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Attention: Mr. Thomas A. Ippolito, Chief
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Division of Operating Reactors

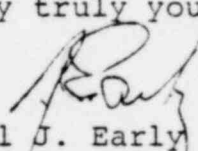
Subject: James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333
Fire Protection System

Dear Sir:

We are enclosing additional information in response to NRC staff concerns on the JAF Fire Hazards Analysis. This response is consistent with your request in the JAF Safety Evaluation Report supporting Amendment No. 47 to Facility Operating License No. DPR-59 dated August 1, 1979.

The enclosure relates to the SER Paragraph 3.2.1 Fire Hazard Analysis (PF-11).

Very truly yours,


Paul J. Early
Assistant Chief Engineer-Projects

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JAMES A. FITZPATRICK NUCLEAR POWER PLANT
FIRE HAZARDS ANALYSIS
SUPPLEMENTAL DOCUMENT No. 50-333

REFERENCE: NRC Letter of September 22, 1978, Enclosure No. 2

Response to NRC Concern PF-11: Fire Hazard Analysis

NRC Staff Concern:

The fire hazards analysis submitted April 29, 1977 and subsequent additional information submitted August 3, 1978 has not provided sufficient information for the staff to conclude that safety related systems are adequately protected from fires in all fire areas. The submittals have listed the major components located in each fire zone and described the engineering criteria established for the installation of safeguards electrical circuits; however, it has not been shown that adequate design consideration was given to preserving the operability of one division of safety related system required to achieve and maintain cold shutdown conditions given an exposure fire in any fire zone. The licensee has commenced a study to determine the exact location of electrical raceways for those systems and auxiliaries required to safely shutdown and cooldown the plant.

NRC Staff Position:

An analysis should be performed for each fire area containing safety related cables raceways (trays conduit) or components, to verify the effectiveness of the spatial separation, tray covers, and/or fire stops in preventing simultaneous damage to redundant safety systems from a possible exposure fire involving the fixed combustibles in the area and a reasonable amount of transient combustible materials, which may be in the area for routine plant operations and maintenance. In addition to the damage resulting from elevated temperatures in the immediate vicinity of the fire the analysis should consider the effects of:

- (1) Smoke and heat propagation via open stairways, hatches, and unrated penetrations in barriers;
- (2) Smoke and heat propagation via HVAC ducts not equipped with automatic closing fire dampers; and
- (3) Water spray damage from fire hose streams.

2 Where the analysis indicates that the present design is inadequate, corrective modifications should be proposed.

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Response

The James A. FitzPatrick Plant was reviewed to determine where fires within single fire areas could jeopardize the ability to safely shut down the plant. The analysis was performed using assumptions shown below. These assumptions become more conservative in light of proposed modifications to provide greater "defense in depth" against fires in the plant. These modifications include increased number of early warning fire detection systems (response to NRC request PF-19); additional fire hose stations (response to NRC request PF-20); augmented and upgraded fire door supervision (response to NRC request PF-8); revisions to assure greater independence and reliability of the fire water header system (response to NRC request PF-36); fire protecting of structural steel (response to NRC request PF-22); and major modifications to confine, detect, and fight any fire in the crescent (safeguards) area of the plant (response to NRC request PF-23).

As a result of the analysis performed in response to NRC request PF-11, further modifications are recommended in the areas listed below where it appears that safe shutdown capability may be jeopardized by fire. These recommendations to be implemented will include fire protecting 23 sections of conduit; protecting or rerouting 18 cables; fire protecting 4 cable trays; providing redundant control power to actuating valves for the pressure relief system; providing an local emergency control station for Manual ADS value operation outside of the control room/relay room/cable spreading area complex; closure of openings which connect certain safety-related areas (see attached table); and installation of a spray barrier and sleeve sealant on reactor building El 272.

These modifications will assure that the plant can be safely shut down with a minimum of operator action in the event of fire.

<u>Fire Zone</u>	<u>Area</u>
RB1W	Reactor Building Crescent Area - West
RB1E	" " " " - East
RB13A	Reactor Building El.272 - (NE Quadrant)
RB13B	" " " " - (SE ")
RB13C	" " " " - (SW ")
RB13D	" " " " - (NW ")
RB14C	" " El.300 - (SW ")
RB14D	" " " " - (NW ")
RR1	Relay Room
CS1	Cable Spreading Room
CT1	Cable Tunnel - West
CT2	Cable Tunnel - East
CT4	Cable Tunnel - 4
TB12	Turbine Building - (Mezzanine)

The following are the assumptions and design bases for the James A. FitzPatrick Plant fire hazards analysis.

