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September 28, 1981



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

Subject: LaSalle County Station Units 1 and 2
 Recommended Errata to NUREG-0519
 Fire Protection Program (SER Sect. 9.5)
 NRC Docket Nos. 50-373/374

Dear Mr. Schwencer:

The purpose of this letter is to document information discussed in previous telephone conferences with Mr. G. Harrison et al regarding the LaSalle County fire protection program. In addition, detailed justifications for certain issues are provided in response to requests from the Staff made during those calls, as well as a discussion of two areas of potential discrepancy recently identified with which you may have an interest. Finally, based on these materials which are provided as documentation of previous telephone conferences, we have also included proposed errata for incorporation into NUREG-0519.

1. SER Changes

The attached description from the fire protection section of the SER (Section 9.5) is marked to indicate changes we would like to see made. The changes that are not accompanied by an arrow and an item number in the right hand column were included in the ERRATA of the first supplement. The changes accompanied by an arrow and item number in the right hand column are "new" corrections. Listed below is a summary of these new changes with a justification of the change:

<u>Item</u>	<u>Page</u>		
1.	9-13	Line 36	Change "30" and "320" to "20" and "340".

This reflects the design point of the pump curve.

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2. 9-14 Line 44 Delete.

Fire Zones 4C2 and 4C3

The FSAR presently states that both fire zones 4C2 and 4C3 have ceiling sections of both 3 hour and 1 hour fire ratings. The average fire loading for each zone is equivalent to a fire severity of less than 1/2 hour. The NRC's previous comment was that the ceilings of fire zones 4C2 and 4C3 should not have a fire rating of less than 2 hours. The ceiling and floor areas required for structural support of the control have 3 hour fire ratings. The ceiling areas to be upgraded based on the NRC's comment are above office and locker room areas.

The present FSAR is based on conservatively classifying the zones' ceiling construction as "unrestrained" assemblies. Based on the NRC's request to upgrade the ceiling's fire protection rating to 2 hours, we re-reviewed the zones ceiling design and construction. Our review found that zones 4C2 and 4C3 have ceiling constructions classified as "restrained" assemblies. Dan Swytnk of Underwriters Laboratories in Northbrook, IL confirms the fact that a beam design from U.L. 'N' series can be substituted into an assembly design 'D' series provided the listed unrestrained beam rating is met and that the floor construction has a comparable or greater capacity for heat dissipation than that tested.

Construction documentation indicates a minimum of 3/8 of pyrocrete has been installed over the beams in this area. Designs N721, N722 & N723 indicate 3/8" provides a 1-1/2 hour unrestrained beam rating.

By using the beam substitution method U.L. design D902 or D904 could be utilized giving a 3 hour rating either way with the 18" slab as provided.

Based on U.L.'s acceptance criteria for rating restrained assembly design, we believe that the upgraded zones' ceiling sections as presently constructed have a fire rating of as much as 3 hours; and a minimum 1-1/2 hour rating is without question. We believe that present construction can be reclassified to the requested hourly fire rating.

- | <u>Item</u> | <u>Page</u> | | |
|-------------|-------------|---|---|
| 3. | 9-15 | Lines 9 & 10 | Delete |
| | | <u>Zones 5B13 & 5C11</u> | |
| | | 1) The structural steel in these areas will be protected as noted in Section 9.5.2.1 (paragraph 2), | |
| | | 2) Fire detection is provided in these areas, and | |
| | | 3) Electrical equipment is located in these areas and installing an automatic sprinkler system could create a worse hazard than the fire. | |
| 4. | 9-16 | Line 22 | Change "separating walls between" to read "walls of" |
| | | This simply reads better. The areas are not adjacent to one another. | |
| 5. | 9-16 | Line 24-27 | Delete sentence beginning with "In addition, . . ." and add "All structural members within areas comprising the control room and cable spreading room are protected to a 3 hour rating. All structural members within areas comprising the switchgear room and auxiliary equipment rooms are protected to a 2 hour rating." |
| | | This change reflects the plant design and commitments. | |
| 6. | 9-16 | Lines 32,33,34 | Delete sentence beginning with "The structural" and add "The structural steel in the diesel-generator ventilation equipment rooms is protected to a one hour rating. The structural members in fire zone 5A1, 5A2, 5B13, and between column rows 6-24 and N-R in zone 5C11 are protected to a 3 hour rating." |
| | | This change reflects the plant design and commitments. | |
| 7. | 9-17 | Line 4 | Add after <u>shafts</u> , "with the exceptions of the reactor building and turbine building ventilation systems". |

There are 3 "openings" for which the SER as currently written does not apply:

The Reactor Building Ventilation System opening was addressed in NRC question Q10.55 (part 3) and our response (FSAR, page Q10.55-3). We believe our response satisfactory answered the NRC's questions and removed any concern about the plant design. Based on that belief, installation of 1 -1/2 hour fire rated damper has not been planned nor felt required.

The second and third duct "opening" were not addressed in a specific question. In fact, we do not consider them to be duct openings into air riser shafts. We consider them to be transition sections in ventilation ducts.

