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April 16, 1979
IPN-79-16

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 fine ten (10) copies of Attachment 1 which contains supplemental responses to Questions 1, 11 and 12 of our letter to you of February 6, 1979 and supercedes our responses to Question 1 and Staff Position 14 and 15 of our letter to you of October 23, 1978.

This information provides the evaluations requested by you in Table 3.2 (p 3-7) of your Safety Evaluation Report on the subject item dated March 6, 1979, and referenced in Amendment No. 24 to Facility Operating license No. DPR-64.

Very truly yours,

Paul J. Early
Assistant Chief Engineer-
Projects

A006 S 1/1
COLOR-CODED DRWG TO FILES

7904230262

CABLE	FROM	TO	CKT. CODE	PURPOSE	ROUTING
AL8-JB4	480V Swgr 32 Sect 15B & C	Supv Pnl Shf Electrical	DA1	Control Ch 1	53E,5YM,14N,80N,92L,34Q,33Q,32Q,31Q,30Q, 29Q,28Q,27Q,26Q,25Q,24Q,23Q,46M,45M,2PX
AN5-JB4	480V Swgr 31 Sect 18B & C	Supv Pnl Shf Electrical	DB1	Control Ch 2	05X.5YG1.75N,91N,53H,09P,07P,71Q,70O,69Q, 68Q,67Q,66Q,65Q,64Q,63Q,62Q,15M,14M,2UX
AS4-JB4	480V Swgr 31 Sect 29B & C	Supv Pnl SHf Electrical	DD1	Control Ch 4	40X,5UQ2,78N,42K,27L,21L,20L,19L,18L,17L, 16M,2SX
BC2-BF8	15 KVA Stepdown XFMR 32	7.5 KVA Solatron 32	FC3	120/208V Power	1ZQ
BC2-DD9	15 KVA Stepdown XFMR 32	480V MCC 36B Compt 1FDL	FC1	480V Power Ch 3	1YY,23K,24K,25K,26K,27K,28K,29K,30K,31K, 32K,33K,34K,37K,42N,34G,12G,4AS3,1EJ
BF8-PE6	7.5 KVA Solatron 32	118V AC Inst. Bus 34	FC3	120/208V Power	1ZR,22K,21K,1TQ5
DB4-W78	480V MCC 36A Compt 5RM	PB W78 Diesel Gen. Bldg	FB1	480V Power Ch 2	8ME,4BG5,23G,28N,01L,91Q,6QP
DI5-W80	480V MCC 36B Compt 5RM	PB W80 Diesel Gen Bldg	FA1	480V Power Ch 1	2ET,4AT6,13H,28G,38N,57K,47Q,6QN
DQ3-W86	480V MCC 37 Compt 7FMR	PB W86 Diesel Gen Bldg	FA1	480V Power Ch 1	1EK,4AD1,11G,13H,28G,38N,57K,47Q,46Q,45Q, 5UT1,6QT,6WB,6TV,6NF
EF3-W81	480V MCC 39 Compt 4M	PB W81 Diesel Gen Bldg	FB2	480V Power	1WA,87Q,88Q,89Q,90Q,02P,6QZ
GC9-PC9	Static Inverter 33	125V DC Power Pnl 33	FD4	DC Power Ch 4	5RW,90N,87N,82N,81N,5RY
GC9-PE7	Static Inverter 33	118V AC Inst Bus 33	FD3	120/208V Power	5RU,10L,09L,1ZY5
GD1-PC1	Inverter No. 31	125V DC Power Pnl 31	FB4	DC Power Ch 2	1WD2,83Q,84Q,92Q,07Q
GD1-PE8	Inverter No. 31	118V AC Inst Bus 31	FB3	120/208V Power	1WD1,82Q,81Q,80Q,1ZU5
GD2-PC2	Inverter No. 32	125V DC Power Pnl 32	FA4	DC Power Ch 1	1WF,06Q
GD2-PE9	Inverter No. 32	118V AC Inst Bus 32	FA3	120/208V Power	1WF1,05Q,41Q,40Q,39Q,1ZV4
H27-JF2/1	Pen H27 Inst Ch III	R10 (RK B2) RX Prot Ch 3	JC1	Inst Channel 3	0DX,52J,53J,54J,60J,63J,14G,07G,10G,12G, 34G,42N,36K,95M,4XP
H27-JF2/2	Pen H27 Instr Ch III	R10 (RK B2) RX Prot Ch 3	JC1	Inst Channel 3	0DX,52J,53J,54J,60J,63J,14G,07G,10G,12G, 34G,42N,36K,95M,4XP
H27-JF2/3	Pen H27 Instr Ch III	R10 (RK B2) RX Prot Ch 3	JC1	Inst Channel 3	0DX,52J,53J,54J,60J,63J,14G,07G,10G,12G, 34G,42N,36K,95M,4XP
H27-JF2/4	Pen H27 Instr Ch III	R10 (RK B2) RX Prot Ch 3	JC1	Inst Channel 3	0DX,52J,53J,54J,60J,63J,14G,07G,10G,12G, 34G,42N,36K,95M,4XP
H27-JF3/1	Pen H27 Instr Ch III	R09 (RK B3) RX Prot Ch 3	JC1	Inst Channel 3	0DX,52J,53J,54J,60J,63J,14G,07G,10G,12G, 34G,42N,36K,95M,94M,4XQ

