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GEORGE S. THOMAS
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December 22, 1994

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

**Subject: Beaver Valley Power Station, Unit No. 2
Docket No. 50-412, License No. NPF-73
Response to 10CFR50.54(f) Follow-up to the
Request for Additional Information Regarding
Generic Letter 92-08, "Thermo-Lag 330-1 Fire Barriers"**

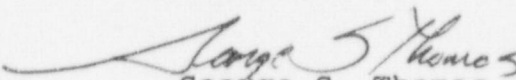
- References:
1. Request for Additional Information Regarding Generic Letter 92-08, "Thermo-Lag 330-1 Fire Barriers," Pursuant to 10 CFR 50.54(f), dated December 21, 1993
 2. DLC's Response to Reference 1, dated February 11, 1994
 3. Follow-up to the Request for Additional Information Regarding Generic Letter 92-08 Issued Pursuant to 10CFR50.54(f), dated September 23, 1994

Provided as Enclosure 1 is the Duquesne Light Company (DLC) response to the Nuclear Regulatory Commission's (NRC's) follow-up to the request for additional information (Reference 3) regarding Generic Letter 92-08, "Thermo-Lag 330-1 Fire Barriers" for the Beaver Valley Power Station (BVPS) Unit 2.

The enclosed report updates our previous response (Reference 2), which provided the information requested in the initial letter (Reference 1) concerning the Thermo-Lag 330-1 fire barrier configurations installed at BVPS Unit 2.

Should you have any questions regarding Enclosure 1, please contact Nelson Tonet, Manager of Nuclear Safety at (412) 393-5210.

Sincerely,


George S. Thomas

Attachment

cc: Mr. L. W. Rossbach, Sr. Resident Inspector
Mr. T. T. Martin, NRC Region I Administrator
Mr. G. E. Edison, Project Manager

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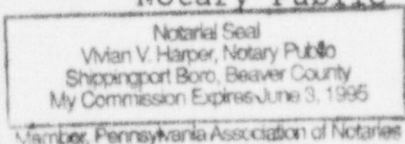
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Before me, the undersigned notary public, in and for the County
and Commonwealth aforesaid, this day personally appeared George S.
Thomas, to me known, who being duly sworn according to law, deposes
and says that he is Division Vice President, Nuclear Services of the
Nuclear Power Division, Duquesne Light Company, he is duly authorized
to execute and file the foregoing submittal on behalf of said
Company, and the statements set forth in the submittal are true and
correct to the best of his knowledge, information and belief.

George S. Thomas
George S. Thomas

Subscribed and sworn to before me
on this 22nd day of December, 1994

Vivian V. Harper
Notary Public



Response To 10CFR50.54(f) Follow-up to the
Request for Additional Information Regarding
Generic Letter 92-08 For
Beaver Valley Power Station (BVPS) Unit 2

ENCLOSURE 1

Pursuant to 10 CFR 50.54(f), NRC requested that licensees provide follow-up information relative to Thermo-Lag 330-1 Fire Barriers. This enclosure provides an update to the previous BVPS Unit 2 response submitted on February 11, 1994.

I.B. Thermo-Lag Fire Barrier Configurations and Amounts

1. Describe the Thermo-Lag 330-1 barriers installed in the plant.
2. Provide an approximation for the total population of the Thermo-Lag fire barriers.

Response:

Table 1 of this enclosure provides a description and the approximate quantities of Thermo-Lag 330-1 fire barrier installations at BVPS Unit 2.

Thermo-Lag 330-1 fire barriers are relied upon at BVPS Unit 2 to comply with the fire protection requirements of 10 CFR 50.48. The use of Thermo-Lag 330-1 to comply with 10 CFR 50.48 is described in the commitment to NRC Branch Technical Position (BTP) CMEB 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants," dated July 1981. Therefore, installed Thermo-Lag 330-1 fire barrier material is utilized at BVPS Unit 2 to satisfy fire protection licensing commitments as described in Section 9.5.1 and Appendix 9.5A of the BVPS Unit 2 Updated Final Safety Analysis Report.

Thermo-Lag 330-1 fire barrier systems have been used at BVPS Unit 2 to protect electrical power and control cables for systems and components used for achieving and maintaining safe shutdown conditions.

