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February 6, 1979
IPN-79-2

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Director, Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. Albert Schwencer, Chief
Operating Reactors Branch No. 1
Division of Operating Reactors

Subject: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
Fire Protection Program Review

Dear Sir:

Enclosed please find ten (10) copies of Attachment 1 which contains responses to your request for additional information on the Power Authority's October 23, 1978 (IPO-163) submittal to the NRC on the subject item. The request was telecopied to us on November 28, 1978 by your Mr. L. Olshan.

In the April 15, 1977 submittal to the NRC containing Revision 1 to the report entitled, "Review of Indian Point Station Fire Protection Program", commitments were made to the NRC with respect to the hydrogen trailer located outside the Primary Auxiliary Building (Pg 8-9) and the air intake louvers on the Battery Room Doors (Pgs 8-100, 10-35).

Please be advised that the hydrogen trailer will be removed. Instead, a bulk hydrogen storage facility located at the river front will provide hydrogen to the plant through a buried line to the Primary Auxiliary Building.

The air intake louvers on the Battery Room doors will not be closed off with fire dampers. In a phone conversation on January 22, 1979 between the Authority's staff and your Mr. L. Olshan and Mr. H. George it was concluded that such modification is not required.

Very truly yours,

REGULATORY DOCKET FILE COPY

Paul J. Early
Assistant Chief Engineer-
Projects

Handwritten: A006
5/11

7902090355

bcc: Wilverding, Wayne, Davis, Gidwani, Bayne, Zulla, Lyon,
Weiser, Miller, Kilduff, Goyette, Halama - ALL WITH ATTACHMENTS

Sunder Raj, Schomer, Martin, Early Schmieder, Klausmann,
Gronberg - ALL WITHOUT ATTACHMENTS

ATTACHMENT 1

RESPONSES TO NRC REQUEST OF
NOVEMBER 28, 1978 FOR
ADDITIONAL INFORMATION
ON FIRE PROTECTION PROGRAM

POWER AUTHORITY OF THE STATE OF NEW YORK
INDIAN POINT 3 NUCLEAR POWER PLANT
DOCKET NO. 50-286
February 6, 1979

1. (11.d, & 12) Identify the assumed area of sprinkler operation for the penetration area and electrical tunnel systems (el. 33 and 43 feet)

Response

The preaction dry pipe system is being designed to ANI criteria. This criteria requires a flow rate of 30 gpm per sprinkler head when 10 heads are activated for a total system flow of 300 gpm. The sprinkler heads of this system are spaced 10 feet apart. Each sprinkler will cover the bottom surface of the overhead cable tray and the top surface of the underlying tray. The projected area of each tray covered by a single sprinkler is 22.5 square feet (i.e. 2'-3" wide by 10 feet long). Thus the total projected tray area protected by each sprinkler head is 45 square feet. This results in a spray density of 0.67 GPM/square foot of projected tray area which exceeds the NFPA Std.15-1977 requirements of 0.3 GPM/square foot.

During a phone conversation on December 11, 1978, the NRC staff requested an additional calculation be performed to verify the sprinkler system design adequacy. This requirement was further qualified by the NRC staff in a phone conversation on January 5, 1979. The Fire Protection Review Team postulated a fire in the electrical tunnel at a cable tray location covered by the sprinkler system spray heads. The staff assumed that all heads at that location were actuated and further postulated that because of the resultant smoke produced by this fire, that the heads located within 10 feet on either side of the fire location and including the corresponding heads on the opposite wall of the electrical tunnel were also actuated. For the Indian Point 3 facility, there are 5 spray heads vertically at each location, and the spray heads are located at 10 foot intervals, on either side of the electrical tunnel; this makes a total of 30 spray heads. The necessary calculations to obtain this information are being performed and the results will be made available to the NRC by April 16, 1979.

(Attached is a revised page for the response to Question No. 12 contained in Attachment 1 of our letter to you of October 23, 1978).

Question No. 12

Verify that the design of the sprinkler system protecting the electrical tunnel will comply with NFPA Std. 15-1977.