One of these ventilation ducts is part of the Unit 1 Turbine Building Ventilation System. The ventilation duct begins in fire zone 2k (elev. 687), (approximate Col. N-10), is approximately 6 ft wide and 16 ft high, and is constructed of concrete walls, floor and ceiling. The ventilation duct rises vertically at col. L-11 (app.) to fire zone 4A (elev. 820'-6", app. col. L-11). In fire zone 4A, the transition from concrete structure to fabricated metal duct occurs. Our position is that this transition is not a duct opening into an air riser shaft, but that the metal section and concrete sections constitute one continuous ventilation duct. There are no penetrations nor openings into this duct except at its beginning at elev. 687. At its opening into zone 2K, (elev. 687') flow check dampers are installed and their construction, although not rated, is comparable to 1-1/2 hour dampers. Opposed blade type dampers are installed in the metal duct section in fire zone 4A.

The second ventilation duct is for the Unit 2 Turbine Building Ventilation System and is a duplicate of the Unit 1 design described above. The Unit 2 ventilation duct begins in fire zone 3k and ends in zone 4A.

Because of the physical separation between the fire zones, the type and construction of the dampers presently installed, and because the transitions do not "open" into air risers, we believe that installation of 1-1/2 hour fire rated dampers is not required and the present design is acceptable.

8. 9-20 Lines 40,41 Delete "a safe" and add "a safe shutdown and in access routes adjacent to those areas".

In a revised response to Question Q10.43 we indicated LaSalle would comply with the requirements of Section D.5 (a) of BTP-9.5-1 "Guidelines for Fire Protection for Nuclear Power Plants. Rev. 1 is the option given to plants with construction permits which were issued prior to July 1, 1976. In addition, sealed beam units will be installed in the access routes adjacent to safe shutdown areas.

9. 9-22 Lines 17 & 18 Were changed in the ERRATA to read: "a 2-hour rated fire vapor seal where the bus duct penetrates the floor/ceiling assembly to the Div. 1 essential switch-gear room". Change the above (ERRATA) to read: "A fire stop will be installed in the bus duct where it penetrates the floor/ceiling assembly between Div. 1 and Div. 2 essential switchgear rooms".

Next Steps

The schedule for installing the fire stops in the electrical penetrations for the non-segregated phase bus duct is:

	<u>Action</u>	<u>Week of</u>
1.	Tech-Sil submits proposal	9-28-81
2.	CECo issues order (CCA)	10-12-81
3.	Tech-Sil submits fire stop design and fire test procedure for approval	11-2-81
4.	CECo/S&L reviews and approves the design and test procedure	11-16-81
5.	CECo furnishes sections of bus duct to Tech-Sil for the test	11-16-81
6.	Tech-Sil installs fire stops & starts test	11-23-81
7.	Tech-Sil completes test	12-21-81
8.	Tech-Sil submits report	1-4-82
2.	<u>FSAR Changes</u>	

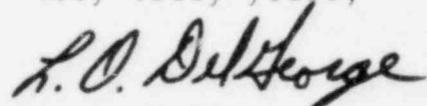
There are many changes required to update the FSAR to reflect recent commitments and SER changes. These changes will be incorporated in Amendment 59 to the FSAR. There are 2 areas

that are being reviewed by S&L that should be noted to the NRC:

- A. FSAR (Page 9.5-13) commits to installing ion detection systems in "inlet and outlet plenums of all air handling equipment". All systems do not have these detectors and they cannot be backfitted prior to fuel loading. We propose that the FSAR be revised to reflect present design to agree with other HVAC FSAR sections.
- B. FSAR (Page 9.5-14) states air intakes to areas housing safety related equipment are a minimum of 100 feet from exhaust and smoke vents. The actual minimum distance is 20 feet.

If there are any questions in this regard, please direct them to this office.

Very truly yours,



L. O. DelGeorge
Director of Nuclear Licensing

Attachment

cc: NRC Resident Inspector - LSCS
Mr. R. Earnes

2596N

9/24/81

The ventilation system for the residual heat removal service water pump cubicles provides a mixture of outside and recirculated air and directs this air to the cubicle through a duct system to maintain a maximum temperature of approximately 104 degrees Fahrenheit. The ventilation air for the system is provided by outside air intakes and exhausts that are ~~tornado~~-missile protected.

We reviewed the adequacy of the applicant's design necessary to maintain a suitable environment for the emergency core cooling system equipment during normal, abnormal, and accident conditions. We conclude that the design is acceptable.

9.5 Fire Protection Systems

We reviewed the La Salle Fire Protection Program Reevaluation and Fire Hazards Analysis submitted by the applicant by letter dated August 25, 1977, and amendments to the Final Safety Analysis Report. The submittals were in response to our request to evaluate their fire protection program against the guidelines of Appendix A to Branch Technical Position ASB 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants." As part of our review, we visited the plant site to examine the relationship of safety-related components, systems, and structures in specific plant areas to both combustible materials and to associated fire detection and suppression system. The overall objective of our review was to ensure that, in the event of a fire, personnel and the plant equipment would be adequate to safely shut down the reactor, maintain the plant in a safe shutdown condition, and to minimize the release of radioactivity to the environment.

