IES
INDUSTRIES INC.

February 14, 1994
NG-94-0563

L. J. Callan
Acting Associate Director of Projects
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, D.C. 20555

Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49
Response to NRC Request for Additional Information Regarding Generic Letter 92-08, "Thermo-Lag 330-1 Fire Barriers", Pursuant to 10CFR50.54(f)-Duane Arnold Energy Center

References:
1) Letter from L. J. Callan (NRR) to Lee Liu (IESUI), Request For Additional Information Regarding Generic Letter 92-08, "Thermo-Lag 330-1 Fire Barriers", Pursuant to 10CFR50.54(f)-Duane Arnold Energy Center, dated December 21, 1993.

2) Letter from John Franz (IESUI) to Dr. Thomas E. Murley (NRR), NG-93-1143, Response to Generic Letter 92-08, "Thermo-Lag 330-1 Fire Barriers", dated April 5, 1993.

3) Letter from Robert M. Pulsifer (NRR) to Lee Liu (IESUI), Duane Arnold Energy Center - Response to Generic Letter 92-08, "Thermo-Lag 330-1 Fire Barriers", (TAC NO. M85547), dated June 16, 1993.

File: A-101a, P-72a

Dear L. J. Callan:

This letter and its attachments provide IES Utilities Inc.'s (IESUI) response to the NRC's Request For Additional Information Regarding Generic Letter 92-C8 (Reference 1). The detailed information provided and commitments made in this letter supersede those made in our earlier response to Generic Letter 92-08 (References 2 & 3).

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1/1

If you have any questions or require additional information, please contact this office.

This letter is true and accurate to the best of my knowledge and belief from the information known at this time.

IES Utilities Inc.

By _____
John F. Franz
Vice President-Nuclear

State of Iowa

(County) of Linn

Signed and sworn to before me on this 14th day of

February, 1994, by Cynthia L. Helgenberg.

_____
Notary Public in and for the State of Iowa

3-29-96
_____
Commission Expires

JFF/DSR:so
Enclosure w/attachments: Response to NRC Request For Additional Information Regarding "Thermo-Lag 330-1 Fire Barriers"

I.B.1(a) Description of Raceway Fire Barriers Used at DAEC

I.B.1(b) Description of Steel Coating and Structural Steel Fire Barriers Used at DAEC

I.B.1(c) Description of Miscellaneous Fire Barriers Used at DAEC

(continued)
Enclosure w/attachments:

I.B.2	Total Population of Thermo-Lag Barriers Used at DAEC
II.B	DAEC Electrical Barrier Parameter Matrix
V.B	DAEC Thermo-Lag Resolution Options

cc: D. Robinson
L. Liu
L. Root
R. Pulsifer (NRC-NRR)
J. Martin (Region III)
Mr. Stephen N. Brown (State of Iowa)
NRC Resident Office
DCRC

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION
REGARDING "THERMO-LAG 330-1 FIRE BARRIERS"

I. Thermo-lag Fire Barrier Configuration and Amounts

A. Discussion

The Duane Arnold Energy Center (DAEC) uses Thermo-lag 330-1 (Thermo-lag) material in three general applications that are addressed by the NRC request for information:

- Raceway Fire Barriers
- Steel Coatings and Fireproofing
- Miscellaneous fire barrier installations such as penetration seals

This response will address these applications independently for each information area addressed by the NRC 10 CFR 50.54(f) letter.

Information provided in this response is considered more detailed and current than that provided in our response to Generic Letter 92-08. Commitments in this response replace the commitments provided in our earlier letter.

B. NRC Required Information

Except as discussed below, all of the above mentioned applications of Thermo-lag at DAEC are installed to meet 10 CFR 50.48 or 10 CFR Part 50 Appendix R requirements. Thermo-lag is not used to satisfy any specific condition of the plant's operating license. However, the DAEC is required per the license to maintain an approved Fire Protection Program as described in the Updated Final Safety Analysis Report.