CABLE	FROM	TO	CKT. CODE	PURPOSE	ROUTING
H27-JF3/2	Pen H27 Instr Ch III	R09 (RK B3) RX Prot Ch 3	JC1	Inst Channel 3	0DX,52J,53J,54J,60J,63J,14G,07G,10G, 12G,34G,42N,36K,95M,94M,4XQ
H27-JF6	Pen H27 Instr Ch III	R17 (RK B6) P+Level Ctl	JC2	Misc Inst	0DX,52J,53J,54J,60J,63J,14G,07G,10G, 12G,34G,42N,36K,95M,94M,4XR,4XU
H33-JF4	Pen H33 Instr Ch I	R25 (RK B4) FW Ctl	JA2	Misc Inst	0GE,24J,23J,13J,29J,32J,11G,13H,28G, 38N,57K,84M,86M,5DX,4XS
H33-JF5	Pen H33 Instr Ch I	R18 (RK B5) FW Ctl	JA2	Misc Inst	0GE,24J,23J,13J,29J,32J,11G,13H,28G, 38N,57K,84M,86M,5DX,4XT
H33-JG2/5	Pen H33 Instr Ch I	R04 (RK A1) RX Prot Ch 1	JA1	Inst Channel 1	0GE,24J,23J,13J,29J,32J,11G,13H,28G, 38N,57K,84M,26N,5AX
H33-JG2/6	Pen H33 Instr Ch I	R04 (RK A1) RX Prot Ch 1	JA1	Inst Channel 1	0GE,24J,23J,13J,29J,32J,11G,13H,28G, 38N,57K,84M,26N,5AX
H33-JG5/1	Pen H33 Instr Ch I	R01 (RK A4) RX Prot Ch 1	JA1	Inst Channel 1	0GE,24J,23J,13J,29J,32J,11G,13H,28G, 38N,57K,84M,86M,5FX
H33-JG5/2	Pen H33 Instr Ch I	R01 (RK A4) RX Prot Ch 1	JA1	Inst Channel 1	0GE,24J,23J,13J,29J,32J,11G,13H,28G, 38N,57K,84M,86M,5FX
H35-JF4	Pen H35 Instr Ch II	R25 (RK B4) FW Ctl	JB2	Misc Inst	0EE,39J,40J,50J,51J,15G,22G,23G,28N, 01L, 69M,67M,68M,5IX
H35-JF5	Pen H35 Instr Ch II	R18 (RK B5) FW Ctl	JB2	Misc Inst	0EE,39J,40J,50J,51J,15G,22G,23G,28N, 01L,69M,67M,68M,5IX
H35-JH4/1	Pen H35 Instr Ch II	R05 (RK A10) RX Prot Ch 2	JB1	Inst Channel 2	0EE,39J,40J,50J,51J,15G,22G,23G,28N, 01L,69M,5MX
H35-JH4/2	Pen H35 Instr Ch II	R05 (RK A10) RX Prot Ch 2	JB1	Inst Channel 2	0EE,39J,40J,50J,51J,15G,22G,23G,28N, 01L,69M,5MX
H35-JH1/5	Pen H35 Instr Ch II	R08 (RK A7) RX Prot Ch 2	JB1	Inst Channel 2	0EE,39J,40J,50J,51J,15G,22G,23G,28N, 01L,69M,67M,68M,5JX
H35-JH1/4	Pen H35 Instr Ch II	R08 (RK A7) RX Prot Ch 2	JB1	Inst Channel 2	0EE,39J,40J,50J,51J,15G,22G,23G,28N, 01L,69M,67M,68M,5JX
H42-JF9/1	Pen H42 Instr Ch IV	R13 (RK B9) RX Prot Ch 4	JD1	Inst Channel 4	0XG,68J,69J,73J,74J,90J,01G,02G,08G, 18G,31G,32N,25L,11N,12N,4XX
H42-JF9/2	Pen H42 Instr Ch IV	R13 (RK B9) RX Prot Ch 4	JD1	Inst Channel 4	0XG,68J,69J,73J,74J,90J,01G,02G,08G, 18G,31G,32N,25L,11N,12N,4XX
H42-JF9/3	Pen H42 Instr Ch IV	R13 (RK B9) RX Prot Ch 4	JD1	Inst Channel 4	0XG,68J,69J,73J,74J,90J,01G,02G,08G, 18G,31G,32N,25L,11N,12N,4XX
H42-JF9/4	Pen H42 Instr Ch IV	R13 (RK B9) RX Prot Ch 4	JD1	Inst Channel 4	0XG, 68J,69J,73J,74J,90J,01G,02G,08G, 18G,31G,32N, 25L,11N,12N,4XX