Our review included an evaluation of the automatic and manually operated water and gas fire suppression systems, the fire detection systems, fire barriers, fire doors and dampers, fire protection administrative controls, and the fire brigade size and training.

9.5.1 Description and Evaluation

9.5.1.1 Water Supply Systems

The water supply system consists of two fire pumps separately connected to a buried, 14-inch pipe loop around the plant common to both units. The fire pumps are rated at 2500 gallons per minute at 136 pounds per square inch gage head, and both are diesel-engine driven. The fire pumps are located at opposite ends of the lake screen house in rooms enclosed by 3-hour enclosures, and both take suction directly from the seismically designed water tunnel in the lake screen house. This tunnel has multiple intakes from the cooling lake.

Two separate ²⁰30 gallons per minute at ³⁴⁰320 feet total head ¹⁶⁰pressure maintenance pumps (jockey pumps) maintain the system pressure at ~~175~~ pounds per square inch gage. If the water supply system pressure falls to 123 pounds per square inch gage, then the first fire pump starts. The second pump actuates if the pressure falls to 118 pounds per square inch gage. The fire pumps are located in separate fire pump rooms with separate alarms provided in the control room to monitor pump operation, prime mover availability, or failure of a fire pump to start. A low header pressure alarm also sounds in the control room. The

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power to start the fire pump is supplied by individual pump battery systems.
~~power supply fire pumps are supplied by the Class IE station battery system.~~
Both the fire pumps and their controllers are Underwriter Laboratory listed.

The water flow requirement for the fire suppression system requiring the greatest water demand for areas containing or exposing safety-related equipment is 1000 gallons per minute and, coupled with 500 gallons per minute for hose streams, totals a water demand of 1,500 gallons per minute. Since the system can deliver 2,500 gallons per minute at rated pressure with one pump out of service, the water supply system is adequate and is, therefore, acceptable.

As a backup to the fire pumps, the service water system can be used to supply fire-fighting water. The service water system is connected to the fire water system through a 12-inch line at each fire pump discharge line, with a normally open valve and a check valve to prevent contamination of the service water system. This connection does not degrade the fire suppression system.

9.5.1.2 Sprinkler and Standpipe Systems

The automatic/manual sprinkler systems and the hose stations are connected to the interior water supply header. The interior water supply system is fed through separate supply connections to the looped yard system with appropriate valves so that sections can be isolated to perform maintenance or to prevent a single break from impairing the entire distribution system. The water supply valves ~~to the sprinklers are electrically supervised~~ with alarms in the control room. All other fire protection valves will be controlled with a key locking procedure. In addition, the sprinkler systems have water flow alarms which alarm in the control room.

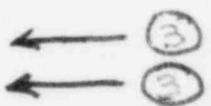
The automatic sprinkler system (e.g., wet pipe sprinkler system, pre-action sprinkler systems, deluge, and water spray systems) will be designed to the recommendations of National Fire Protection Association Standard No. 13, "Standard for Installation of Sprinkler Systems," and National Fire Protection Association Standard No. 15, "Standard for Water Spray Fixed Systems."

The areas that have or will be equipped with automatic (unless otherwise indicated) water suppression systems include the following:

- Turbine building, *various areas,*
- Standby gas treatment system charcoal adsorbers (manual),
- Control room emergency makeup system charcoal filters (manual),
- Auxiliary electric equipment room supply air system filters (manual),
- Primary containment purge air system filters (manual),
- Control room supply air system filters (manual),
- Dirty and clean oil tank room,
- Emergency diesel-generator fuel storage tank room,
- High pressure core spary diesel fuel storage tank rooms,
- Emergency diesel-generator day tank room,
- Hallway outside emergency diesel-generator rooms,
- Reactor feedwater pump rooms,
- Condensate pump rooms,
- ~~Auxiliary building main floor, Zones 4C2 and 4C3,~~
- ~~High pressure core spray diesel pump room, Zone 7C4,~~
- ~~Residual heat removal service water pump rooms, Zones 7C5 and 7C6,~~

- Reactor feedwater pump exhaust duct rooms,
- Diesel fire pump rooms,
- Radwaste building truck bay and dry waste storage area,
- Railroad entrance area of reactor building,
- Auxiliary building ground floor, Zone 4F3 cables above ceiling,
- ~~- Auxiliary building lower ventilation equipment floor, columns 12 to 18 and L to R,~~
- Cable spreading room,
- ~~- Balance of plant cable area, Zone 5B13, and~~
- ~~- Zone 5C11, areas between columns 5 to 25 and N to S, and~~
- High pressure core spray diesel day tank room

delete



Manual hose stations are located throughout the plant to ensure that an effective hose stream can be directed to any safety-related area in the plant. An additional hose station with 100 feet of hose will be provided as backup manual hose coverage for the cable spreading room. The supply for this hose station will be from a separate connection to the fire protection supply header, with adequate valves installed to prevent a single failure of the fire water system from affecting both the cable spreading room automatic suppression system and the hose station.