1. The only consequence of fire that is considered unacceptable is the inability to safely shut down and maintain the plant in a safe shutdown mode.
2. It is assumed that:
 - a. the reactor is operating at 100 percent power when a fire occurs
 - b. only onsite power is available in achieving safe shutdown
 - c. the reactor is isolated from the main condenser.

It was also assumed that there would be manual or automatic scram at the direction of the Shift Supervisor to bring the reactor to hot shutdown.

3. As presented in the NRC Review Reminder (see footnote (1)) it was assumed that there is a 72 hr period in which to achieve cold shutdown. During this 3-day period, credit may be taken for manual system operation, as well as for reasonable repairs, etc.
4. No single or concurrent failures other than those directly attributable to the fire were considered.
5. It was initially assumed that for any fire in a given fire area, all shutdown equipment and cable within that area is lost, and a determination was made whether cold shutdown can be achieved using safe shutdown equipment in the remaining areas.
6. Loss of a cable does not automatically mean loss of components connected to that cable. Each cable was evaluated to determine whether it is essential to the functioning of the components to which it is connected before it is concluded that the component is lost.

Other failures due to hot shorts, opens, or grounds were also considered
7. If the results of the above, indicated that it is not possible to shut down the plant using shutdown equipment in other areas, the area in which the fire is assumed to have occurred was evaluated to determine where credit can be taken for separation by distance, fire detection and suppression, etc. If it appeared that safe shutdown capability was still jeopardized recommendations for plant modification were on a case by case basis.

(1) August 8, 1979, NRC "Review Reminder" from V. Benaroya to Auxiliary System Branch Staff members.

EFFECTS OF HEAT PROPAGATION THROUGH OPENINGS

<u>Areas or Zones Evaluated</u>	<u>Connected Via</u>	<u>Effects on Safe Shutdown</u>	<u>Recommendations</u>
Crescent Area East (RB-1E) to Reactor Building El 272 (RB-13B)	Directly through stairs, ductwork, cable penetration	Fire spread from RB-1E to RB-13B or vice versa does not cause loss of safe shutdown capability.	Cable penetrations to be modified pending results of PF-27 testing.
Crescent Area West (RB-1W) to Reactor Building El 272 (RB-13C)	Directly through spiral stairs, stairwell, cable penetrations, ductwork	Fire spread from RB-1W to RB-13C could jeopardize safe shutdown capability.	Enclose spiral stair, provide 3 hour fire dampers or other isolation in ductwork. Cable pene- trations to be modified pending results of PF-27 testing.
Reactor Building El 272 (RB-13; all quadrants) to Reactor Building El 300 (RB-14; all quadrants)	Directly through stairs, hatches, duct	Recommendations made ensure that for quadrants A, B, and C shutdown is still pos- sible in the unlikely event of fire spreading from RB-13 to RB-14 (or vice versa) in these quadrants.	To protect switchgear L016 from fire spreading from RB-13D to RB-14D, the open hatch beside L016 should be closed with a removable fire rated cover or other means.
Battery Rooms 1 and 2 (BR-1 and 2) to Battery Rooms 3 and 4 (BR-3 and 4)	Via corridor BR-5 through ductwork and doors	All ductwork has fire dampers and doors are fire rated.	None
Emergency Diesel Generator Rooms 1 and 2 (EG-1 and 2) to Emergency Diesel Generator Rooms 3 and 4 (EG-3 and 4)	Via switchgear rooms EG-5 and EG-6 through doors	Door is 3 hour fire rated.	None
Emergency Diesel Generator Switchgear Rooms (EG-5 to EG-6)	Via SH-1 through doors	Doors are 3 hour fire rated.	None

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Areas or
Zones
Evaluated

Connected
Via

Effects on Safe
Shutdown

Recommendations

IE Switchgear
Rooms (SW-1 to SW-2)

Via TB-1 through doors
and ducts and Via AD-3
(corridor) through
doors and Via 12" x 16"
duct

All doors 3 hour fire
rated; all ducts, except
direct connection duct
equipped with fire dampers.

Provide 3 hour fire damper
in 12" x 16" duct.

Safety Related
Pump Rooms
(SP-1 to SP-2)

Direct through door
and Via SH-1 through
48" x 36" ducts
(2 ducts in each
pump room) and
Via SH-1 through doors

All doors are 3 hour
fire rated.

Provide 3 hour fire
dampers in ductwork
into screenwell house.*

Cable Tunnel 1
(CT-1) to
Cable Tunnel 2
(CT-2)

Directly through door

Door is 3 hour fire
rated

None

Cable Tunnel 3
(CT-3) to
Cable Tunnel 4
(CT-4)

Via RR-1 through ducts

Fire spread could cause
loss of redundant
shutdown equipment.

Provide 3 hour fire dampers
in ductwork.

NOTE:

* For further details see responses to Item 3.1.8 of Safety Evaluation Report of August 1, 1979.

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