Thermo-lag installed for structural steel fireproofing purposes is three-hour rated for those areas of the plant where bulk room heating has been calculated to challenge the steel and is one-hour rated for those areas where only localized heating is a concern. The DAEC was granted an exemption from the requirement to protect structural steel which forms or supports a fire barrier unless localized heating or bulk room heating is sufficient to cause degradation of the steel. The structural steel protection program at the DAEC

requires us to provide an adequate margin of fireproofing, based on combustible loading and type and location of fixed combustibles, to ensure that structural temperature limits are not exceeded during a Design Basis Fire (DBF).

Applications of Thermo-lag for non-regulatory purposes, such as structural steel fireproofing in stairwells for personnel egress, are not subject to NRC requirements and are not included in this response.

Attachments I.B.1.(a),(b), and (c) to this enclosure provide the information requested in Section I.B.1 of the NRC letter and Attachment I.B.2 provides the information requested in Section I.B.2.

II. Important Barrier Parameters

A. Discussion

Section II.A of the NRC letter discusses various parameters previously identified by the Nuclear Management and Resource Council (NUMARC) and additional cable parameters identified by the NRC as potentially affecting the assessments of tested configurations and test results in relation to plant-specific configurations. NUMARC has further refined a list of important parameters for Thermo-lag raceway barriers. Final determination of important parameters cannot be made until the NUMARC tests are completed and final NRC acceptance criteria for these tests are available. Our program for addressing these parameters is described in Section V of this enclosure.

B. NRC Required Information

The status of each of the NRC listed parameters available at this time is provided in Attachment II.B. Data not obtained for parameters that may be identified as significant subsequent to completion of the NUMARC testing will be addressed by one or more of the following options:

1. Review installation work practices and procedures to obtain as-built information related to the parameters.

2. Assume conservative limiting conditions that were used for testing purposes. For example, assume no internal bands in lieu of verifying the actual spacing of internal bands. NUMARC test results and Application Guide will be used to determine bounding conditions.

3. Implement a sampling inspection plan which will determine data applicable to parameters for the unexamined portions of the barriers.

4. Eliminate the need to address these parameters for some installations by implementing non-Thermo-lag alternatives to meet 10 CFR 50, Appendix R requirements.

It is not clear at this time if all the currently identified parameters will be considered critical because NUMARC testing and NRC acceptance of the testing has not been completed.

The degree of conservatism of cable functionality evaluation requirements implied by the NRC listing of cable parameters and as described in the draft Supplement 1 to Generic Letter 86-10 significantly exceeds the original requirements of Generic Letter 86-10. Also, the cable/barrier contact issue is being investigated in the Phase 2 test program by placement of thermocouples below the cable tray rungs. The specification for all scheduled cable at the DAEC requires that these cables be tested to a minimum temperature of 340F following accelerated aging (at elevated temperatures) and radiation exposure. The cables are required to demonstrate current carrying capability during this test. This temperature exceeds the NRC requirement for maximum protected raceway cold side temperature. Important cable parameters will be identified and verified in accordance with the DAEC Thermo-lag Resolution Program described in Section V of this enclosure.

The temperature requirements for structural steel protection are less stringent than those for electrical raceways. The design basis for spray on/preformed board Thermo-lag steel coating and fireproofing applications at DAEC was derived from qualification testing which is different from that which is currently in question. We are, however, in the process of investigating the validity of the supporting test documentation. Critical parameters for these barriers will be developed and verified in accordance with the program in Section V of this enclosure.

Miscellaneous applications of Thermo-lag at DAEC will be replaced with alternate materials; therefore, their critical parameters are not addressed in this response.

III. Thermo-lag Barriers outside the scope of the NUMARC program

A. Discussion

We have provided input to NUMARC regarding the benefits of additional generic testing of raceway installations beyond the current test program. Recommendations were also provided concerning testing of specific parameters and configurations apparently not directly bounded by the NUMARC program. Determination of which installations are actually bounded will depend on the test results and the final content of the application guide.

B. NRC Required Information

1. Some raceway barriers at the DAEC, such as large junction boxes, equipment enclosures, and other installations which may not be directly bounded by the NUMARC generic test program. It is expected, however, that the current NUMARC test program will provide useful details relative to items not directly within the test scope. Resolution for these items not bounded will not be determined until after the NUMARC test results and Application Guide are available in accordance with the program outlined in Section V of this enclosure.

