables is acceptable at current breaker settings when applying 28.04% derating in addition to the .7 derating factor (7-24 cables and 40°C ambient temperature) utilized in Cycle 6 Cable Sizing Criteria.

TRAYS 551/553

DESCRIPTION:

480V Cable Trays #551 and 553 are located in CB-FA-1. These trays contain circuits LP5A, LP5B, and LS6.

DATA:

Circuit No.	Equipment	Rating	Load Current	Load Current x 1.25 (amps)	Cable Size	Cable ampacity (.80) (amps)	Cable ampacity (.8) with 13% derating (amps)	Cable ampacity (.8) with 28.04% derating (amps)	ICEA P54-440 derating (amps)	ICEA P54-440 with 28.04% derating (amps)
LP5A/ LP5B	ICESVMMC Feeder	--	--	540*	2-350 MCM	652	567	469	588	423
LS6	NS-P-1B	125 HP	140	175	4/0	236	205	170	185	133

*Breaker Setting

SUMMARY:

Cable ampacity for LP5A, LP5B cables (2-350 MCM) applying (.80) derating factor and 28.04% derating for TSI material results in an ampacity value less than the breaker setting.

Cable ampacity for LS6 cable applying (.80) derating factor and 28.04% derating for TSI material results in an ampacity value slightly less than the load current x 1.25 (overload) factor.

ICEA P-54-440 ampacity values were calculated and the results are shown in the above table. These ampacity values are less than the former values because the calculated depth of fill for Tray 551 (6" wide tray) is 2.6 inches. Using the 2.5 inch loading depth P-54-440 ampacities, from Table 3 results in reduced ampacities as shown.

TRAY 590

DESCRIPTION:

480 V Cable Tray 590 is located in AB-FZ-7 and is wrapped with a 1 hr TSI wrap. Tray 590 contains circuits CG11, CG83, CQ43, LP2, and LP6.

DATA:

Circuit No.	Equipment	Rating (hp)	Load Current (amps)	Load Current x 1.25 (amps)	Cable Size	Cable ampacity (.80) (amps)	Cable ampacity (.8) with 13% derating (amps)	Cable ampacity (.8) with 28.04% derating (amps)	ICEA P54-440 derating (amps)	ICEA P54-440 with 28.04% derating (amps)
CG11	AH-E-15A	3	4.8	6	#10	27	24	19	32	23
CG 83	IC-P-1A	75	87	109	1/0	150	131	108	199	143
CQ43	NS-V-4	.33	1	1.25	#1[illegible]	27	24	19	32	23
LP2	DC-P-1A	100	120	150	2/0	174	151	125	224	161
LP6	NS-P-1A	125	140	175	4/0	236	205	170	284 ↑	205 284K @ 1.25

SUMMARY:

Cable ampacity for circuits CG11, CQ43 is acceptable when applying 28.04% derating in addition to the .8 derating factor (4-6 cables and 40°C ambient temperature) utilized in Cycle 6R cable sizing criteria. Ampacity of circuits CG83, LP2, LP6 with the same derating is not high enough to maintain 1.25 overload factor.

An additional ampacity calculation was performed using ICEA P54-440 methodology. The current depth of fill was calculated to be 1 inch. TMI-1 cables and the P-54-440 rubber jacketed cable tray fill may not be sufficiently similar to provide an engineering basis for using this standard. Adjusting for the larger interlocked armor cable diameters in the calculation yields cable ampacities in a one inch fill depth which can exceed the Kerite free air ampacity.

TRAYS 1019/1020

DESCRIPTION:

480 V Cable Tray 1019 is located in CB-FA-1 and is wrapped with a 1 hr. TSI wrap. Tray 1019 contains circuits ED5033, ED5033A, CH61, ED5034, ED5034A, LS5, and LS7. Due to physical configuration, circuits ED5033 and ED5033A are treated as a single circuit. Likewise, circuits ED5034 and ED5034A are treated as a single circuit.