Thermo-Lag was not utilized at BVPS Unit 2 for Regulatory Guide 1.75 applications or as a radiant energy shield. The majority of the Thermo-Lag installations involve cable in conduits, electrical junction boxes and pull boxes. Thermo-Lag was not utilized for protection of cable tray applications at the facility.

Thermo-Lag 330-1 fire barrier systems installed at BVPS Unit 2 were initially qualified to industry standards applicable at that time. Subsequently, NRC Bulletin 92-01 and Supplement No. 1 reported the existing Thermo-Lag 330-1 barrier qualification testing invalid for protection of electrical raceways and the fire resistance rating of the Thermo-Lag 330-1 material as indeterminate. As a result, the fire barriers in the affected areas at BVPS Unit 2 were declared potentially inoperable and hourly fire watch patrols were instituted as an interim measure.

II.B. Important Barrier Parameters

1. State whether or not you have obtained and verified each of the aforementioned parameters for each Thermo-Lag barrier installed in the plant. If not, discuss the parameters you have not obtained or verified. Retain detailed information onsite for NRC audit where the aforementioned parameters are known.
2. For any parameter that is not known or has not been verified, describe how you will evaluate the in-plant barrier for acceptability.
3. To evaluate NUMARC's application guidance, an understanding of the types and extent of the unknown parameters is needed. Describe the type and extent of the unknown parameters at your plant in this context.

Response:

Based on the Nuclear Energy Institute* (NEI) Application Guide which provided positions with respect to bounding parameters for Thermo-Lag 330-1 fire barriers, an evaluation was conducted at BVPS Unit 2 using the following methods:

1. Reviews of contractor work practices and procedures through documentation.
2. Field verifications of Thermo-Lag installations.
3. Destructive examinations of barriers on a sample basis to obtain information on construction techniques.

Walkdowns were performed which examined applicable Thermo-Lag installations at BVPS Unit 2. These walkdowns examined the parameters as identified in the NRC letter.

The 50.54(f) letter also provided an eight (8) item listing of parameters of importance concerning cable protected by fire barrier material. These items have been reviewed for applicability to BVPS Unit 2 installations. Cable fill, distribution, and intervening materials such as Siltemp are only applicable to Thermo-Lag encapsulated cable tray installations, which are not utilized at Beaver Valley. Cables used at BVPS Unit 2 are environmentally qualified to temperatures in excess of the cold side temperature used in the NEI testing.

As requested in Action Item II.B.1, detailed information will be retained on site for NRC audit of known parameters. Unbounded parameters not specifically enveloped by testing

* Formerly NUMARC

have been identified in the list of raceway configurations which are outside the scope of the NEI Application Guide (reference Attachment 1).

The 50.54(f) letter also discusses chemical testing of Thermo-Lag. Chemical testing performed by NEI on a wide variety of aged samples did not reveal significant variations in chemical composition. In addition, Thermo-Lag 330-1 fire barrier material is listed by Underwriters Lab (UL) and, as such, material samples are periodically tested by UL. Further chemical analysis of plant specific samples will be coordinated through NEI.

III.B. Thermo-Lag Fire Barriers Outside the Scope of the NUMARC Program

1. Describe the barriers discussed under Item I.B.1 that you have determined will not be bounded by the NUMARC test program.
2. Describe the plant-specific corrective action program or plan you expect to use to evaluate the fire barrier configurations particular to the plant. This description should include a discussion of the evaluations and tests being considered to resolve the fire barrier issues identified in GL 92-08 and to demonstrate the adequacy of existing in-plant barriers.
3. If a plant-specific fire endurance test program is anticipated, describe the following:
 - a. Anticipated test specimens.
 - b. Test methodology and acceptance criteria including cable functionality.

Response:

A re-evaluation of the circuit analysis used for the initial determination of safe shutdown capability for a fire event at BVPS Unit 2 has been conducted. As a result, approximately 50% of the circuits, and the associated fire barriers, have been excluded from consideration. Safety evaluations performed in accordance with 10CFR50.59 contain the technical basis for the changes and the documented engineering analyses. This effort has resulted in a decrease in the number of fire areas requiring compensatory measures in the form of hourly fire watch patrols.