   The non-raceway applications of thermo-lag identified in Section I are not within the scope of the NUMARC program. However, useful information regarding certain non-raceway applications, such as boxed in structural steel fireproofing, may be obtained from the NUMARC tests due to similarity of construction. These applications have different acceptance requirements than those required for raceway. Acceptable steel temperatures at the end of a fire test may reach 1000F. Therefore, resolution for these items not bounded will not be determined until after the NUMARC test results and Application Guide are available in accordance with the program outlined in Section V of this enclosure.

2. The specific actions necessary to demonstrate the adequacy of each Thermo-lag installation outside the current test scope cannot be defined at this time. Due to the unavailability of information and data inputs required to evaluate each specific installation of Thermo-lag, a supplemental report will be provided to the NRC when more information is available. The supplemental report will also address non-raceway applications. Section V

provides our generic program that will be used to evaluate installations outside the scope of the current program in addition to alternatives being considered. Section VI of this enclosure discusses the schedule for implementing this program.

The following inputs will be required to evaluate the adequacy of Thermo-lag installations and determine a resolution schedule:

a. Final NRC acceptance criteria (reference draft supplement to Generic Letter 86-10).

b. Test results and Application Guide for NUMARC current Phase 2 test scope. This includes NRC agreement with NUMARC bounding conditions, philosophy and specific application of test results to the installed configurations.

c. Test results of NUMARC expanded test scope (if undertaken).

d. Identification of acceptable raceway upgrades or alternative barrier materials.

e. Ampacity test results for the fire tested raceway barrier configurations.

f. DAEC Fire IPEEE data to assess safety significance of current Thermo-lag configurations to aid in scheduling priorities and to support exemption requests for areas where adequate barrier margin exists.

g. Information on the potential for shared utility testing of specific plant parameters not bounded by NUMARC program and test facility availability.

IV. Ampacity Derating

A. Discussion

For upgraded trays and conduits, NUMARC will be discussing with the NRC the generic applicability of ampacity derating factors derived by Texas Utilities Electric Company (TUEC) using the methodology of IEEE Std. 848. This methodology has been extensively discussed with the NRC by NUMARC and TUEC. However, NRC acceptance of this methodology is still pending. Ampacity derating factors determined for upgraded

barrier configurations can be conservatively applied to baseline configurations due to the additional material used for upgrade configurations.

The cable ampacity method used at DAEC is outlined in Design Standard DES STD-ELEC-003 and Engineering Design Guide DGC-E109. Under the DAEC program, derating is an issue which pertains only to raceways containing continuously energized power cables.

Protected trays at the DAEC contain a small number of continuously energized power cables. The remaining cables in the tray are either control cables or power cables associated with an intermittent load such as a motor-operated valve.

The existing DAEC protected tray ampacity methodology is based on the fact that only continuously energized power cables will contribute significant heat to the inside of the tray wrap envelope. As an additional conservatism, a factor is included in the methodology to account for the small amount of heat which may be generated by control and intermittently loaded power cables. Cables associated with intermittent loads such as motor operated valves do not contribute significant heat to the envelope. Control cables do not contribute significant heat to the tray envelope because of the low currents involved (typically less than one ampere). This methodology calculates the amount of heat which can be dissipated by the Thermo-lag wrap. The heat generated by the continuously energized cables is subtracted from the amount of heat which can be dissipated.

The DAEC has a program in place which tracks addition of cable to protected trays. This program does not require derating of individual cables until the amount of heat generated by the continuously energized power cables in the protected tray approaches the amount of heat which can be safely dissipated by the protective envelope. This program was in place prior to the original NRC DAEC Appendix R audit.

It is our intent, at this time, to retain the existing DAEC methodology; however, revised heat dissipation figures will be developed to account for the upgraded Thermo-lag barrier configurations. These figures will be developed following review of the NUMARC/TUEC ampacity test data.

B. NRC Required Information

Section V addresses the DAEC Thermo-lag Resolution Program. Cable ampacity will be considered as appropriate when solutions for specific raceway

applications of Thermo-lag are specified. The NUMARC ampacity testing is currently scheduled for August, 1994. NRC will be provided a status and schedule in accordance with Section VI timetables.