Response

The preaction dry pipe system is being designed to ANI criteria. This criteria requires a flow rate of 30 gpm per sprinkler head when 10 heads are activated for a total system flow of 300 gpm. The sprinkler heads of this system are spaced 10 feet apart. Each sprinkler will cover the bottom surface of the overhead cable tray and the top surface of the underlying tray. The projected area of each tray covered by a single sprinkler is 22.5 square feet (i.e. 2'-3" wide by 10 feet long). Thus the total projected tray area protected by each sprinkler head is 45 square feet. This results in a spray density of 0.67 GPM/square foot of projected tray area which exceeds the NFPA Std. 15-1977 requirement of 0.3 GPM/square foot.

2. (11.g) Three-hour fire-rated doors should be used in barriers separating the control building from the turbine building.

Response

Attached is a revised page for the response to Question 11.g contained in Attachment 1 of our letter to you of October 23, 1978.

g. Fire Doors and Dampers

Location (see drawings A019 and A021)

Fire Rating

Control Bldg. to Turbine
Bldg. EL. 15'-0"

U.L. 3 Hour Rating

Control Bldg. to Stair
EL. 15'-0"

U.L. 3 Hour Rating

South Wall of Control
Bldg. to Sump Pump Rm.
EL. 15'-0"

U.L. 1½ Hour Rating

West Wall to Diesel
Gen. Bldg. EL. 15'-0"

U.L. 3 Hour Rating

Diesel Gen. Bldg.
E. 15'-0" Between
the three Gen. Rms.
(4 doors)

U.L. 3 Hour Rating

East Wall of Diesel
Gen. Bldg. EL. 15'-0"

U.L. 3 Hour Rating

Control Bldg. to Turbine
Bldg. EL. 36'-9"

U.L. 3 Hour Rating

Control Bldg. to Stair
EL. 33'-0"

U.L. 1½ Hour Rating

South Wall of Control
Bldg. to Air EL. 33'-0"

U.L. 1½ Hour Rating

West Wall of Control
Rm. to Turbine
Bldg. EL. 53'-0"

Bullet resistant (class 4)
as required by 10 CFR 73.55
(c) (6). Equivalent to
a 3 Hour Rating

East Wall of Control
Rm. to Stair EL. 53'-0"

Bullet resistant (class 4)
as required by 10 CFR 73.55
(c) (6). Equivalent to
a 3 Hour Rating

Northeast Wall of Diesel
Gen. Bldg. EL. 43'-6"

U.L. 3 Hour Rating

North End of Diesel Gen.
Bldg. EL. 43'-6" (Between
the Gen. Rms., Two doors)

U.L. 3 Hour Rating

3. (11.g) Justify the lack of fire dampers in ventilation ductwork penetrations of fire barriers enclosing the switchgear room, cable spreading room, and each diesel generator room.

Response

There are no ductwork penetrations passing through the control building from other buildings in this area of the switchgear room, cable spreading room and each diesel generator room. All ductwork exhausts to the outside of the control building. A small section of ductwork passes through the overhead of the cable spreading room and exhausts through an inline fan to the outside. This line ventilates the room in the 15' elevation of the control building that houses the control room air conditioner.

Attached is a revised page 7-3 of the Authority's June 29, 1978 (IPO-125) submittal to the NRC on the subject item. This page corrects and/or amplifies the description of the ducts in the Electrical Tunnels and the Control Building.

Also attached is a list of six ducts/louvers which were included in the response to Question 7 of the Authority's June 29, 1978 submittal to the NRC. These ducts/louvers were specifically identified by the NRC staff in a phone conversation on December 19, 1978. Included with the location of each duct/louver is the size, description and reasoning why a 3 hour rated fire damper is not required for each case.

Electrical Tunnels

- El. 33' - Zone 7A: 4' x 5' louver to outside air inlet.
El. 15' - Zone 7A: 45" x 60" louver to outside air inlet.

Control Building

- El. 15' - Zone 14: 5' x 3'-9" louver in east wall into duct in hallway to Zone 34A.
El. 33' - Zone 11: 4' x 5' opening through Zone 35A and louver to outside air inlet.
El. 15' - Zone 35A: 18" x 20" duct thru duct chase from Zone 34A.
El. 15' - Zone 14: 4' x 3'-9" duct opening thru south wall into Zone 34A.
El. 33' - Zone 11: 18" x 12" duct thru south east corner from duct chase into Zone 34A.
El. 33' - Zone 11: 3'-9" x 6'-0" duct register thru south wall into Zone 34A.
El. 33' - Zone 12: 6" x 11" duct thru roof thru Zone 11 to outside.
El. 33' - Zone 13: 6" x 11" duct thru roof thru Zone 11 to outside.
El. 33' - Zone 11: 3' x 12' louver in south wall to outside.
El. 15' - Zone 14: 3' x 12' louver in south wall to outside.