The remaining installations were reviewed and evaluated against the NEI Application Guide. The majority of the BVPS Unit 2 installations are bounded by the NEI testing. Thermo-Lag 330-1 fire rated barriers are mainly installed on electrical conduits and associated boxed enclosures to meet the 1 hour fire rated separation criteria for redundant trains of safe shutdown circuits as identified in licensing commitments.

A list of Thermo-Lag cable raceway fire barriers which are currently outside the scope of the NEI Application Guide is provided in Attachment 1. Corrective action plans for demonstrating the adequacy of these barriers are identified in response to Action Item V.B.

A list of non-cable raceway barriers which are outside the scope of the NEI Application Guide is provided in Attachment 2. These installations have been evaluated previously, or are in the process of being evaluated, to demonstrate the adequacy of the existing fire barrier systems.

A plant-specific fire endurance test program is not anticipated.

IV.B. Ampacity Derating

1. For the barriers described under Item I.B.1, describe those that you have determined will fall within the scope of the NUMARC program for ampacity derating, those that will not be bounded by the NUMARC program, and those for which ampacity derating does not apply.
2. For the barriers you have determined fall within the scope of the NUMARC program, describe what additional testing or evaluation you will need to perform to derive valid ampacity derating factors.
3. For the barrier configurations that you have determined will not be bounded by the NUMARC test program, describe your plan for evaluating whether or not the ampacity derating tests relied upon for the ampacity derating factors used for those electrical components protected by Thermo-Lag 330-1 (for protecting the safe-shutdown capability from fire or to achieve physical independence of electrical systems) are correct and applicable to the plant design. Describe all corrective actions needed and submit the schedule for completing such actions.
4. In the event that the NUMARC fire barrier tests indicate the need to upgrade existing in-plant barriers or to replace existing Thermo-Lag barriers with another fire barrier system, describe the alternative actions you will take (and the schedule for performing those actions) to confirm that the ampacity derating factors were derived by valid tests and are applicable to the modified plant design.

Response:

An evaluation was performed to address the higher deration factors referenced in Generic Letter 92-08 (i.e., 37.4% for one hour and 38.9% for three hours) for potential impact on the installed cables at BVPS Unit 2. Ampacity derating is an issue that applies only to cable raceways containing power cables. The evaluation provides reasonable assurance that all applicable power cables have sufficient margin to accommodate the higher deration factors.

As stated in the follow-up to the request for additional information (reference 3), there are unresolved technical issues regarding ampacity derating. It is the industry's position, which is consistent with the NRC Staff's views, that these issues can be resolved independently of the fire endurance issues. We will continue to follow developments in resolution of this long term issue through NEI.

V.B. Alternatives

Describe the specific alternatives available to you for achieving compliance with NRC fire protection requirements in plant areas that contain Thermo-Lag fire barriers. Examples of possible alternatives to Thermo-Lag-based upgrades include the following:

1. Upgrade existing in-plant barriers using other materials.
2. Replace Thermo-Lag barriers with other fire barrier materials or systems.
3. Reroute cables or relocate other protected components.
4. Qualify 3-hour barriers as 1-hour barriers and install detection and suppression systems to satisfy NRC fire protection requirements.

Response:

Each of the four NRC identified alternatives is a possible means to achieve compliance with NRC fire protection requirements in plant areas containing Thermo-Lag 330-1 fire barriers. Given the complexity of many plant barrier installations, a combination of resolution approaches may be required to achieve compliance.

The 50.54(f) letter provided only a partial listing of resolution alternatives. Additional resolution alternatives are provided below which include:

1. Evaluation of the installed Thermo-Lag configurations using state-of-the-art analytical methods to justify the adequacy of the installation vs. hazards of the area. An evaluation, in accordance with 10CFR50.59, will be performed which will include the technical basis for demonstrating that the in-plant condition provides an adequate level of fire safety.
2. Additional industry testing may be conducted on a generic basis to address boxed enclosures and certain installation anomalies.