CABLE	FROM	TO	CKT. CODE	PURPOSE	ROUTING
H42-JG1	Pen H42 Instr Ch IV	R12 (RK B10) RX Prot Ch 4	JD1	Inst Channel 4	0XG,68J,69J,73J,74J,90J,01G,02G,08G, 18G,31G,32N,25L,11N,12N,4XZ
JB4-JC3/1	Supv Pnl Shf Electrical	Supv Pnl SBF2 Safeguards	DA1	Control Ch 1	2PX,45M,46M,23Q,24Q,25Q,26Q,27Q,28Q, 58M,57M,2XP
JB4-JC3/2	Supv Pnl Shf Electrical	Supv Pnl SBF2 Safeguards	DB2	Misc 120V AC/DC	2UX,14M,15M,62Q,63Q,64Q,65Q,66Q,67Q, 28M,27M,2XU
JB4-JC3/3	Supv Pnl Shf Electrical	Supv Pnl SBF2 Safeguards	DD1	Control Ch 4	2SX,16M,17L,18L,19L,29M,2XS
JB4-PQ1	Supv Pnl Shf Electrical	Emerg DG 32 Control Pnl	DA1	Control Ch 1	2PX,45M,46M,23Q,24Q,25Q,26Q,27Q,28Q, 29Q,30Q,31Q,32Q,1SQ,6QT1,6WB1,6TT
JB4-PP9/1	Supv Pnl Shf Electrical	Emerg DG 31 Control Pnl	DD1	Control Ch 4	Cable Data Inconsistent w/RWY 6TN1, Intended: 6TH1,2SX,16M1,17L1,18L1, 1SP,6WC1
JB4-PP9/2	Supv Pnl Shf Electrical	Emerg DG 31 Control Pnl	DC1	Control Ch 3	2MX,44M,27K,28K,6PK,6QR3,6WC3,6TN2
JB4-PQ2	Supv Pnl Shf Electrical	Emerg DG 33 Control Pnl	DB1	Control Ch 2	2UX,14M,15M,92K,93K,94K,95K,96K,07P, 09P,53H,1SR,6QV1,6WA1,6UB
JB4-PQ2/1	Supv Pnl Shf Electrical	Emerg DG 33 Control Pnl	DB2	Misc 120V AC/DC	2UX,14M,15M,92K,93K,94K,95K,96K,07P, 09P,53H,1SR,6QV1,6WA1,6UB
JB8-PQ2	Supv Pnl SBF1 Safeguards	Emerg DG 33 Control Pnl	DB2	Misc 120V AC/DC	2XT,27M,28M,95K,96K,07P,09P,53H,1SR 6QV1,6WA1,6UB
JC3-PP9/1	Supv Pnl SBF2 Safeguards	Emerg DG 31 Control Pnl	DD3	Ct Leads	2XS,29M,19L,1SP,6QR1,6WC1,6TN
JC3-PP9/2	Supv Pnl SBF2 Safeguards	Emerg DG 31 Control Pnl	DD2	Misc 120V AC/DC	2XS,29M,19L,1SP,6QR1,6WC1,6TN
JC3-PQ1/1	Supv Pnl SBF2 Safeguards	Emerg DG 32 Control Pnl	DA3	Ct Leads	2XP,57M,58M,29Q,30Q,31Q,32Q,1SQ,6QT1, 6WB1,6TT
JC3-PQ1/2	Supv Pnl SBF2 Safeguards	Emerg DG 32 Control Pnl	DA2	Misc 120V AC/DC	2XP,57M,58M,29Q,30Q,31Q,32Q,1SQ,6QT1, 6WB1,6TT
JC3-PQ2/1	Supv Pnl SBF2 Safeguards	Emerg DG 33 Control Pnl	DB3	Ct Leads	2XU,27M,28M,95K,96K,07P,09P,53H,1SR, 6QV1,6WA1,6UB
JC3-PQ2/2	Supv Pnl SBF2 Safeguards	Emerg DG 33 Control Pnl	DB2	Misc. 120V AC/DC	2XU,27M,28M,95K,96K,07P,09P,53H,1SR, 6QV1,6WA1,6UB
JE2-PP9	Supv Pnl SMF Safety Inj	Emerg DG 31 Control Pnl	DD2	Misc 120V AC/DC	2AX,08M,15L,16L,17L,18L,1SP,6QR1,6WC1, 6TN
JE2-PQ1	Supv Pnl SMF Safety Inj	Emerg DG 32 Control Pnl	DA2	Misc 120V AC/DC	1XY,37M,39M,19Q,20Q,21Q,22Q,23Q,24Q, 25Q,26Q,27Q,28Q,29Q,30Q,31Q,32Q,1SQ, 6QT1,6WB1,6TT