V. Alternatives

A. Discussion

We have developed a resolution program to address Thermo-lag installations at DAEC (See Attachment V.B). This program provides for consideration of options to use Thermo-lag materials, other fire barrier materials, or alternative approaches. Initially, we will determine the status of parameters for installed configurations using available information for each installation in the plant. This includes reviewing installation documentation and possibly walkdowns to confirm specific parameters. Feasible options will then be identified and evaluated. It should be noted that alternative options may be considered even if Thermo-lag upgrades are available. The program also includes a process to evaluate as-built parameters that are not bounded by tested and acceptable installations.

For raceway installations, several inputs are required to determine whether upgrades using additional Thermo-lag or other materials are practical and what alternatives would be appropriate in the event upgrades cannot be developed. These include:

1. Test and acceptance criteria which have been finalized and issued by the NRC. The proposed criteria contained in the draft supplement to Generic Letter 86-10 contain new conservatism that could affect the qualifications of proposed upgrades or replacements.

2. Final NUMARC Phase 2 test results. These are not expected until mid-March.

3. The NUMARC Application Guide. This is expected in mid-April. Discussions between the industry and the NRC will be necessary to reach agreement on the selection of comparison parameters and bounding conditions. The result of these NRC interactions will define the content and directly impact the generic applicability of a given test to an installed configuration.

4. Ampacity test results for one- and three-hour tray configurations. These are not expected until August.

This program also applies to non raceway applications (such as a wall or protection of structural steel). Critical parameters for each major category will be developed following our review of existing raceway and non raceway tests, existing NRC/NUMARC raceway parameters, industry standards and regulatory correspondence.

B. NRC Required Information

The following describes the possible alternatives which will be considered under the DAEC Thermo-lag Resolution Program for ensuring compliance to NRC fire protection requirements (Attachment V.B):

1) Accept existing barriers based on NUMARC or other acceptable baseline test results.

2) Upgrade existing barriers utilizing Thermo-lag or alternative materials based on NUMARC or other acceptable test results.

3) Evaluations to justify the acceptability of minor deviations between as-built installations and acceptable test configurations.

4) Replace Thermo-lag barriers with other accepted fire barrier materials or systems.

5) Relocate or replace protected components. This includes but is not limited to cable reroutes or circuit modifications.

6) Qualify 3-hour barriers as 1-hour and install detection and suppression systems to satisfy NRC requirements.

7) Re-evaluate Appendix R safe shutdown analysis for Thermo-lag protected equipment to determine if the scope of protected circuits can be reduced.

8) Submit exemption requests to the NRC for areas where adequate margin can be determined. This could include analysis based on combustible loading versus barrier performance as well as probabilistic risk analysis (PRA) to determine the affects of a degraded barrier on core damage frequency.

VI. Schedules

A. Discussion

Developing a schedule to resolve Thermo-lag issues depends on various data and programmatic inputs that

are not available at this time. These inputs were discussed in Sections III, IV, and V of this enclosure.

B. NRC Required Information

1. A status of our resolution of the DAEC Thermo-lag raceway and Steel Coatings/Fireproofing issues will be provided to the NRC within 90 days of receipt of the NUMARC Application Guide, which is expected to be issued in April 1994. An appropriate schedule for the determination, evaluation and implementation of options will be included at that time taking into consideration the variables previously discussed.

2. Raceway ampacity issue status will be provided within 90 days of receipt of the NUMARC ampacity test report. The NUMARC report is not expected until August, 1994. Data from this testing is required for evaluating this issue at DAEC.

3. Currently identified miscellaneous applications (Attachment I.B.1(c)) of Thermo-lag installed at the DAEC will be replaced with alternative materials. Non-outage activities are planned to be completed by the end of 1994. Outage related activities are currently planned to be completed during refueling outage RFO13 with all miscellaneous applications being resolved by July 1, 1995.

4. Appropriate compensatory measures as stated in our response to Generic Letter 92-08 will remain in place until the DAEC Thermo-lag issues are resolved for each application.