VI.B. Schedules

Submit an integrated schedule that addresses the overall corrective action schedule for the plant. At a minimum, the schedule should address the following aspects for the plant:

1. Implementation and completion of corrective actions and fire barrier upgrades for fire barrier configurations within the scope of the NUMARC program.
2. Implementation and completion of plant-specific analyses, testing, or alternative actions for fire barriers outside the scope of the NUMARC program.

Response:

Engineering evaluations discussed in responses to Action Items III.B and V.B to address fire endurance issues for Thermo-Lag installations should be completed by June 30, 1995.

The overall schedule for corrective actions to address installations outside the scope of the NEI test program will be dependent on additional industry testing and the scheduled outage dates for BVPS Unit 2. While upgrades may be implemented during power operations, certain modifications may require an outage to perform. Recognizing the design and engineering time constraints involved in development of modification work packages, the next scheduled outage which would accommodate this projected work scope would be the 6th Refueling Outage for BVPS Unit 2 scheduled to start in late 1996.

In the interim, BVPS Unit 2 will maintain the existing compensatory measures program identified previously in our response to Generic Letter 92-08 until the Thermo-Lag issues are resolved for each affected area.

VII.B. Sources and Correctness of Information

Describe the sources of the information provided in response to this request for information (for example, from plant drawings, quality assurance documentation, walkdowns or inspections) and how the accuracy and validity of the information was verified.

Response:

Information relative to generic Thermo-Lag 330-1 fire barrier issues and the NUMARC generic testing program was provided via guidance from NEI (formerly NUMARC).

Plant-specific information for BVPS Unit 2 was provided by plant personnel utilizing the following means:

1. Review of contractor work practices and procedures.
2. Review of installation details and design documents.
3. Walkdowns and inspections of installed configurations.
4. Destructive examinations of specific barriers on a sample basis to verify certain installation parameters.

The plant inspections verified that externally visible parameters matched the design documentation, and the sample destructive examinations confirmed the contractor work practices and installations.

Response To 10CFR50.54(f) Follow-up to the
Request for Additional Information Regarding
Generic Letter 92-08 For
Beaver Valley Power Station (BVPS) Unit 2

ATTACHMENT 1

Page 1 of 1

THERMO-LAG 330-1 FIRE BARRIER SYSTEMS
ENCAPSULATING ELECTRICAL RACEWAY CONFIGURATIONS
AT BVPS UNIT 2 OUTSIDE THE SCOPE OF NEI APPLICATION GUIDE

- Thermo-Lag Flexi-Blanket Wrap
 - Flexi-Blanket material was installed on air drops, elbows and lateral bends.
- Box enclosures surface-mounted to concrete (junction boxes, pull boxes, and boxed conduit runs)
 - Box enclosures are mounted with steel banding and edges/joints filled with trowel grade material as compared to the tested configuration of flanged and hilti-bolt wall attachment.
 - Size of box enclosures exceeds what is being tested by the NUMARC generic test program.
- Encapsulated conduits surface-mounted to concrete
 - Full circumference of Thermo-Lag pre-formed conduit sections could not physically be installed; sections were cut to fit and trowel grade material added to the joint and wall surface.
- Installation anomalies
 - Pre-formed conduit sections for encapsulating conduits and conduit fittings (lateral bends) were interfaced with flat panel material, cut to size, and field-fit.
- 3M/TSI interfaces were used on conduit runs, supports and transitions of cable from tray to conduit.
- Band distance to joints
 - Band spacing from joints, in some cases, exceeds 2 inches.

Response To 10CFR50.54(F) Follow-up to the
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Beaver Valley Power Station (BVPS) Unit 2

ATTACHMENT 2

Page 1 of 1

THERMO-LAG 330-1 FIRE BARRIER SYSTEMS
FOR NON-CABLE RACEWAY BARRIER INSTALLATIONS
AT BVPS UNIT 2 OUTSIDE THE SCOPE OF NUMARC TESTING PROGRAM

NOTE: The Thermo-Lag installations identified below have been evaluated previously, or are in the process of being evaluated, to demonstrate the adequacy of the existing fire barrier arrangements.