Since the containment is inerted during operation, stand pipe hose stations with adequate hose will be provided outside the containment access openings. Also an
~~Similarly, standpipe hose stations with adequate hose will be provided at~~ *additional*
~~strategic locations in containment.~~ The length of hose provided will be *hose station*
 increased to 100 feet at the following standpipe hose locations: Zone 2B1, *has been*
 column 8.9BC; ~~Zone 4A, column 20L;~~ Zone 5a3, columns 4R, 12R, and 18R; and Zone *added*
 5B13, columns 13N and 17.2N. These systems are designed to the recommendations *into the*
 of National Fire Protection Association Standard No. 14, "Standpipe and Hose *4A at*
 Systems." *column 21.1N.*

Based on our review and the applicant's commitments, we conclude that the water suppression systems meet the guidelines of Appendix A to Branch Technical Position ASB 9.5-1 and are, therefore, acceptable.

9.5.1.3 Fire Suppression Gas Systems

Total flooding carbon dioxide systems are provided for the diesel-generator rooms and the turbine-generator alternator exciters. These systems are actuated by heat detection systems. The carbon dioxide system in the diesel-generator rooms is designed to discharge, after a brief time delay, at ~~50~~ *34* percent concentration. In addition, ~~fourteen~~ *seventeen* carbon dioxide hose reels are provided and are located in areas with high concentrations of electrical cabling.

We reviewed the design criteria and bases for the carbon dioxide fire suppression systems. We conclude that these systems satisfy the provisions of Appendix A to Branch Technical Position ASB 9.5-1 and are, therefore, acceptable.

9.5.1.4 Fire Detection Systems

The fire detection systems consist of the detectors, associated electrical circuitry, electrical power supplies, and the fire annunciation panels. The types of detectors used are ionization (products of combustion), and thermal (heat sensors) *and ultra-violet.*

Fire detection systems are installed in all areas housing safety-related panels or equipment, and areas of cable concentration including all areas of the reactor building, the new and spent fuel pool area, the diesel-generator ventilation equipment rooms, and below the ceiling in Fire Zone 4F3, auxiliary building ground floor.

Fire detection systems have audible and visual alarms which annunciate in the plant control room. Local audible and/or visual alarms are also provided. Both types of fire detection systems are connected to the emergency power supply.

The fire detection systems are or will be installed according to National Fire Protection Association No. 720, "Standard for the Installation, Maintenance, ^{irrigation} and Use of Proprietary Protection Signaling Systems." Those detection and alarm systems which are used to actuate suppression systems are or will be upgraded to Class A systems as defined in National Fire Protection Association No. 720.

We reviewed the fire detection systems to ensure that fire detectors are adequate to provide detection and alarm for fires that could occur. We also reviewed the fire detection system's design criteria to ensure that they conform to the applicable sections of National Fire Protection Association No. 720. We conclude that the design of the fire detection systems meet the guidelines of Appendix A to Branch Technical Position ASB 9.5-1 and are, therefore, acceptable.

9.5.2 Other Items Related to the Station Fire Protection Program

9.5.2.1 Fire Barriers and Barrier Penetrations

The ^{walls of} separating walls between the control room, switchgear rooms, cable spreading room, auxiliary equipment room, reactor building, turbine building, and auxiliary building are 3-hour fire-rated walls. ~~In addition, all structural steel members in areas comprising the control room, switchgear room, cable spreading room, and the auxiliary equipment room are protected by a 3-hour fire-rated barrier.~~

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The floor/ceiling assemblies between the cable spreading room and the auxiliary equipment room, and the floor assembly for the auxiliary equipment room and the floor/ceiling assemblies between the electrical equipment room and Division 2 switchgear room and between Divisions 1 and 2 switchgear rooms are rated for 2 hours. ~~The structural steel in the diesel-generator ventilation equipment rooms, Fire Zone 5B13, and between column rows 5-25, and "N" to "S" in Fire Zone 5C11 will be protected for 2 hours.~~ Structural steel in Fire Zones 5A1, 5A2, 5B9, and 5B10 will be protected for 1 hour. Based on the evaluation of the fire loading and fire protection for these areas, we have concluded that the fire barriers are acceptable in these areas. Other areas of the plant not listed above have appropriate and acceptable fire barriers.

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← (6)
← (6)

By referencing specific Underwriter Laboratory designs, the applicant has provided adequate documentation to substantiate the fire rating of both the fire-rated barriers and the 3-hour penetration seals used in the penetration cable trays, conduits, and piping. We conclude that the fire barrier and fire seal ratings meet the guidelines of Appendix A to Branch Technical Position ASB 9.5-1, and, therefore, are acceptable.

9.5.2.2 Fire Doors and Dampers

We reviewed the placement of fire doors and verified that the fire doors of the proper fire rating have been provided. The applicant will install 1-1/2 hour fire dampers in all duct penetrations of air riser shafts, *with the exception of the Reactor Building and Turbine Building ventilation systems.*

The licensee has provided 3-hour ventilation fire dampers for 3-hour walls, ceiling/floor assemblies.

The fire doors and dampers are provided in accordance with the guidelines of Appendix A to Branch Technical Position ASB 9.5-1 and, therefore, are acceptable.

9.5.3 Alternate Shutdown

To assure that redundant safety-related cable systems are separated from each other so that both are not subject to damage from a single fire hazard, we required the applicant to provide the following information for each Class 1E system needed to bring the plant to safe cold shutdown.

