Commonwealth Edison
1400 Opus Place
Downers Grove, Illinois 60515

June 2, 1994

Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Attention: Document Control Desk

Subject: LaSalle County Nuclear Power Station Units 1 and 2

Commonwealth Edison Company Response to NRC's questions regarding company's Thermo-Lag Test Program

NRC Dockets 50-373 and 50-374

Reference: (1) M. J. Vonk letter to Document Control Desk dated April 6, 1994 transmitting the LaSalle Thermo-Lag Test Program

(2) A. Gody Jr. letter to D. L. Farrar dated May 18, 1994, "Review of Commonwealth Edison Proposed Fire Barrier Testing Program"

In reference (1), Commonwealth Edison submitted its proposed test plan to resolve fire barrier issues associated with repair/replacement of Thermo-Lag 330-01 barriers. Reference (2) requested Commonwealth Edison to clarify issues resulting from that submittal. The following is our responses to your questions regarding the subject test plan.
The specific question identified in reference (2) will be repeated in this letter for completeness.

1. It is our understanding that the fire test specimens and the subsequent fire testing will be performed at the Faverdale Technology Center/Laboratories in Darlington, United Kingdom. In addition, it is our understanding that this facility is associated with Darchem Engineering, the manufacturer of the Darmatt KM1 fire barrier material that is being tested. From this submittal, you indicated that Faverdale will perform the Quality Control inspection of the raceway fabrication and of the installation the fire barrier material, conduct and witness the test, and write the final report. Since, these tests are not truly independent, please provide a detailed description on how you plan to independently verify the construction, installation and testing activities associated with the test specimen.

A029 1/0

CECo's Response:

Clarification of the fire test control plan is as follows. The Faverdale Technology Centre and Darchem are independent divisions of Weir Group PLC. Faverdale Technology Centre has previously been required to demonstrate its independence as a test facility in order to attain its NAMAS certification from the British Government Standards Committee.

For this particular test, the procedure will be revised to clarify that Transco Products Inc. will provide its own independent quality review of all items involved in the testing process, including but not limited to raw material procurement (through a QA Audit of Darchem's Procedures), materials batching, fabrication, installation, and quality review of the testing. Additionally Commonwealth Edison will have a qualified Fire Protection Engineer available during all phases of the fire test.

In addition, Commonwealth Edison Co. is proposing the following security measures:

1) All material fabrication will be witnessed by Transco Products Inc. Quality Control personnel. Only materials previously identified during the batching process shall be used for fabrication.

2) Material installed as part of test assemblies will have tape, with QC signature applied across the tape and onto the adjacent materials, securing the assemblies to identify acceptance of the installation. The tape will remain in place until the items are fire tested. Removal of the tape shall only be done in the presence of the TPI QC inspector and the designated utility representative.

3) Due to the removability of the DARMATT KM1 materials the designated utility representative may request the opening of any previously installed section to verify that the installation has not been altered after initial inspection.

4) Security for the LaSalle fire test specimens after normal workday hours will be further assured by placing a steel enclosure around the specimen/furnace during periods when representatives from Commonwealth Edison are not present. The steel enclosure rolls on wheels which ride inside of tracks. The enclosure has one open end which will accommodate the specimen/furnace as the steel box is rolled in and out of place. When used for securing the specimen, the open end of the enclosure will be closed with a tarp that will be equipped with a lock to which Commonwealth Edison's representatives will hold the only key.

5) The areas used for fabrication and the fire test specimen installation will be available to Faverdale personnel only with the designated utility representative present. These areas will be locked and lead sealed, with utility personnel holding the key when unoccupied.

2. It is our understanding that you intend to use Darchem personnel to install the fire barrier material. Describe how the upgrade will be installed in the plant with regard to the training and qualification of installers, development of installation procedures, quality control inspections of the installation process, and procedures for assuring configuration control after the completion of the in-plant installations.

CECo's Response:

The Test Procedure TR-213 is being revised to indicate that Transco Products Inc. personnel will be doing the actual installation at the test facility (Darchem personnel will be advising Transco as to material installation requirement based on product development testing). It is CECO's intent that the same installation and quality control people (TRANSCO) will be used at the LaSalle Station to either provide technical direction to other contractors or as the actual installation personnel. The installation at the site will fulfill the same requirements as the tested.

3. Test Procedure No. TR-213, Section 1.0, Item 2, "Fire barrier envelope use a ceiling and wall as part of the envelope," and Item 4, "Four-Sided cable tray barrier envelope," indicate that the in-plant configuration consists of two trays that run together, one over the top of another, that will be enclosed within the same fire barrier enclosure. However, the test procedure indicates that only one 4" x 30" tray will be tested to qualify this condition. This is not consistent with the guidance provided in Supplement 1 to Generic Letter (GL) 86-10 which indicates that the test specimen should be representative of the construction for which the fire rating is desired as to materials, workmanship, and details such as dimensions of parts and should be built under representative conditions.

   The supplement also indicates that the cable tray or raceway design should be representative of in plant conditions (e.g., mass associated with cable trays and conduits). In addition, the GL guidance indicates that the test program should encompass or bound raceway sizes and the various configurations for those fire barriers installed (or going to installed) in the plant. In qualifying the fire resistive capabilities of a fire barrier system it has been noted that fire barriers designs have two basic failure mechanisms. The first mechanism is that they fail thermally on small dimensional raceway configurations and the second is that they fail structurally on large dimensional raceway configurations. The staff finds that your proposed program does not bound field conditions. In order to further evaluate the acceptability of this proposed testing program, please justify how the proposed test specimen configuration (single cable tray fire barrier enclosure) bounds the double cable tray enclosure installed in the plant.