1. Removable Floor Plugs (Service Building 745'6" and 760'6"):
 - Corrugated metal decking with 1" thick Thermo-Lag panels on both top and bottom (for maintaining a 3-hour fire rated floor/ceiling fire area boundary).
2. Conduit Sleeve Extensions:
 - Thermo-Lag pre-formed conduit sections (1/2" thick minimum) were installed on certain conduit sleeves (> 4 inch in diameter) to extend the 3-hour fire rated barrier penetration seal. Where the fire seal could not be physically installed at the barrier, the fire seal was installed at the first opening and the conduit sleeve was wrapped with Thermo-Lag from the seal back to the barrier, effectively extending the fire barrier.

NOTE: This was documented as a deviation in BVPS Unit 2 UFSAR (Section 9.5A.2, "Conduits/Penetration Seals") and approved in NUREG-1057 Supplement No. 5, SER for BVPS Unit 2.

3. Seismic Gap Seal for Walls:
 - A gap seal was protected with Thermo-Lag where the wall meets the ceiling in the Relay Room (CV-6) Elevation 755'6", for maintaining a 3-hour fire rated boundary.
 - A gap seal was protected with Thermo-Lag in the Service Building (SB-2) Elevation 730'6", where an electrical ductline enclosure meets the ceiling, for maintaining a 3-hour fire rated boundary.
4. Fireproofing Structural Steel Support Plates
 - Thermo-Lag is utilized as a fireproofing material for protection of exposed structural steel plates for floor-mounted penetration seals in various locations.

Response To 10CFR50.54(f) Follow-up to the
Request for Additional Information Regarding
Generic Letter 92-08 For
Beaver Valley Power Station (BVPS) Unit 2

TABLE 1

DESCRIPTION/QUANTITIES OF THERMO-LAG 330-1 FIRE BARRIERS: BVPS Unit 2

<u>DESCRIPTION</u>	<u>PURPOSE</u>	<u>TYPE/DIMENSIONS</u>	<u>APPROXIMATION OF TOTAL FOOTAGE</u>
1. Electrical Raceway Conduits	1-Hour Fire Barriers	1/2" Thick Pre-formed Conduit Sections (3/4" diameter conduit up to 6" diameter conduit).	2900 Linear Ft.
	3-Hour Fire Barriers	1" Thick Pre-formed Conduit Sections (3/4" diameter conduit up to 5" diameter conduit).	1500 Linear Ft.
2. Supports Associated with Conduit Runs	1-Hour Fire Barriers	1/2" Thick Panels (cut to size).	800 Ft. ²
	3-Hour Fire Barriers	1" Thick Panels (cut to size).	800 Ft. ²
3. Electrical Raceway Boxes (Junction Boxes and Pull Boxes)	1-Hour Fire Barriers	1/2" Thick Panels (cut to size). Sizes vary: • Min. 4 ft. ² • Max. 127 ft. ²	467 Ft. ²
	3-Hour Fire Barriers	1" Thick Panels (cut to size). Sizes vary: • Min. 4 ft. ² • Max. 30 ft. ²	250 Ft. ²
4. Removable Floor Plugs	3-Hour Fire Barriers	1" Thick Panels mounted (top & bottom) to corrugated steel decking. Thermo-Lag panels are 2' x 8'6". Total size of opening protected is 15' x 8'6" (2 floor levels).	510 Ft. ²

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Beaver Valley Power Station (BVPS) Unit 2

TABLE 1

Page 2 of 2

DESCRIPTION/QUANTITIES OF THERMO-LAG 330-1 FIRE BARRIERS: BVPS Unit 2
(Continued)

<u>DESCRIPTION</u>	<u>PURPOSE</u>	<u>TYPE/DIMENSIONS</u>	<u>APPROXIMATION OF TOTAL FOOTAGE</u>
5. Seismic Gap Seal for Walls	3-Hour Fire Barriers	1" Thick Panels (cut to size to protect small gap openings between walls and ceilings).	210 Ft. ²
6. Conduit Sleeve Extensions	1-Hour Fire Wrap Material (used to extend the Fire Rated Penetration Seal for the Wall/Floor)	1/2" Thick (minimum) Pre-formed Conduit Sections (Conduits > 4" in diameter).	104 Linear Ft.
7. Structural Steel Support Plates for Oversized Penetration Seals	Fireproofing for Protection of Exposed Structural Steel	1" Thick Panels (cut to size).	486 Ft. ²