- (1) A table listing of electrical equipment required or essential for safe shutdown,
- (2) Each equipments location by fire area.
- (3) Each equipments redundant counterpart with a description of its location with respect to its redundant counterpart.
- (4) Identification of essential cables (instrumentation, control, and power) for each equipment.
- (5) Description of cable routing from source to termination.
- (6) Identification of each location where essential cables are located in the same fire area with their redundant counterpart.

The applicant has incorporated the required information in their safe shutdown analysis, Amendment 47, Section H.4 of the Final Safety Analysis Report. The following items address the problem areas revealed during our review of this information and the resolutions concerning them.

- (1) The applicant identified a number of fire areas where essential cables for both methods of shutdown are located. These areas include 2E, 2F, 2G, 2H1, 2I1, 2J, 4D1, 4E1, 4E3, and 5C11. For each of these areas, the physical separation of essential cables is described ~~and justified in Section H.4.2 of the Final Safety Analysis Report. The adequacy of the separation described has been evaluated and found acceptable in the fire protection safety evaluation report.~~ The objective of this review is limited to identification of essential cables that are located in the same fire area and subject to damage from a single fire hazard.
- (2) For the design basis fire affecting the control room, cable spreading room, or remote shutdown locations, we require electrical circuits between these control locations to be sufficiently isolated so that both safe (hot and cold) shutdown capability will not be lost at both locations. To assure

modification identified in Section 9.5.4 of this report.

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As a result of our evaluation, the applicant has agreed to make

this shutdown capability, we required the applicant to provide the following information.

- (a) Identification of each circuit located on the hot shutdown panel that is required for both hot and cold shutdown,
- (b) Description including detailed electrical schematic drawings of how each circuit identified is isolated from the control room,
- (c) Identification of each circuit required from shutdown (both hot and cold) that is located in the control room but not on the hot shutdown panels,
- (d) The results of an analysis that demonstrates that failure (open, ground, or hot short) of each circuit identified will not affect the capability to achieve safe shutdown.

We received the information from the applicant and based on our review of selected electrical schematic drawings and information requested in its Final Safety Analysis Report, we conclude that an electrically isolatable alternative shutdown capability exists for the control room and cable spreading room, that no fire in the remote shutdown room will preclude shutdown from the control room, and is, therefore, acceptable.

- (3) The residual heat removal system at La Salle is a low pressure system that interfaces with the high pressure primary reactor system. To preclude a loss-of-coolant accident through this interface, we required compliance with the recommendations of Branch Technical Position RSB 5-1, "Design Requirements of the Residual Heat Removal System."

Thus, this interface for La Salle consists of two redundant and independent motor-operated valves with diverse interlocks. These two motor-operated valves and their associated cable can be subject to a single fire hazard. It is our concern that this single fire could cause the two valves to open resulting in a fire and initiating a loss-of-coolant accident high-low pressure system interface. To assure that this interface and other high-low pressure system interfaces are adequately protected from the effects of a single fire, we require the applicant to provide the following information:

- (a) Identification and description of each high-low pressure system interface, and
- (b) Results of an analysis for each interface identified that demonstrates adequate protection from the effects of a single fire.

Item 3 was discussed with the applicant, and information was provided in a letter dated February 11, 1981 as a proposed amendment to the Final Safety Analysis Report. Based on our review of this information and the results of the applicant's analysis, we conclude that the high-low pressure system interfaces have been identified, are adequately protected from the effects of a single fire, and are acceptable.

To assure that cables associated with safety-related cables systems (evaluated and described above) will not adversely affect safe shutdown, we requested that the applicant provide the following information:

- (1) A table that lists Class 1E and non-Class 1E cables that are associated with the essential safe shutdown systems. For each cable listed: (*See note below)
 - (a) Define the cables' associated to the safe shutdown system (common power source, common raceway, separation less than Regulatory Guide 1.75, "Physical Independence of Electric Systems," guidelines, cables for equipment whose spurious operation will adversely affect shutdown systems, etc.),
 - (b) Describe each associated cable routing (by fire area) from source to termination, and
 - (c) Identify each location where the associated cables are separated by less than a wall having a 3-hour fire rating from cables required for or associated with any redundant shutdown system.
- (2) Provide one of the following for each of the circuits identified in item 1.c above:
 - (a) The results of an analysis that demonstrates that failure caused by open, ground, or hot short of cables will not affect ~~its~~ ^{its} associated shutdown system,
 - (b) Identify each circuit requiring a solution in accordance with Section III.G.3 of Appendix R (see Section 9.5.8 of this report), or
 - (c) Identify each circuit meeting the requirements of Section III.G.2 of Appendix R (i.e., 3-hour wall, 20 feet of clear space with automatic fire suppression, or 1-hour barrier with automatic fire suppression).
- (3) In regard to associated cables in the control room and cable spreading rooms, provide a table that list Class 1E and non-Class 1E cables that are associated with the remote method of shutdown. For each item listed, identify each associated cable located in the fire area containing the primary shutdown equipment. For each cable so identified provide the results of an analysis that demonstrates that failure (open, ground, or hot short) of the associated cable will not adversely affect the remote method of shutdown.