CECo's Response:

The purpose of testing a single tray (instead of two trays as is the case in the field) is to demonstrate and qualify a worst case condition for both "two-sided" and "four-sided" fire barrier envelopes. The issue of smaller heat masses being more severe has been established in testing already performed by NEI/VECTRA. The question we are responding to states that bounding conditions should be accounted for by demonstrating that the following two possible failure mechanisms will be tested.

1.) thermal failure
2.) structural failure.

In the case of Test No. TR-213 and thermal failure, we have proposed to use the smaller (than found in the field) heat masses to establish a worst case bounding condition that could be used for thermally qualifying the larger heat masses found in the field.

Further, the test utilizes representative plant tray widths in order to respond to structural concerns of how the material reacts during a fire. (Note: the cable tray to be used in the test program was manufactured by Transco in accordance with LaSalle's specifications and dimensions for these articles.) Hence, structural integrity of the actual field installation of the fire barrier envelope, as it spans the width of the tray, is demonstrated in this test.

Structural integrity of the envelop (at the joints, etc.) is more severe in the horizontal position (which we are demonstrating) than joints in the vertical position. It is felt that vertical joints may be less severe since they are held together in tension as well as being tied together. Further, softening/weakening of this material has not been observed when the product was exposed to fire in testing already performed.

4. Test Plan No. TR-213, Section 3.0, Item 1, "Cable Trays" and Item 3, "Junction box", indicates that if the trays are not supplied by the LaSalle Station as a plant specific item, then the trays and junction box will be constructed by Darchem. The supplement to GL 86-10 recommends that the cable tray or raceway design should be representative of in plant conditions (e.g., mass per linear foot associated with cable trays and conduits). We are concerned that the manufactured cable tray and junction box may not be representative of the in plant condition. We recognize that these tests are being conducted without cables and that in itself reduces the thermal mass of the raceway being protected by the fire barrier. Please confirm that the mass (weight per linear foot) of the raceway component (e.g., conduits, cable trays) used in the test specimen is equivalent to those components installed in the plant.

CECo's response:

Cable trays used in the test were manufactured by Transco in accordance with LaSalle's specifications for these articles. The gauge metal used for the junction box is the same as that used in the field.

5. Test Plan No. TR-213, Section 4.0, "Fire Barrier Installation", indicates that the materials for the test will be purchased, received, and installed in accordance with the latest approved revision of Transco Products Quality assurance program. Please describe how this process will be independently monitored or sampled (e.g., plans to conduct independent commercial grade dedication sample inspections).

CECo's response:

Commonwealth Edison and Transco have audited the Faverdale Centre and Darchem to determine their individual quality programs are sufficient to perform the activities requested.

6. Test Plan No. TR-213, Section 5.0, "Thermocouple", indicates that at a minimum, temperatures shall be documented at five minute intervals for the first two hours of the test. It is our understanding that the proposed test will be conducted for 1-hour. Please clarify the frequency at which the test temperatures will be recorded during this 1-hour test.

CECo's response:

The procedure reflects standard ASTM E-119 type requirements for documenting temperature data for tests up to three hours. These were stated in our procedure as minimum requirements. The temperatures will be documented in approximately two minute intervals for the actual test.

7. The test plan does not address ampacity derating. In order to get an understanding on how this fire barrier technical issue will be addressed, please describe the program for determining the ampacity derating for the proposed fire barrier upgrade. This program description should specifically address how the licensee intends to determine the derating for the "as-built" composite fire barrier (Thermo-Lag with Darmatt KM1 upgrade) plant applications.

CECo's response:

Power cable ampacity assessment has been completed for the affected power cable tray routing points utilizing the installation of a one-hour Darmatt KM1 fire barrier over the existing Thermo-Lag 330-1 fire barrier material.

Calculation 4266/19G52, Revision 0, dated March 4, 1994, determined the ampacity derating required for two configurations. Configuration 1 calculated a derating factor with a one-hour rating of Darmatt firewrap material covering the existing Thermo-Lag 330-1 material over the top, bottom, and sides of the 4" x 30" power cable trays. Configuration 2 calculated a derating factor similar to configuration 1 except that the top layer of the existing Thermo-Lag 330-1 material was removed. The results of this calculated determined derating factors of 0.57 and 0.59 for Configuration 1 and Configuration 2 respectively.

Since the derating factor of 0.57 has the greater impact upon ampacity derating, this value was entered into the Interactive Cable Engineering (SLICE) program for affected routing points 163A, 164A, 165A, 153A, 154A, and 155A. The "Cable Tray Power Cable Ampacities selected Cables" Report S110 was generated for the affected power cable routing points. The results from this report show that the calculated ampacities for the affected power cable are greater than their respective full load currents.

Therefore the one-hour rating of Darmatt KM1 firewrap material can be applied directly over the existing Thermo-Lag 330-1 without any adverse affect upon cable ampacity derating.

The fabrication of the test specimen will start on 6/7/94 and we will test the entire assembly (the actual burn) on 6/17/94. Please direct any questions pertaining to this response to Mr. Shahram Javidan at (708) 663-7685 and or Jim Behn at (708) 663-7387.

Sincerely,

Martin J. Vonk
Generic Issues Administrator
Nuclear Regulatory Services

cc: J. Martin, Regional Administrator, NRC Region III
W. Schaefer, NRC Region III
R. Capra, Director of Directorate III, NRR
G. Dick, Generic Issues Project Manager, NRR
A. Gody, Jr., LaSalle Project Manager, NRR
S. West, DSSA, NRR