Doors which do not carry an Underwriters Laboratory Label will be replaced.

Electric Tunnels

El. 33' - Zone 7A: 4' x 5' louver to Zone 14 then duct up to Zone 11. This should be changed to read "4' x 5' louver to outside air inlet". This inlet is open to the transformer yard and does not pass through Zone's 11 or 14.

Control Building

El. 15' - Zone 14: 40" x 44" duct through south wall into Zone 34A. This duct should be deleted from this list since it is outside Zone 14 in the hallway to the stairwell.

El. 15' - Zone 14: 18" x 12" duct thru ceiling into Zone 11. This duct should be deleted from the list. It runs from Zone 35A into a duct chase.

El. 33' - Zone 11: 10" x 12" duct thru south wall into Zone 34A. This duct should be deleted from this list since it runs inside the stairwell, not Zone 11, up to the toilet and locker room.

El. 33' - Zone 11: 18" x 12" duct thru south wall into Zone 34A. This should be changed to read "18" x 12" duct thru south east corner from duct chase". Approximately 5 linear feet of ductwork including one 90° elbow past thru Zone 11.

El. 33' - Zone 11: 3'9" x 6'0" duct register thru south wall into Zone 34A. This register has a damper provided with fusible links. The section of Zone 34A into which this register exhausts contains Control Building exhaust fans 31 and 32 and is separated from the other half of Zone 34A by a floor to ceiling metal partition. Additionally, the ventilation system for the cable spreading area exhausts through a separate area of Zone 34A from the ventilation exhaust for the switchgear room. These two exhaust systems are separated by a floor to ceiling metal partition.

4. (11.h) Identify the method of actuation for the automatic CO₂ systems to be installed in the relay room and cable spreading room.

Response

Attached is a revised page to Question 11 contained in Attachment 1 of our letter to you of October 23, 1978.

Cable Tunnel Entry
EL. 33'-0"

U.L. 3 Hour Rating

Fire Damper Between
Turbine Bldg. & Control
Bldg. EL. 33'-0"

U.L. 3 Hour Rating

Fire Damper Between
Turbine Bldg. & Control
Bldg. EL. 15'-0"

U. L. 3 Hour Rating

h. CO₂ System

<u>System</u>	<u>Concen- tration</u>	<u>Application Time (Soak Time)</u>	<u>Actuation Method</u>
Cable spreading rm. Control Bldg. EL. 33'-0"	50%	Total Flooding (10 min.)	Early warning by smoke detectors. Automatic actuation by heat detectors. Second shot by local pushbutton.
Relay Room Control Bldg. EL. 15'-0"	50%	Total Flooding (10 min.)	Early warning by smoke detectors. Automatic actuation by heat detectors. Second shot by local pushbutton.

5. (17) Identify which sprinkler or deluge system has the maximum water demand. Identify this demand.

Respond

Preliminary calculations indicate that the largest water demand will be 3,250* gpm for Wet Pipe System No. 7 serving the Turbine Generator Building elevation 36'-9" (this 3,250 gpm flow includes 1000 gpm for hose streams). The system pressure required to meet this demand is 84* psig.

A new pump will be incorporated into the fire protection system which will deliver the required 3,250* gpm at a discharge pressure of 90* psig, thereby, exceeding the system requirement of 84* psig.

*These figures are preliminary since the system is still under design.

6. (P3) Verify that fixed emergency lighting units will be placed in all areas providing access to safety-related areas unless access area lighting is on a different circuit from lighting for the safety-related area, and if wiring for access lighting is not in the safety-related area.

Response

Attached is a revised page for the response to Staff Position P3 contained in Attachment 2 of our letter to you of October 23, 1978.

STAFF POSITION P3

Normal and emergency lighting could potentially be damaged for fires in various areas. To preclude loss of lighting required in a fire situation, fixed lighting units consisting of eight hour battery packs should be provided for access lighting in passage ways to safety-related areas and in the control room or it should be shown that fires in various areas would not cause loss of lighting in the control room or in passage ways which provide access to safety-related areas.