These items addressing associated circuits were discussed with the applicant, and as a result the requested information was provided by letter dated February 11,

*Item 2a is one method of meeting the requirements of Section III.G.3 of Appendix R. If item 2a is selected, the information requested in items 1a and 1c should be provided in general terms and the information requested by 1b need not be provided.

Fire Zone 5C11 will have cables rerouted to avoid the turbine building.

In addition to acceptable alternative modifications discussed elsewhere in this section of fire protection, the hallway adjacent to the diesel-generator rooms in Fire Zone 5C11 is included in this consideration. Also cables from Unit 2 engineering safety features, Div 1 battery room in

1981. The applicant stated: "...that cables which are not needed for either the basic or alternate shutdown modes but which have a common power source or a common raceway with cables needed for safe shutdown have coordinated short circuit protection such that the open, ground or hot short of these cables will not affect the shutdown system for which a common power source or common raceway is shared." Based on this statement, we conclude that there is reasonable assurance that associated circuits will not affect safe shutdown systems, that the design meets the requirements of Section III.G.3 of Appendix R, and that the design is acceptable.

9.5.4 Plant Areas Containing Redundant Divisions

A number of plant areas have physical arrangements wherein redundant divisions of cables/conduits and equipment are in close proximity to each other and, therefore, could be vulnerable to a single, transient fire event. Originally, the applicant was relying solely on administrative controls to preclude a fire event from taking place in affected areas. Based on experience, administrative controls alone are not sufficient to prevent storage of combustibles, or presence of ignition sources. We requested, and the applicant agreed to provide, an automatic sprinkler system and an automatic detection system in all areas where redundant safe shutdown systems are not separated by a 3-hour fire-rated barrier (except those areas of the reactor building where redundant circuits are on opposite sides of the containment structure and are separated by more than 50 feet). In addition, wherever redundant systems are separated by less than 20 feet of clear, open space, one of the redundant systems will be completely enclosed in a 1-hour fire-rated barrier. ~~Areas that come under these considerations include the following:~~

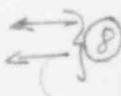
- ~~(1) Fire Zone 5C11 in the hallway adjacent to the diesel-generator rooms.~~
- ~~(2) Fire Zone 4B, auxiliary building, lower ventilation equipment floor.~~
- ~~(3) Fire Zone 2E, elevation 761 feet - 0 inches of the reactor building.~~
- ~~(4) Fire Zone 4F1 bus duct will be enclosed in a 2-hour fire-rated enclosure.~~
- ~~(5) Fire Zone 5C11, which has cables from Unit 2 engineering safety features and Division 1 battery room, will have cables re-routed to avoid the turbine building.~~

We have reviewed the areas containing redundant divisions of equipment and cable and conclude that, with the modifications, the fire protection meets Appendix A to Branch Technical Position ASB 9.5-1 and is, therefore, acceptable.

9.5.5 Emergency Lighting

Eight-hour battery-pack emergency lights are required for areas of the plant necessary for safe shutdown. At our request, the applicant agreed to install self-contained 8-hour battery-pack emergency lighting in all areas of the plant which could be manned to bring the plant to a safe cold shutdown and in access routes to and from all fire areas.

a safe shutdown and in access routes adjacent to those areas.



Based on the applicant's commitment to install 8-hour battery emergency lights, we conclude that the emergency lighting meets the guidelines of Appendix A to Branch Technical Position ASB 9.5-1 and is, therefore, acceptable.

9.5.6 Specific Areas

9.5.6.1 Control Room

The control room fire area is separated from the balance of the plant by 3-hour fire-rated walls and floor/ceiling assemblies. However, the ducts which penetrate the control room walls are not provided with dampers. At our request, the applicant has agreed to install 3-hour fire-rated dampers at each duct penetration of the control room walls.

Manual suppression capability consists of standpipe hose stations outside the control room and carbon dioxide and dry chemical portable fire extinguishers. At our request, the applicant has agreed to provide water type fire extinguishers in the control room.

Smoke detectors are installed throughout the control room area and in the return air plenums which are located between the front and back-row control panels. To ensure a conservative design, the applicant will also install smoke detectors below the dropped ceiling area between the front and back-row control panels.

As discussed in Section 9.5.3 above, the applicant has installed an emergency shutdown panel so that alternate shutdown capability exists independent of the control room.

Based on our review and the applicant's commitments, we conclude that the control room fire protection meets the guidelines of Appendix A to Branch Technical Position ASB 9.5-1 and is, therefore, acceptable.

9.5.6.2 Auxiliary Electric Equipment Room

The auxiliary electric equipment room is separated from the balance of the plant by 3-hour rated walls and 2-hour rated floor/ceiling assemblies except that the ventilation ducts which penetrate the barriers are not provided with dampers. This room contains redundant safe shutdown electrical circuits and cabinets, and also contains the plant emergency shutdown panel. Fire suppression for this area consists of manual hose streams from adjacent areas and portable fire extinguishers. No automatic suppression system is installed. An ionization smoke detection system is provided in this area.

