Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

March 25, 1982

Mr. A. Schwencer, Chief
Licensing Branch #2
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: LaSalle County Station, Units 1 & 2
Fire Protection
NRC Docket Nos. 50-373 and 50-374

Dear Mr. Schwencer:

The purpose of this letter is to transmit information on fire protection at LaSalle County Station. The attached three reports are in response to a request from the NRC for additional information following our telephone conversation on March 18, 1982, with Dr. Bournia, et al, of your staff.

These reports are a part of Commonwealth Edison Company's evaluation of the fire protection system's pre-op test results. The three reports address:

1. The diesel-generator corridors
2. Fire door labels
3. The cable spreading room

Commonwealth Edison Company has concluded that these issues are satisfactorily resolved and will clarify the FSAR to reflect the information contained herein in a future amendment.

If there are any further questions in this matter, please contact this office.

Very truly yours,

C W Schroeder 3/25/82

C. W. Schroeder
Nuclear Licensing Administrator

lm

Enclosures

3728N

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SEND DMGS to:
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ENCLOSURE 1

Diesel Generator Corridor - Zone 5C11

The SER page 9-20 requires a one-hour enclosure for one of the redundant systems in the DG corridors of zone 5C11. The FSAR page H.4-17 requires a 1 1/2 hour barrier around one of the systems. The FSAR page 9.5-12a states the water suppression system is a wet pipe sprinkler.

The fire protection design for the cable trays in the DG corridor is a pre-action water suppression system on one of the redundant trains and a 1 1/2 hour Kaowool barrier enclosing the other redundant train according to the attached S&L letter dated March 22, 1982 (with sketch SK-WER-7-11). The top of the power tray has not been enclosed due to heat loading considerations. The remaining 3 sides of the tray plus the entire control tray are wrapped in 3" of Kaowool. (S&L letter dated March 23, 1982 references the Unit 2 sketch SK-WER-9-21).

The engineering judgment is that the design and installation protect the cables to the extent that a fire affecting one division will not compromise the integrity of the redundant system for the following reasons:

1. the low fire loading in the area,

2. the lack of significant combustibles beneath the cables,

3. the large volume of the corridor and the short run across the hall for the wrapped trays,

4. the solid bottom cable trays, and

5. the water suppression system.

The appropriate sections of the FSAR will be clarified in a future amendment.

This report documents and satisfies our commitment to you made during our telephone conversation on March 18, 1982.

3728N

SARGENT & LUNDY
ENGINEERS
FOUNDED 1891
55 EAST MONROE STREET
CHICAGO, ILLINOIS 60603
(312) 269-2000

SCE-1590
March 23, 1982
Project No. 4267-00

Commonwealth Edison Company
La Salle County Station - Unit 2

Cable Trays in Diesel
Generator Corridor

Mr. B. R. Shelton
Commonwealth Edison Company
P. O. Box 767
Chicago, Illinois 60690

Dear Mr. Shelton:

Enclosed are four (4) copies of Sargent & Lundy sketch SK-WER-9-21. This sketch shows the layout of the cable trays in the Diesel Generator Corridor for Unit 2.

The "AS BUILT" condition for the Kaowool wrap in Unit 2 is similiar to the one in Unit 1. The arrangement of the cable trays in Unit 2 is different from Unit 1. The Division II and Division I cable trays do not cross and the trays are farther apart in the Unit 2 corridor. Similiar to Unit 1, a pre-action sprinkler system is provided to protect the Division I trays.

If you have any questions or comments concerning the enclosed sketch, please contact me at your convenience.

Yours very truly,

C. H. Furlow
Electrical Project
Engineer

CHF/lw
In duplicate
Enclosure
Copies:
T. E. Watts (1/0)
S. R. Dileto (1/1)
H. L. Massin (1/1)
L. O. DelGeorge (1/0)
D. C. Haan (1/0)

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SCE-1586
March 22, 1982
Project Nos. 4266-00
4267-00

Commonwealth Edison Company
La Salle County Station - Units 1 & 2

Cable Trays in Diesel
Generator Corridor

Mr. B. R. Shelton
Commonwealth Edison Company
P. O. Box 767
Chicago, Illinois 60690

Dear Mr. Shelton:

Enclosed are four (4) copies of Sargent & Lundy sketch SK-WER-7-11. This sketch shows the layout of the cable trays in the Diesel Generator Corridor for Unit 1.