5. Actions necessary to resolve the Thermo-lag issues are not presently known. The DAEC will aggressively pursue the options discussed in Section V.B. We anticipate resolution by December 31, 1996. This schedule allows for any outage related modifications to be completed during RFO14 which is scheduled for the fall of 1996. This schedule assumes a limited amount of modification work will be required to reroute cables, modify circuits, upgrade existing barriers or install new fire barriers. If the final resolution requires major modifications, such modifications may require more than one refueling outage to complete. In this case we will submit an updated schedule for completion of these major activities.

VII. Sources and Correctness of Information

Sources for this document are original plant modification packages, process documentation, and limited walkdowns of the Thermo-lag installations. References to appropriate sources are being maintained until the Thermo-lag issues are resolved. Verification of parameters is pending.

VIII. Attachments:

I.B.1(a)	Description of Raceway Fire Barriers Used at DAEC
I.B.1(b)	Description of Steel Coating and Structural Steel Fire Barriers Used at DAEC
I.B.1(c)	Description of Miscellaneous Fire Barriers used at DAEC
I.B.2	Total Population of Thermo-lag Barriers Used at DAEC
II.B	DAEC Electrical Barrier parameter Matrix
V.B	DAEC Thermo-lag Resolution Options

Attachment I.B.1(a): Description of Raceway Fire Barriers Used at DAEC

DAEC Identification Installation Figure #(s)	ID #	Item Description	Rating(Hr.)
1A-1	1J186	1'x2'x3' J-Box	3
	1B142	1-1/2" Conduit	3
	1B143	1-1/2" Conduit	3
	1B701	3/4" Conduit	3
	1B702	3/4" Conduit	3
	1B144	3/4" Conduit	3
	1B132	4" Conduit	3
	1B133	4" Conduit	3
1C-1	3A107	4" Conduit	3
	3J510	1'x1'x1' J-Box	3
	3P109	4" Conduit	3
1C-2	2H8A	4"x30" Tray	3
	2K231	5" Conduit	3
	2K232	5" Conduit	3
	2K233	5" Conduit	3
	2B203	5" Conduit	3
	2B204	5" Conduit	3
	2B205	5" Conduit	3
1C-3	2H2D	4"x18" Tray	3
	2B201	5" Conduit	3
	2B202	5" Conduit	3
	2K234	5" Conduit	3
	2K235	5" Conduit	3
2A-1,2,3,8	1L3A	4"x24" Tray	3
	1L3B/1L7G	4"x15" Tray	3
	5C317	1" Conduit	3
	5J502	6"x6"x4" J-Box	3
	1C128	6" Conduit	3
	1C129	6" Conduit	3
	1C130	6" Conduit	3
	1C131	6" Conduit	3
	5P332	1" Conduit	3
	1J1744	20"x30"x10" J-Box	3
	1C980	4" Conduit	3
	1C979	4" Conduit	3

Attachment I.B.1(a): Description of Raceway Fire Barriers Usedat DAEC

DAEC Identification Installation Figure #(s)	ID #	Item Description	Rating(Hr.)
2A-5	1D148	4" Conduit	3
	1D149	4" Conduit	3
2A-4,6,7,9,10	1M5A	4"x24" Tray	3
	1N5A	4"x24" Tray	3
	1JX105A	2'x 2'-4"x 2'-4" Drywell Pen/J-Box	3
	1JX105C	4'x 2'-4"x 1'-10" Drywell Pen/J-Box	3
	1C145	1-1/2" Conduit	3
	3C325	3/4" Conduit	3
2D-1,2,3,4	1L7F	4"x12" Tray	3
	1D148	4" Conduit	3
	1D149	4" Conduit	3
	1C140	2" Conduit	3
	1C141	2" Conduit	3
	1C142	2" Conduit	3
	1B132	4" Conduit	3
	1B133	4" Conduit	3
3A-1,2	2D223	1-1/2" Conduit	3
	2D224	1-1/2" Conduit	3
	MO 2137	3'x3'x5' Enclosure	3
	2L8A	4"x24" Cable Tray	3