At our request, the applicant will make the following improvements to the protection of the auxiliary equipment room to correct deviations from our guidelines. A 3-hour fire-rated damper will be provided at all duct penetrations of the fire barrier walls and floor/ceiling construction. To provide separation of the redundant safe shutdown circuits, the circuits and cabinets in the auxiliary equipment room will be relocated so that redundant circuits are on opposite sides of column line 14, and a 2-hour rated fire barrier will then be constructed to completely separate the area into two separate rooms. A single fire door will be installed in the center wall to provide access

personnel

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and a certified 3-hr roll-up fire door will be provided to access the back of panels adjacent to the wall. In addition, the applicant will provide a liquid-tight sill at this door opening and install a remote pull chain for the overhead door. The remote pull chain should be located at the single fire door in the center aisle.

between the rooms at the center aisle. ~~In addition, an automatic water fire suppression system will be installed in both sections of the auxiliary electric equipment room.~~

The isolation of the emergency shutdown panel from the control room circuits is discussed in Section 9.5.3 above.

Based on our review and the applicant's commitments, a fire in either section of the auxiliary equipment room will not cause the loss of redundant safe shutdown equipment. We conclude that the auxiliary electric equipment room fire protection meets the guidelines of Appendix A to Branch Technical Position ASB 9.5-1 and is, therefore, acceptable.

9.5.6.3 Division 2 Essential Switchgear Room

The Division 2 essential switchgear room is separated from the balance of the plant by 2- and 3-hour fire-rated barriers except that the ventilation openings are not provided with fire dampers, and a bus duct enters through an outside wall and penetrates the floor of this area without protection. The applicant, at our request, will provide a 3-hour fire-rated damper at all ventilation penetrations of the fire barriers, and ~~a 2-hour fire-rated enclosure will be provided to enclose the bus duct in this area.~~ The 2-hour fire-rated barriers are acceptable because of the low fire loading that exists in this area.

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Automatic fire detection and manual suppression in the form of hose stations and portable extinguishers are provided, which are adequate for this area.

A cable riser gallery in the northeast corner of this fire zone contains Division 1 cable which is redundant to the Division 2 safe shutdown circuits located in the same area. At our request, the applicant will construct a 3-hour fire-rated barrier at column line 13 to separate the Divisions 1 and 2 circuits; thus, the redundant circuits will be located in separate rooms separated by a complete 3-hour fire barrier.

Based on our review and the applicant's commitments, we conclude that the Division 2 essential switchgear room fire protection meets Appendix A to Branch Technical Position ASB 9.5-1 and is, therefore, acceptable.

9.5.6.4 Diesel-Generator Rooms

The diesel-generators are located in different fire areas separated by 3-hour fire-rated barriers. The structural roof of these rooms will be fire-proofed to provide a 3-hour fire-rated structure. Each diesel-generator room is protected by an automatic carbon dioxide fire suppression system and a fire detection system. Manual fire suppression in the form of hose stations and portable extinguishers are provided, which is adequate backup to the automatic fire protection.

Curbs to contain a liquid spill were not provided at either the entrance to the diesel-generator rooms or to the walkway separating the diesel-generator rooms. At our request, the applicant agreed to provide spill containment curbs for these locations and at the doors in the walls separating the room.

In addition, we were concerned that the location of the exterior air intakes for the Division 1 and 2 diesels could be exposed to large amounts of smoke released from either an outside transformer fire, a fire in one of the diesel-generator rooms, or from a fire in the diesel fuel tank rooms below the generators. These air intakes are on the same elevation and are located together. At our request, the applicant has agreed to move the air intakes to a location above the roof of the auxiliary building such that smoke from a fire as indicated above would not expose the air intakes.

Based on our evaluation, with the proposed modifications, we conclude that the fire protection for the diesel-generator rooms meets the guideline of Appendix A to Branch Technical Position ASB 9.5-1 and is, therefore, acceptable.

9.5.6.5 Battery Rooms

The station battery rooms are separated from the balance of the plant by 2-hour rated fire barriers. At our request, the applicant agreed to upgrade the fire doors and dampers to 3-hour rated units and to provide 3-hour fire-rated protection to the structural steel in the floor and ceiling of these areas.

Ventilation is provided for the battery rooms with the exhaust air being taken out of the rooms at floor level. Since such an arrangement will not prevent hydrogen concentrations from accumulating near the ceiling, the applicant, at our request, has agreed to modify the exhaust air systems so that exhaust air is drawn out of the battery rooms to the ceiling level.

Based on our review and the applicant's commitment, a fire in either battery room will not cause the loss of redundant emergency power to the plant. We conclude that the battery room fire protection meets the guidelines of Appendix A to Branch Technical Position ASB 9.5-1 and is, therefore, acceptable.

9.5.6.6 Reactor Building and Containment

Fire protection for the reactor building and containment include hand hose lines and portable extinguishers in the reactor building, automatic fire detection at several locations in the reactor building and in containment, and deluge water spray systems on charcoal filters. At our request, the applicant installed portable extinguishers and standpipe and hose stations at strategic locations ^{outside} inside containment. Also, because of the arrangement of the reactor building and the limited access to the lower levels, automatic fire detection systems are installed throughout the reactor building, including the refueling floor. In addition, an automatic sprinkler system is installed in the area near the open floor ceiling hatch (elevation 710 feet-6 inches) of the reactor building, to provide protection for the possible combustibles brought in through the railroad entry. The system will cover the entire railroad entry and adjacent areas.