The "AS BUILT" condition for the Kaowool wrap is shown on sketch SK-WER-7-11. Presently, 3" of Kaowool is wrapped around the Division II control cable tray providing a 1½ hour fire barrier and the Division II power tray is wrapped on the bottom and both sides with 3" of Kaowool. As you can see in the sketch, the Division II power tray is the furthest from the redundant Division I cable trays with the Division II control tray directly beneath it for most of the run in corridor. Also, the non-safety related trays are between the two divisions, except where the Division I trays cross the corridor. Also, the Division I trays are protected by a pre-action sprinkler system. The location of the sprinkler heads are identified on the sketch.

Also, please note that corridor is closed. Although the wall near the "N"-line is only a partial wall, there is a wire mesh from the top of this wall to the ceiling. The door provided at this wall and the door at the oppcsite end of the corridor have card readers to control access to this corridor.

The above information was discussed with the NRC during our conference call of March 18, 1982. If you have any questions or comments concerning the above or the enclosed sketch, please contact me at your convenience.

Yours very truly,

C. H. Furlow

C. H. Furlow
Electrical Project
Engineer

CHF/lw
In duplicate
Enclosure
Copies:

T. E. Watts	(1/0)
S. R. Dileto	(1/1)
H. L. Massin	(1/1)
L. O. DelGeorge	(1/0)
D. C. Haan	(1/0)

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1.1, 5.34

March 22, 1982
Project Nos. 4266, 4267

Commonwealth Edison Company
LaSalle County Station - Units 1&2

Fire Doors and Frames

Mr. B. R. Shelton
Commonwealth Edison Company
Station Nuclear Engineering
P. O. Box 767
Chicago, Illinois 60690

Dear Mr. Shelton:

As a result of a telephone conference with NRC held on March 18, 1982, we have compiled the following fire door and frame detail information requested by NRC.

Of the 231 fire rated door openings, there are 62 frames which bear a manufacturer's certification label instead of the underwriter's label. These are single and three piece frames. The frames vary from the underwriter's label details primarily by the method of anchorage to the wall.

The following is a list of the door frames by door number:

Three Piece Frames:	49, 58, 89, 91, 118, 120, 133, 135, 140, 141, 142, 149, 160, 218, 219, 220, 224, 249, 252, 264, 255, 256, 269, 296, 298, 302, 304, 358, 351, 377, 380, 383, 391, 393, 402, 427, 421, 424, 427, 440, 443, 465, 466, 467, 468, 470, 474, 475, 476, 478, 500, 501, 502, 504, 506, 779, 780
Single Piece:	305, 446, 447, 452, 453

Of the 231 door openings, there are ten double doors which have manufacturer's certification instead of the underwriter's label. These doors have manufacturer's certification because electric strikes, for security reasons, are used in the inactive leaf and because the doors are larger than those tested by the manufacturer.

The following is a list of these doors:

49, 58, 222, 251, 257, 262, 265, 268, 302, 393

Enclosed is a copy of the following vendor drawings which show door and frame construction and certification:

C-8300 - Sheet 4 of 30 through
C-8300 - Sheet 13 of 30
C-8300 - Sheet 15 of 30 through
C-8300 - Sheet 21 of 30
C-8300 - Sheet 23 of 30
C-8300 - Sheet 25 of 30

Also enclosed is a copy of the Sargent & Lundy drawings showing location of these doors:

A-12, A-13, A-66, A-68, A-79, A-91, A-99, A-101, A-105, A-109, A-184, A-185, A-186, A-187, A-190, A-191, A-194, A-195, A-218, A-220, A-221, A-225, A-228, A-229, A-233, A-234, A-238, A-245, A-246, A-273, A-274, A-275, A-276, A-279, A-280, A-379

If you have any questions regarding this information, please contact me.

Yours very truly,

V. Reklaitis
Structural Project Engineer

VR:cah
Enclosures
Copies:
T. E. Watts (1/0)
L. O. Del George (1/1)
K. T. Kostal (1/0)
E. R. Weaver (1/0)
D. C. Haan (1/0)
W. U. Choudhury (1/0)
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SARGENT & LUNDY
ENGINEERS
55 EAST MONROE STREET
CHICAGO, ILLINOIS 60603
TELEPHONE 312-269-2000

S&L rec'd. Project Eng. will provide duction by 2-18-82. HMM 2-9-82

February 8, 1982
Project Nos. 4266/4267
File Nos. 1.1/5.34

Commonwealth Edison Company
LaSalle County Station - Units 1 and 2

Fire Doors and Frames
Punch List 2.154

Mr. B. R. Shelton
Station Nuclear Engineering
Commonwealth Edison Company
Post Office Box 767
Chicago, Illinois 60690

Dear Mr. Shelton:

As requested in your December 28, 1981, letter regarding fire ratings, we have reviewed the commitments made in Appendix H of the FSAR with the design drawings and with the results of the field survey.