DATA:

Circuit No.	Equipment	Rating (hp)	Load Current (amps)	Load Current x 1.25 (amps)	Cable Size	Cable ampacity (.8) (amps)	Cable ampacity (.8) with 13% derating (amps)	Cable ampacity with 28.04% derating (amps)	ICEA P54-440 derating (amps)	ICEA P54-440 with 28.04% derating (amps)
ED5033/ ED5033A ED5034/ ED5034A	DC Feed to 1T Swgr. DC Feed to 1T Swgr.	--	60**	--	2-#2	222	193	160	254	182
CH61	1C-P-1B	75	87	109	2/0	174	151	125	224	161
LS5	NS-P-1C	125	140	175	4/0	236	205	170	284	204
LS7	1BESVMCC	--	320*	--	500 MCM	408	355	294	463	333

*Breaker Setting
**Breaker Size

SUMMARY:

Cable ampacity for ED5033/ED5033A, ED5034/ED5034A, and CH61 is acceptable after derating 28.04% in addition to .7 derating factor utilized in Cycle 6R cable sizing criteria.

An additional ampacity calculation was performed using ICEA P54-440 methodology. the current depth of fill was calculated to be one inch. TMI-1 cables and the P-54-440 rubber jacketed cable tray fill may not be sufficiently similar to provide an engineering basis for using this standard. Utilizing the interlocked armor cable diameter in the calculations yeilds cable ampacities in a one inch fill depth which approaches the Kerite free air ampacity.

TRAY 1020

DESCRIPTION:

480 V Cable Tray 1020 is located in CB-FA-1 and is wrapped with a 1 hr. TSI wrap. Tray 1020 contains circuits ED5033A, ED5034A, CH61, LS7, LS5, and ED307A. The data and summary for Circuits ED5033A, ED5034A, CH61, LS7, LS5, is identical for Tray 1019.

DATA:

Circuit No.	Equipment	Breaker Rating (hp)	Size (amps)	Load Current x 1.25 (amps)	Cable Size	Cable ampacity (.8) (amps)	Cable ampacity (.8) with 13% derating (amps)	Cable ampacity (.8) with 28.04% derating (amps)	ICEA P54-440 derating (amps)	ICEA P54-440 with 28.04% derating (amps)
ED307A	DC Feed to 1R Swgr.	--	40	--	#8	46	40	33	44	31

SUMMARY:

Circuit ED307A ampacity is not equivalent to breaker size when applying 28.04% derating in addition to the .8 derating factor (4-6 cables and 40°C ambient temperature) utilized in Cycle 5R cable sizing criteria and when applying 28.04% derating to ICEA P54-440 values.