Attachment I.B.1(a): Description of Raceway Fire Barriers Used at DAEC

DAEC Identification Installation Figure #(s)	ID #	Item Description	Rating(Hr.)
7E-1,2	1J378	8'x2'x1' J-Box	1
	1J379	4'x3'x1' J-Box	1
	1L509	4" Conduit	1
	1L510	4" Conduit	1
	1L519	4" Conduit	1
	1L508	4" Conduit	1
	1L597	1-1/2" Conduit	1
	1L507	4" Conduit	1
	1K108	5" Conduit	1
	1K109	5" Conduit	1
	1K110	5" Conduit	1
	1K111	5" Conduit	1
	1K112	5" Conduit	1
16F-1	1J1A	4"x24" Tray	3
	1J1B	4"x12" Tray	3
	1J5A	4"x24" Tray	3
	1J5B	4"x18" Tray	3

General Note: Intervening steel and supports are not included in these tables.

Attachment I.B.1(b): Description of Steel Coating and Structural Steel Fire Barriers Used at DAEC

Equipment ID#	Fire Zone	Item Description	Rating(Hr.)
N/A	2A	Fireproofing	1
N/A	2B	Fireproofing	1
N/A	3A	Fireproofing	1
N/A	3B	Fireproofing	1
N/A	7A	Fireproofing	3
N/A	7B	Fireproofing	3
N/A	7C	Fireproofing	3
N/A	7E	Fireproofing	1
N/A	10C	Fireproofing	3
N/A	10E	Fireproofing	3
N/A	10F	Fireproofing	3
N/A	1C	Duct Coating	3
N/A	16A	3'x48' Fire Wall	3
1V-FD-013	2B	Fire Damper	3
1V-FD-115	2B	Fire Damper	3
1V-FD-016	1A	Fire Damper	3
1V-FD-015	1A	Fire Damper	3
1V-FD-114	1A	Fire Damper	3
1V-FD-116	1A	Fire Damper	3
1V-FD-010	1A	Fire Damper	3
1V-FD-012	1A	Fire Damper	3
1V-FD-014	1A	Fire Damper	3
1V-FD-302	12B	Fire Damper	3
1V-FD-038	12B	Fire Damper	3

Attachment I.B.1(c): Description of Miscellaneous Fire Barriers Used at DAEC (I. B. 1)

Equipment ID#	Fire Zone	Item Description	Rating(Hr.)
2A-S5-2	2A	Penetration Seal	See Note
2A-S5-2	2A	Penetration Seal	See Note
2B-N4-6	2B	Penetration Seal	See Note
2B-S-22	2B	Penetration Seal	See Note
8A-W	8A	Penetration Seal	See Note
Door	8A	Door Frame/Jamb	See Note
Door	7A	Door Frame/Jamb	See Note

Note: The DAEC Fire Hazards Analysis does not require a rated barrier for all of the above applications; however, the thermo-lag is planned to be removed in these applications.

Attachment I.B.2: Total Population of Thermo-lag Barriers Used at DAEC

Barrier Type	Rating	Amount
Cable Tray	1	0
Cable Tray	3	220 LF, 1278 Sq.Ft.
Conduit	1	150 LF
Conduit	3	467 LF
Junction Box/ Other Raceway	1	61 LF
Junction Box/ Other Raceway	3	178 LF
Spray-on Coating/ Fireproofing	1	780 LF
Spray-on Coating/ Fireproofing	3	214 LF
Non Spray-on Coating/ Fireproofing	1	86 LF
Non Spray-on Coating/ Fireproofing	3	1412 LF
Miscellaneous	3	42 Sq. Ft.