You have questioned if the use of manufacturer's certified doors in lieu of Underwriter's Laboratories labeled doors is considered consistent with the required wall rating. An Underwriter's label designation is the method used on our design drawings to specify where we require a fire rated door. Depending upon variables such as door size, door accessories and frame profile, the manufacturer may or may not have the Underwriter's label for all of his products. If the manufacturer has not actually tested the particular frame or door, then we are likely to receive a door and frame with a manufacturer's certificate of construction. A manufacturer's certificate of construction has been an industry accepted practice for items which because of a size change or a design change from that of a labeled (Underwriter's Laboratories tested) item by the same manufacturer cannot technically bear the Underwriter's label. No one manufacturer has tested all possible door assemblies.

All the doors and frames provided have been reviewed against the Underwriter's Laboratories Acceptance Criteria and with other manufacturer's labeled doors and frames to assure that the intent of the fire rating requirements have been met. It is our judgement that the certified doors and frames are constructed of equivalent materials, have been installed properly, and, therefore, are technically equivalent to the Underwriter's Laboratories labeled construction. Design drawings will not be revised to reflect if certificates in lieu of labels have been supplied.

The FSAR pages which have previously referenced Underwriter's Laboratories labeled doors instead of the actually installed certified doors will have to be revised. The proposed changes to the FSAR pages have been marked up to reflect the existing condition and indicates all doors and frames to have ratings consistent with that of the walls. The FSAR pages with proposed revisions are attached.

The following is a listing of specific inconsistencies between the FSAR and the design drawings found during the review. Copies of the proposed revisions to the FSAR are attached.

1. Doors #176 and #184

   Schedules do not specify labeled doors, however, FSAR and floor plans do. Field survey shows labeled doors are provided. Schedules shown on design drawings will be revised.

2. Doors #226, #248, #394, #418 and #424

   The original door criteria was changed to provide shielding doors for post accident access routes. 2½" thick solid steel doors are installed. In our judgement, the 2½" steel doors will provide protection consistent with the wall ratings. See proposed FSAR Amendment pages H.3-19, H.3-64, H.3-66, H.3-89 and H.3-133.

3. Door #593

   Newly added door which is not reflected in FSAR. Door has no affect on fire hazard analysis. See proposed FSAR Amendment page H.3-92.

In addition to the certified construction discussed above, the following is a list of differences between the design drawings and the survey:

1. Door #165

   The door has an unlabeled channel iron frame. The channel frame was provided by the miscellaneous steel contractor who had no door frame program with Underwriter's Laboratories. However, the unlabeled channel frame is of equivalent construction to a labeled frame, therefore, no modification is required.

2. Doors #97, #101, #106, #112, #114, #128, #321, #487, #513, #523, #525, and #777

   These doors were classified as fire rated after the frames were installed. The doors are U.L. rated and have pressed metal frames with the same profiles and details as other U.L. labeled frames. Our review indicated that the frame details and installation is equivalent to the U.L. rated frames and, therefore, no modification is required. See proposed FSAR Amendment pages H.3-38, H.3-95, H.3-138, H.3-141, H.3-155, H.3-156 and H.3-207.

If you have any further questions regarding fire doors, we will be glad to discuss them with you.

Yours very truly,

V. Reklaitis
Structural Project Engineer

VR:pv
Attachments
Copies:

T. E. Watts	(1/1 enc.)
R. Cosaro	(1/1 enc.)
L. DelGeorge	(1/1 enc.)
T. E. [illegible]aka	(1/1 enc.)
E. R. W[illegible]er	(1/0 enc.)
D. C. Haan	(1/1 enc.)
W. G. Schwartz	(1/0 enc.)
B. L. Pandit	(1/1 enc.)
S. M. Kazmi	(1/0 enc.)
B. A. Rioch	(1/0 enc.)

ENCLOSURE 1

Diesel Generator Corridor - Zone 5C11

The SER page 9-20 requires a one-hour enclosure for one of the redundant systems in the DG corridors of zone 5C11. The FSAR page H.4-17 requires a 1 1/2 hour barrier around one of the systems. The FSAR page 9.5-12a states the water suppression system is a wet pipe sprinkler.

The fire protection design for the cable trays in the DG corridor is a pre-action water suppression system on one of the redundant trains and a 1 1/2 hour Kaowool barrier enclosing the other redundant train according to the attached S&L letter dated March 22, 1982 (with sketch SK-WER-7-11). The top of the power tray has not been enclosed due to heat loading considerations. The remaining 3 sides of the tray plus the entire control tray are wrapped in 3" of Kaowool. (S&L letter dated March 23, 1982 references the Unit 2 sketch SK-WER-9-21).