TEST EQUIPMENT

OMEGA: OM 302 SERIES
THERMOCOUPLE DIGITAL DATA LOGGER

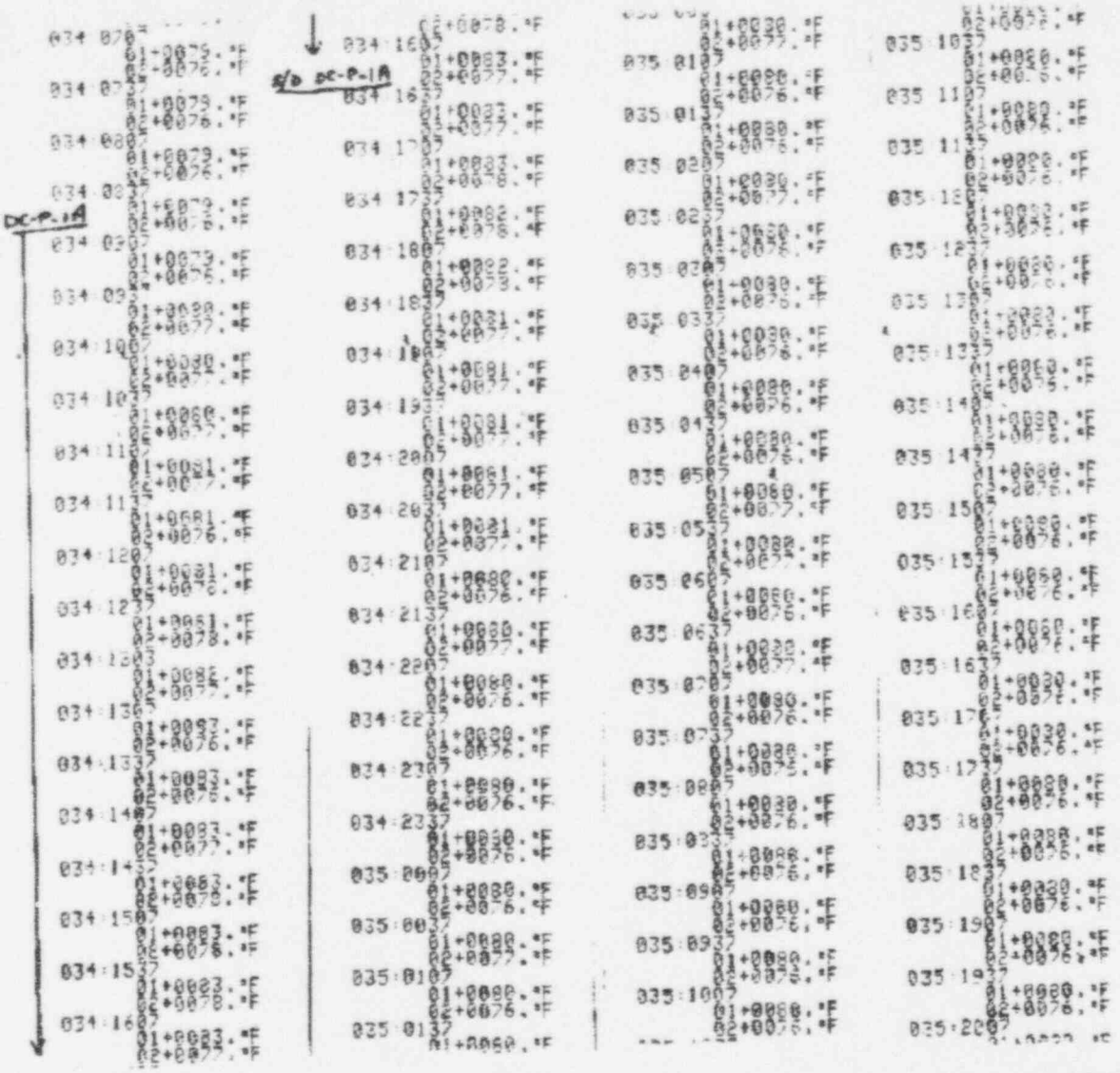
SETTINGS

CHANNEL 1 - INSIDE TRAY # 590
CHANNEL 2 - OUTSIDE TRAY # 590
TEMPERATURE - °F
PRINT INTERVAL - 30 min.
DWELL TIME - 9 sec.

034 - FRIDAY, FEB. 3
035 - SATURDAY, FEB. 4
036 - SUNDAY, FEB. 5
037 - MONDAY, FEB. 6

TR No. BT 5220

TSI FIRE BARRIER
TEMPERATURE MEASUREMENT



START: FRIDAY, FEB 3 at 0707 HRS.