Attachment II.B: DAEC Electrical Barrier Parameter Matrix

NRC IDENTIFIED PARAMETER (10 CFR 50.54 Letter)	INSTALLED PARAMETER IDENTIFICATION		
	NUMBER OF INSTALLATIONS (note 1)	NUMBER IDENTIFIED (notes 2 & 4)	NUMBER VERIFIED (notes 3 & 4)
BARRIER PARAMETERS			
1 Raceway Orientation	23	22	0
2 Conduit	23	22	0
3 Junction Boxes / Lateral Bends	23	22	0
4 Ladder Back Tray	23	23	0
5 Tray with T-Section	23	23	0
6 Raceway Material	23	(note 5)	0
7 Support Protection / Thermal Shorts	23	(note 6)	0
8 Air Drops	23	22	0
9 Panel Thickness	23	(note 7)	0
10 Preformed Conduit Sections	23	(note 8)	0
11 Panel Rib Orientation	23	(note 9)	0
12 Unsupported Spans	23	(note 10)	0
13 Stress Skin Orient.	23	(note 11)	0
14 Stress Skin Joint Cover	23	23	0
15 Stress Skin Ties	23	23	0
16 Joint Buttering	23	23	0
17 Joint Gap Width	23	(note 12)	0
18 Joint Type	23	0	0
19 Steel Bands/Tie Wires	23	(note 13)	0
20 Band/Wire Spacing	23	(note 14)	0
21 Band/Wire Proximity to Joints	23	0	0
22 Internal Tray Bands	23	(note 15)	0

NRC IDENTIFIED PARAMETER (10 CFR 50.54 Letter)	INSTALLED PARAMETER IDENTIFICATION		
	NUMBER OF INSTALLATIONS (note 1)	NUMBER IDENTIFIED (notes 2 & 4)	NUMBER VERIFIED (notes 3 & 4)
23 Joint Trowel Material Cover	23	23	0
24 Edge Guards	23	23	0
CABLE PARAMETERS			
1 Cable Size and Type	23	23	0
2 Cable Jacket Type	23	23	0
3 Cable Insulation Type	23	23	0
4 Cable Fill / Distribution	23	(note 16)	0
5 Cable Proximity to Cold Surface	23	0	0
6 Barrier Internal Protective Materials (Sealtemp Cloth, etc)	23	0	0
7 Cable Operating Temperatures	23	23	0
8 Cable Function Temperature Limits	23	23	0

NOTES:

1. Thermolag installations are identified by Figure Number. Each Figure may contain several raceways associated with a single installation.

2. The information on each parameter was derived from the original Design Change Packages which installed the barriers and plant walkdowns conducted during the past year. Documentation containing information on installation parameters has been assembled for each installation.

3. Verification of parameter information will be performed as part of the resolution program.

4. A specific critical parameter verification plan will be included in each resolution which takes credit for an installed configuration.

5. Cable tray and conduit materials per DAEC raceway database. Junction box material believed to be steel based on standard plant usage.

6. Governing design specification required protection of raceway supports and thermal shorts to a bounding minimum coverage. The Resolution Program will verify the protection required for qualification.

7. Material procurement required specific identification of one hour barrier material (1/2") to assure segregation. Minimum panel thickness was verified during receiving inspection. Installation inspections verified proper materials were used for specific rating.

8. Both preformed conduit panels and boxed configurations used for conduit protection. Resolution Program to identify specific amounts of each protection type used prior to accepting as basis for qualification.

9. Panel rib orientation not known for boxed configurations. NUMARC testing may bound either orientation. Unbound configurations will be addressed by the Resolution Program.

10. Maximum unsupported span can be derived from the greater of barrier width or band spacing. Resolution Program will verify that installed configuration meets qualification basis.

11. Design specification required specific stress skin orientation based on barrier rating. Excess material from original installation contained in the DAEC warehouse has been inspected to verify compliance with the design specification.

12. Based on the practice of pre-buttered joints used at the DAEC, the joint gap may not be critical to qualify an installation. If determined to be critical, the Resolution Program will address this parameter.

13. Both steel bands and wires used. If parameter bounding is not supported by the NUMARC Testing Program, field inspections can document specific installations of each type.

14. The design specification required maximum band/wire spacing for cable trays and conduits. Band/wire spacing for junction box barriers will be identified via field walkdowns under the Resolution Program to support installation qualification.

15. Internal bands were not required by the design specification. Internal banding was used for construction convenience. If qualification evaluation relies on specific internal banding conditions, the Resolution Program will ensure that field installations meet the basis for qualification.

16. The maximum raceway fill is contained in the DAEC raceway data base. The cable installation specification provides direction on distribution of cables in cable trays. Pre-Thermolag installation photographs provide evidence of even cable distribution.

Attachment V.B: DAEC Thermo-lag Resolution Options