[illegible]	FROM	TO	CKT. CODE	PURPOSE	ROUTING
[illegible]	Supv Pnl SMF Safety Inj	Emerg DG 33 Control Pnl	DB2	Misc 120V AC/DC	2CX,06M,07M,90K,91K,92K,93K,94K,95K,96K, 07P,09P,53H,1SR,6QV1,6WA1,6UB
[illegible]	R09 (RK B3) RX Prot Ch 3	118V AC Inst Bus 34	DC1	Control Ch 3	4XQ,92M,93M,34K,33K,32K,31K,30K,29K,28K, 27K,26K,25K,24K,23K,22K,21K,93Q,1GX
[illegible]	R12 (RK B10) RX Prot Ch 4	118V AC Inst Bus 33	DD1	Control Ch 4	4XZ,12N,11N,24L,23L,22L,21L,20L,19L,18L, 17L,16L,15L,14L,13L,12L,11L,10L,09L,94Q, 1HX
JG5-PE9	R01 (RK A4) RX Prot Ch 1	118V AC Inst Bus 32	DA1	Control Ch 1	5FX,86M,83M,99J,82M,81M,6JX,40L,6KX,14Q, 13Q,12Q,11Q,98Q,1NX
JH1-PE8	R05 (RK A10) RX Prot Ch 2	118V AC Inst Bus 31	DB1	Control Ch 2	5MX,66M,65M,64M,53L,05P,52L, 49L,5TJ1
JI2-PQ2	Ctl Rm RKG3 SIS Prot Log	Emerg DG 33 Control Pnl	DB1	Control Ch 2	1ZA1,7GE,50Q,51Q,52Q,53Q,54Q,55Q,56Q, 57Q,58Q,59Q,60Q,61Q,62Q,63Q,64Q,65Q,66Q, 67Q,68Q,69Q,70Q,71Q,07P,09P,53H,1SR, 6QV1,6WA1,6UB
JI2-PQ2/1	Ctl Rm RKG3 SIS Prot Log	Emerg DG 33 Control Pnl	DB1	Control Ch 2	1ZA1,7GE,50Q,51Q,52Q,53Q,54Q,55Q,56Q, 57Q,58Q,59Q,60Q,61Q,62Q,63Q,64Q,65Q,66Q, 67Q,68Q,69Q,70Q,71Q,07P,09P,53H,1SR, 6QV1,6WA1,6UB
JJ1-PQ1	Ctl Rm RKG5 SIS Actu Log	Emer DG 32 Control Pnl	DA1	Control Ch 1	1ZF3,43L,01Q,44L,45L,88P,89P,33L,34L,34M, 99L,6LX,17Q,18Q,19Q,20Q,21Q,22Q,23Q,24Q, 25Q,26Q,27Q,28Q,29Q,30Q,31Q,32Q,1SQ, 6QT1,6WB1,6TT1
JJ1-PQ1/1	Ctl Rm RKG5 SIS Actu Log	Emerg DG 32 Control Pnl	DA1	Control Ch 1	1ZF3,43L,01Q,44L,45L,88P,89P,33L,34L,34M, 99L,6LX,17Q,18Q,19Q,20Q,21Q,22Q,23Q,24Q, 25Q,26Q,27Q,28Q,29Q,30Q,31Q,32Q,1SQ, 6QT1,6WB1,6TT1