EQUIPMENT: AH-E-1SA, IC-P-1A, NS-P-1A } RUNNING

START: DC-P-1A at 0858
SHUTDOWN: DC-P-1A at 1609

Gayle Tulloch x4062
2/7/95

035:2007	01+0080.°F	02+0076.°F
035:2037	01+0080.°F	02+0076.°F
035:2107	01+0080.°F	02+0076.°F
035:2137	01+0080.°F	02+0076.°F
035:2207	01+0080.°F	02+0076.°F
035:2237	01+0080.°F	02+0076.°F
035:2307	01+0080.°F	02+0077.°F
035:2337	01+0080.°F	02+0077.°F
036:0007	01+0080.°F	02+0076.°F
036:0037	01+0081.°F	02+0077.°F
036:0107	01+0080.°F	02+0077.°F
036:0137	01+0080.°F	02+0076.°F
036:0207	01+0080.°F	02+0077.°F
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036:1837	01+0080.°F	02+0076.°F
036:1907	01+0080.°F	02+0077.°F
036:1937	01+0080.°F	02+0078.°F
036:2007	01+0079.°F	02+0077.°F
036:2037	01+0079.°F	02+0078.°F
036:2107	01+0080.°F	02+0077.°F
036:2137	01+0080.°F	02+0076.°F
036:2207	01+0080.°F	02+0077.°F
036:2237	01+0080.°F	02+0077.°F
036:2307	01+0080.°F	02+0077.°F
036:2337	01+0080.°F	02+0077.°F
037:0007	01+0080.°F	02+0078.°F
037:0037	01+0080.°F	02+0077.°F
037:0107		02+0078.°F
037:0137	01+0080.°F	02+0078.°F
037:0207	01+0080.°F	02+0075.°F
037:0237	01+0080.°F	02+0077.°F
037:0307	01+0080.°F	02+0076.°F
037:0337	01+0080.°F	02+0078.°F
037:0407	01+0080.°F	02+0076.°F
037:0437	01+0080.°F	02+0076.°F
037:0507	01+0080.°F	02+0077.°F
037:0537	01+0080.°F	02+0078.°F
037:0607	01+0080.°F	02+0077.°F
037:0637	01+0080.°F	02+0077.°F
037:0707	01+0080.°F	02+0078.°F
037:0737	01+0080.°F	02+0077.°F
037:0807	01+0081.°F	02+0078.°F
037:0837	01+0081.°F	02+0077.°F
037:0907	01+0080.°F	02+0077.°F
037:0937	01+0080.°F	02+0075.°F
037:1007	01+0080.°F	02+0076.°F
037:1037	01+0080.°F	02+0077.°F
037:1107	01+0080.°F	02+0077.°F
	01+0081.°F	02+0077.°F
037:0907	01+0080.°F	02+0077.°F
037:0937	01+0080.°F	02+0076.°F
037:1007	01+0080.°F	02+0076.°F
037:1037	01+0080.°F	02+0077.°F
037:1107	01+0080.°F	02+0077.°F
037:1137	01+0081.°F	02+0077.°F
037:1207	01+0080.°F	02+0076.°F
037:1237	01+0080.°F	02+0078.°F
037:1307	01+0080.°F	02+0077.°F
037:1337	01+0080.°F	02+0076.°F
037:1407	01+0081.°F	02+0079.°F
037:1437	01+0081.°F	02+0078.°F

TR No. BT 5220

EQUIPMENT: AH-E-15A, IC-P-1A, NS-P-1A } CONTINUED TO RUN FOR DURATION OF TEST.

July 10

Attachment 2
C311-95-2119
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To CEH/Shellman G.R.

Per the attached Derating Study performed by Gilberts Associates, it was determined that a derating factor of 28.04%, in addition to the required derating for tray fill, was applied to cables encased in Thermo-Lag 330 barriers. A derating factor of 18% was initially recommended by TSI and that number was later revised to be 33%. Per my discussions with Raj Pruthi of EP&I, it is reasonable to consider the difference of 4.96% inconsequential.

The resulting ampacities are acceptable for all but a few loads, when factoring in a 25% overload allowance for motor loads (which is not continuous). Those exceptions are:

Circuit No.	Load Current (125%)	Ampacity with 28.04% Derating
LS6	175 A	133 A
CG83	109 A	141 A
LP2	150 A	125 A
LP6	175 A	170 A
ED307A	40 A	31 A

Cable Tray #590 in the Auxiliary Building, which includes Circuit Nos LP2 and LP6, was determined to be the worst case. Under the direction of TMI Projects, Start-Up and Test performed a temperature study for that location under reasonable loading conditions during normal operating conditions. The results indicated an ambient temperature of 21 degrees Celsius, whereas the cable is rated at 90 degrees Celsius. It was concluded that under those conditions, the cable is in no danger of being overloaded.

Resultingly, we believe that all cables have been adequately derated. At present, the NRC considers the issue of ampacity derating indeterminant. We feel that the system is thus presently operable and will continue to monitor NUMARC and the NRC for further developments in this matter.

Raj Pruthi
Package you requested.
Tom O'Connor
9/26/94

GPU 1000001456