Response

The Power Authority will install fixed lighting units consisting of eight hour battery packs in the control room and areas providing access to locations containing safe shutdown components where fire could damage normal and emergency lighting circuits, thereby hampering fire fighting efforts.

This lighting will be provided where access area lighting is not on a different circuit from lighting for the safety related area and if wiring for access lighting is in the safety related area.

7. (P4) (a) Cable penetration fire stops should be upgraded to 3-hour fire rated in the following fire barriers; barriers between the diesel generator building and control building; barriers between diesel generator rooms; and barriers between the turbine building and control building.
- (b) To conform to the referenced design tested by Florida Power and Light Company, the IP-3 firestops that will be upgraded by the addition of "Marinite" collars and sleeves should also include "Cera-Felt" blanket or equivalent under the sleeves and application of "Flame-mastic" or equivalent flame retardant coating for a distance of 18 inches from either side of the firestop.

Response

(a) and (b) The Power Authority will conform to the above requirements for firestops.

8. (P7) The response to position P7 indicates that PASNY is evaluating design improvements that may be made to the reactor coolant pump lube oil systems to reduce the potential for leakage. However, the adequacy of the existing oil collection system has not been demonstrated to collect oil from potential leakage points that may remain after modification to the lube oil system.

To demonstrate adequacy of protection for potential reactor coolant pump lube oil fires, the oil collection systems should be evaluated to assure its adequacy to collect leakage from potential leakage points identified in staff position P7 where these leakage points will not be removed by design improvements to the lube oil system. Modifications to the oil collection system should be made if required to collect leakage from potential leakage points which are found not to have adequate protection with the existing collection system. Drawings should be provided to demonstrate the adequacy of the oil collection system and to the lube oil system where the evaluation has been completed.

Response

In addition to the existing oil drip pans installed on the reactor coolant pumps, the following modifications to the oil collection system will be made:

A drip pan will be provided directly below the oil fill pipe and the upper alarm unit and associated gasketed joints. A similar drip pan will be provided directly below the lower alarm control unit. The pans will be approximately one foot deep covering the lower half of the unit. A full enclosure is not necessary since the oil is at atmospheric pressure, consequently there is no chance of a spray.

The upper bearing cooler will be completely enclosed in a spray shield consisting of a series of interlocking cylindrically shaped shields and a round cover at the top and the bottom. This shield will also collect any leakage from all the gasketed joints associated with the cooler.

The thrust bearing oil lift pump and all associated valves, piping, gasketed joints and instruments will be completely enclosed in a box shaped spray shield. Hinge doors will be provided for access to instruments and a gasketed lexan window will be provided to permit reading the oil pressure gauge.

Finally, drainage from all drip pans and spray shields will be piped to a container with capacity to accommodate leakage of oil contained in the pump motor.

9. (P8) The response to staff position P8 does not clearly indicate that hose stations will be provided inside of containment. Verify that fire hose stations will be provided in containment.

Response

Attached is a revised page for the response to Staff Position P8 contained in Attachment 2 to our letter to you of October 23, 1978.

STAFF POSITION P8

Manual hose stations should be provided inside containment for suppressing fires that may occur. Sufficient hose outlets, lengths of hose, and capacity should be provided to reach all areas containing significant quantities of electrical cables in trays and the reactor coolant pump area with an effective fire fighting hose stream.

Response

Manual hose stations will be provided inside containment to reach all areas containing electrical cables in trays required for safe shutdown and the reactor coolant pump areas.

10. (P11) Provide a description of the evaluation performed, and assumptions used, of the effects of water spray due to postulated cracks of fire protection piping or inadvertent operation of suppression systems.

Response

Attached is a revised page for the response to Staff Position P11 contained in Attachment 2 of our letter to you of October 23, 1978.

STAFF POSITION P11

Section 8.5 of the "Review of Indian Point Station Fire Protection Program" is not clear as to the effects on safety-systems of water sprays resulting from cracks in fire water piping or inadvertent system operation. Shields should be provided to prevent water from significantly impairing the functions of safety-related equipment. Additionally, where new suppression systems or piping are installed, protection of safety systems from water spray or flooding damage due to suppression system failure or inadvertent operations should be provided.