The engineering judgment is that the design and installation protect the cables to the extent that a fire affecting one division will not compromise the integrity of the redundant system for the following reasons:

1. the low fire loading in the area,

2. the lack of significant combustibles beneath the cables,

3. the large volume of the corridor and the short run across the hall for the wrapped trays,

4. the solid bottom cable trays, and

5. the water suppression system.

The appropriate sections of the FSAR will be clarified in a future amendment.

This report documents and satisfies our commitment to you made during our telephone conversation on March 18, 1982.

- Request deviation from our guidelines license condition
- Seek to approve or deny
- If denied, what do we do about licensing?

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ENCLOSURE 2

Fire Doors

Commitment

A description of the design and construction of fire barriers is provided in the response to FSAR Q10.35. In particular, on page Q10.35-2 it is stated:

> "Doors - The doors are manufactured by Pioneer Industries and have an attached label indicating the hourly rating Pioneer Industries is an approved UL source."

FSAR page 9.5-2 states that "all openings through walls have door ratings which are consistent with required wall ratings".

Appendix H has a detailed description of each fire zone boundary wall.

Appendix R to 10CFR50 states that door openings shall be protected with equivalent rated doors, frames and hardware that have been tested and approved by a nationally recognized testing laboratory.

Installation

The attached FSAR change pages describe the actual installation of fire doors at LaSalle.

Evaluation

The engineering justification of the technical equivalence between what is installed and the requirements is contained in the attached S&L letters dated February 8, 1982 and March 22, 1982. Vendor drawings showing door and frame construction and certification are also attached.

All the doors and frames provided have been reviewed against the Underwriter's Laboratories Acceptance Criteria and with other manufacturers labelled doors and frames to assure that the intent of the fire rating requirements have been met.

Example

A typical example of manufacturer's certification for frames is door number 49. The door was provided with a manufacturer's certified three piece frame in lieu of an Underwriter's label two piece frame. The certified construction was chosen instead of the Underwriters detail because it is the judgment a shop welded finish frame is superior to the knockdown (Field Assembled) type of finished frame required for the UL assembly.

Detail 9 on Pioneer drawing C-8300 sheet 19 of 30 differs from the UL detail in the following respects:

1. rough buck provided is in two pieces rather than one.

2. rough buck provided is fastened to the wall with 3/8" diameter expansion anchors at 18" O.C. UL rough buck is fastened with 1/4" diameter machine screws at 16" O.C.

3. finished frame is fastened to rough buck with #6 machine screws at 12" O.C. UL finished frame is fastened to the rough buck with #8 machine screws at 10" O.C.

It is the engineering judgment that this frame is technically equivalent to a UL labeled frame.

Example

A typical example of manufacturer's certification of doors is door number 257.

This is a pair of doors controlled by means of electric strikes. The door has a manufactuer's certification label because electric strikes have not yet been tested for use in double doors.

The door is constructed in accordance with UL approved details, is provided with UL approved 3 point locks and also with 3 UL listed electric strikes.

The electric strikes are of the 'fail locked' design to prevent unintentional opening of the doors.

Summary

Project engineering concurs with S&L's findings in the referenced letters. All doors and frames have been reviewed against UL acceptance criteria and meet the fire rating requirements. The doors and frames are constructed of equivalent materials, have been installed properly and, therefore, are technically equivlent to the UL labelled construction.

ENCLOSURE 3.B

Spray Distribution Within The CSR Trays

Attachment 1 is a letter dated March 8, 1982 from B.B. Stephenson to C. Williams describing the CSR spray nozzle type, spray nozzle spacing, spray nozzle size and spray nozzle orientation.

Attachment 2 consists of three "as-built" drawings describing the ceiling sprinkler system and the cable tray spray sytem in the CSR:

dwg. 15 - sprinkler system and supply system
dwg. 16 - cable tray spray system
dwg. 16A - the "drop" description for dwg. 16

Attachment 3 is LaSalle Project Procedure 82-2 dated March 15, 1982. This attachment documents a spray test procedure and the results that were obtained during a demonstration of the spray system in the CSR at LaSalle on March 12, 1982. Engineering's comments on the 82-2 report and evaluation and conclusion regarding the test results follows:

Comments:

1. "scope" and "purpose" should be exchanged on page 1

2. on page 1 under Trial #1

$$\text{average density} = \frac{7.9 \text{ gpm}}{25 \text{ sq. ft.}} = 0.32 \text{ gpm/sq. ft.}$$

3. on page 1 under Trial #2

$$\text{average density} = \frac{9.2 \text{ gpm}}{25 \text{ sq. ft.}} = 0.37 \text{ gpm/sq. ft.}$$

4. on page 2 "spray test #1" should be "Trial #3"

$$\text{average density} = \frac{9.1 \text{ gpm}}{25 \text{ sq. ft.}} = 0.36 \text{ gpm/sq. ft.}$$

5. on page 2 under Spray Test #2

"negligible" should be "very small"

6. under conclusions "at 10 psig nozzle pressure" should be added.