A lube oil fire hazard was initially thought to be associated with the reactor ^{recirculation} coolant pumps located in the primary containment. The pump is lubricated ^{and} by oil and cooled by water, but the pump motor contains lube oil. The pump motor lube oil systems are contained within a metal motor housing with no external parts. Hence, an engineered oil leak collection system or additional fire protection for the pumps is not required.

The essential divisional cable penetrations are separated into opposite quadrants of the containment and reactor building. Each train of high pressure core spray, low pressure core spray, residual heat removal, and reactor coolant isolation cooling equipment is located in opposite reactor building quadrants. These systems are isolated by 3-hour fire-rated barriers. No fire hazards are nearby nor would any transient exposure fire threaten any two divisions of equipment simultaneously. However, an oil separator/sump unit is provided in the low pressure core spray/reactor core isolation cooling pump cubicle, Fire Zone 2I4, which also contains safe shutdown circuits. The separator is located below the floor level and is covered by a metal plate. At our request, the applicant has agreed to provide a fire-rated cover to replace the steel plate over the separator unit.

Any redundant cable divisions routed in close proximity to each other will be protected as indicated in Section 9.5.4 above, except for the single conduit with Division 2 cable in Fire Zone 2F. This conduit will be relocated such that a 50-foot separation in distance results between this conduit and its redundant division.

We reviewed the applicant's Fire Hazards Analysis for the areas inside the containment and reactor building and conclude that with the proposed modifications, the fire protection will meet the guidelines of Appendix A to Branch Technical Position ASB 9.5-1 and is, therefore, acceptable.

9.5.6.7 Other Plant Areas

The applicant's Fire Hazards Analysis addresses other plant areas not specifically discussed in this report. The applicant has committed to install additional detectors, portable extinguishers, and hose stations, prior to loading fuel. We find that the fire protection for these areas with the commitment made by the applicant to be in accordance with the guidelines of Appendix A to Branch Technical Position ASB 9.5-1 and the applicable sections of the National Fire Protection Association Code and are, therefore, acceptable.

9.5.7 Administrative Controls and Fire Brigade

The administrative controls for fire protection consists of the fire protection organization, the fire brigade training, the controls over combustibles and ignition source, the prefire plans and procedures for fighting fires and quality assurance. The applicant has agreed to implement the fire protection program contained in our supplemental guidance "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance," dated August 29, 1977. The applicant will implement the plant administrative controls and procedures before fuel loading.

Initially, the applicant had intended that the five man fire brigade utilize self-contained air masks which would be placed at strategic locations throughout the plant. These units would not be reserved for fire brigade use. At our request, the applicant has agreed to provide at least five self-contained, positive pressure air masks which will be reserved only for fire brigade use. These will be located at a control fire brigade staging area.

We conclude that, with the above modifications and commitments, the five-man fire brigade equipment and training will conform to the recommendations of the National Fire Protection Association, to Appendix A to Branch Technical Position ASB 9.5-1, and to our supplemental staff guidelines, dated June 1977, and, therefore, are acceptable.

9.5.8 Appendix R Statement

On May 23, 1980, the Commission issued a Memorandum and Order (CL1-80-21) which states that: "The combination of the guidance contained in Appendix A to Branch Technical Position, ASB 9.5-1 and the requirements set forth in this proposed rule define the essential elements for an acceptable fire protection program at nuclear power plants docketed for Construction Permit prior to July 1, 1976, for demonstration of compliance with General Design Criterion 3 of Appendix A to 10 CFR Part 50." On October 27, 1980, the Commission approved a rule concerning fire protection. The rule and its Appendix R were developed to establish the minimum acceptable fire protection requirements necessary to resolve certain areas of concern in contest between the staff and licensees of plant operating prior to January 1, 1979.

Although this fire protection rule does not apply to La Salle, based on our review and evaluation of the La Salle fire protection program, we conclude that La Salle meets all the requirements of Appendix R.

9.5.9 Conclusion

Based on our evaluation, we conclude that La Salle, after incorporating all the commitments to their design, will meet the guidelines of Appendix A to the Branch Technical Position ASB 9.5-1, all the requirements of Appendix R to 10 CFR Part 50, and Criterion 3 of the General Design Criteria, and therefore is acceptable. The applicant has been informed that all fire protection items discussed in Section 9.5 must be resolved prior to the fuel loading date. Our Office of Inspection and Enforcement will confirm that all items have been completed.

9.6 Other Auxiliary Systems

9.6.1 Communication Systems

The communication systems are designed to provide reliable intraplant and plant-to-offsite communications under both normal plant operation and accident conditions.

The communication systems provided for each unit at the La Salle facility consist of: (1) a public address system, (2) a dial telephone system, (3) a sound-powered telephone system, (4) an intraplant radio system, (5) a plant-to-offsite radio system, (6) a television system, and (7) a microwave system. During an emergency, in the event the control room is not available, the following communication systems can be controlled from the auxiliary equipment room: (1) the public address systems, (2) dial telephone, (3) intraplant radio system, and (4) a plant-to-offsite radio system.