Response

In the plant with the present fire water piping configurations, there is no possibility that the function of safety related equipment could be significantly impaired by water spray resulting from cracks in fire water piping or inadvertent system operation. This review has been documented in the FSAR Question 9.6, 9.16 and Section 9.6, pg 9.6.2-3. This condition is being considered in the design and installation of new fire water piping systems.

11. (P14) The response to staff position P14 indicates that further evaluation of the routing of control cables in the switchgear room is being performed. Identify when the results of this evaluation will be provided.

Response

A previous response dated October 23, 1978 demonstrates the adequacy of power cable separation for redundant auxiliary feedwater pump, charging pump, safety injection pump and service water pump motor loads. Further study has been performed to analyze the adequacy of separation in the switchgear room of redundant control cable for the same four pump systems. After review of the control cable routing, we conclude that there is adequate separation or fire protection between redundant circuits. The basis for this conclusion is as follows:

Auxiliary Feedwater Pumps

Reference Drawings: 9321-F-30563, 31583, 32783

At one point in the switchgear room control cables for redundant Pumps 31 and 33 are carried in horizontal ladder type trays, one above the other for approximately seven feet of run with only 1'-0" of vertical separation. The Authority will provide fire protection for these control cables.

Charging Pumps

Reference Drawings: 9321-F-30563, 30893, 31493, 31583, 32783

Control cables for redundant Pumps 32 and 33 are carried in the same trays as the cables for Auxiliary Feedwater Pumps 31 and 33, respectively, and encounter the same problem on inadequate separation as described in the preceding paragraph. The result is Charging Pumps 32 and 33 cannot be considered redundant to one another in the event of switchgear room cable fire.

Control cable for Charging Pump 31 follows a different routing through the switchgear room, widely separated from the routing of Pumps 32 and 33. Thus, the requirement is met that at least one charging pump be operable in the event of switchgear room fire.

11. (P14) (con't)

Safety Injection Pumps

Reference Drawings: 9321-F-30563, 31493, 31583, 32783

At one point in the switchgear room, control cable for redundant Pumps 31 and 32 are carried in horizontal ladder type trays, one above the other for approximately six feet of run with only 1'-0" of separation. This represents inadequate separation, and the feasibility of constructing a barrier between trays is questionable in view of the limited space available.

Control cable for Pump 33 follows a different routing through the switchgear room, widely separated from the routing of Pumps 31 and 32. Thus, the requirement is met that at least one Safety Injection Pump be operable in the event of switchgear room fire.

Service Water Pumps

Reference Drawings: 9321-F-30563, 31493, 31583, 32783, 30893

To assess the effects of a damaging cable fire in the switchgear room on service water pump availability, fires were postulated in several switchgear room locations where concentrations of pump control cables occur. The two most damaging locations were the southeast corner of the room in the trays carrying cables to the Service Water Pump Remote Control Panel and in the middle of the north wall of the room in the vicinity of a cable tray rise. A fire in either one of these locations could result in the loss of six service water pumps, leaving three pumps available. Three pumps represent one-third (1/3) of the total pumping capacity, thus meeting the requirement that at least one set of equipment be operable in the event of a damaging cable fire in the switchgear room.

12. (P15) The response to position P15 indicates that further evaluation is being performed of required cable spreading room fire protection. Verify that staff position P15 will be met. Describe modifications to be performed to meet staff position P15.

Response

Our studies on this position are continuing. We anticipate that the response will be provided to the NRC by April 16, 1979.

13. (P16) The response to staff position P16 did not completely address the areas requiring fire detection. Verify that smoke detectors will be provided in the residual heat removal pump rooms and in the containment spray pump room.

Response

Attached is a revised page for the response to Staff Position P16 contained in Attachment 2 to our letter to you of October 23, 1978.

STAFF POSITION 16

Provide smoke detectors alarming in the control room in the following locations containing safety-related equipment; charging pump rooms; residual heat removal pump rooms; containment spray pump room; component cooling water pump room; auxiliary feedwater pump room; corridor at elevation 55' of PAB; walk-in panel with charging pump controls in control room and in fire area 59A.

Response

Additional smoke detectors alarming in the Control Room will be provided for the locations containing safety-related equipment; charging pump rooms; residual heat removal pump rooms; containment spray pump room; component cooling water pump rooms; auxiliary feed water pump room; corridor at elevation 55' of PAB wall panel with charging pump controls in Control Room and in fire area 59A.