These comments are for clarification purposes only and no revision to the procedure is necessary to incorporate them.

ENCLOSURE 3.B
(Cont'd)

Evaluation:

The test was conducted to determine two aspects of the spray nozzle performance in the Cable Spreading Room.

Spray Test #1 was designed to determine the actual flow rate delivered. In Trial #1 and #2, the nozzle flow was delivered at 10 psig and 15 psig respectively. In both cases spillage from the tray due to spreading of nozzle spray was allowed to occur. The average flow density measured in both cases was 0.32 gpm/sq. ft. and 0.37 gpm/sq. ft. respectively. In Trial #3, the entire nozzle flow was directed into the tray so that no spillage occurred. The flow density in this case was 0.36 gpm/sq. ft. Spray Test #1 conclusively demonstrated that the flow performance of the spray nozzle was in excess of the design flow of 0.3 gpm/sq. ft. and the NFPA-15 requirement of 0.15 gpm/sq. ft.

Spray Test #2 was designed to demonstrate the actual coverage obtained from a single spray. The test was designed to collect the spray water in the 8 in. length of the tray as shown in Attachment #1 to the test results. The expected flow rate in this test, with a minimum density of 0.15 gpm/sq. ft., was 0.25 gpm. The test was not setup to measure such a small flow rate. However, visual inspection during the test showed that the spray was reaching this region of the cable tray but a determination of the flow density could not be made from the test.

The code requirement of flow density in (gpm/sq ft.) is used in the design as an average density over the area to be covered by one given spray nozzle. It is highly unlikely that any spray system, optimized from a practical standpoint using good fire protection practice, would have an uniform density everywhere. The test did demonstrate that the spray did reach all areas of the cable tray and that the average flow density was in excess of the NFPA-15 requirements.

Specifically evaluating the test results against NFPA-15 (1981 edition):

Code Section	LSCS Compliance
4-4.1.2	The design density was chosen to be 0.3 gpm/ft^2. This choice was not based on specific test data; test data of this type are not generally available. The choice of 0.3 gpm/ft^2, as the design basis, was governed by recommended fire protection practice as provided in NML Standards and NFPA-15, Section 4-4.1.4. Section 4-4.1.4 specifically deals with Cable Trays and Cable Runs. The recommended density in Section 4-4.1.4 is 0.15 gpm/ft^2 for extinguishment of fire which originates within the cable. The density (gpm/ft^2) is construed to be the average density over the area covered by one given nozzle.

ENCLOSURE 3.B
(Cont'd)

Code Section	LSCS Compliance
4-4.1.4	This section provides guidance for water density to be used for extinguishment of fire originating within the cable or tube in Cable Trays and Cable Runs. The recommended density is 0.15 gpm/ft^2. LSCS density (average) is 0.30 gpm/ft^2.
4-4.3.3(d)	This section provides guidelines for water density required to protect cables and cable runs by water spray from fire or spill exposure. The recommended density for this type of protection is 0.3 gpm/ft^2. Although the intent of fire protection is to extinguish fire originating in the cable (which requires 0.15 gpm/ft^2), LSCS has an average density of 0.3 gpm/ft^2.
4-8.2	This section provides guidelines for positioning of nozzles. As the test results show, the spray does cover the intended 10'-0" length of the cable tray. However, the density at the farthest point from the nozzle is less than 0.3 gpm/ft^2 but certainly it is greater than zero. In the test situation, the expected flow rate for a density of 0.15 gpm/ft^2 is 0.25 gpm. It is a very small flow rate to measure in a crude experiment.

Conclusion:

The cable tray water spray system in U1 CSR has been demonstrated to meet the design intent and is approved by engineering.

Please note again that the test was conducted at a minimum pressure of 10 psig. If there were an isolated fire and only one nozzle were to open it is to be expected that the coverage would be greater than that proved in the above test. The system pressure would be between 80 and 120 psig. Data do not exist to support a judgment of the spray distribution at 120 psig nor the number of nozzles experiencing pressures below 30 psig if all nozzles were to open. If a test were to be conducted on one nozzle at 80-120 psig we do feel comfortable in saying raincoats would be required to witness the test.

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