ATTACHMENT 1

SUPPLEMENTAL INFORMATION TO
NRC REQUEST OF SEPTEMBER 29, 1978
AND NOVEMVER 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
APRIL 13, 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. 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). This results in a spray density of 1.34 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 hydraulics calculations have been performed to determine the spray density of the most remote 30 sprinkler heads in the electrical tunnels, elevations 33' and 43'. The spray density at elevation 33' is 1.15 GPM/square foot and that at elevation 43' is 1.03 GPM/square foot.

(Attached are revised responses to Questions No. 11 and 12 contained in Attachment 1 of our letter to you of October 23, 1978).

Question No. 11

Provide the following design criteria details for proposed additons to fire protection systems:

a. Fire Pumps - number, rated capacity, rated pressure, type drive, electrical power arrangement, starting arrangement.

b. Fire Water Tanks - number, capacity

c. Fire Underground - drawings on location of piping, valves and hydrants.

d. Sprinklers (in safety-related areas) - type system, actuation method, design densities, water flow alarms.

e. Hose Stations - minimum nozzle pressure at design flow rates.

f. Fire Detection Systems - emergency power supply, electrical circuit supervision, use of approved components.

g. Fire Doors and Dampers - locations, fire ratings.

h. CO_2 Systems - concentrations, soak times, actuation method.

Response

a. Fire Pumps

Number	2
Rated capacity	2500 GPM
Rated pressure	110 psig
Type of drive	one electric motor driven one diesel engine driven
Electrical power arrangement	The Motor Driven Fire Pump will have its normal power supply from a new 480 volt switchgear to be located in the turbine bldg. at elevation 15 feet. A stand-by power feed will be provided from an existing 480 volt Class 1E Switchgear. If the normal power supply fails, the pump can be run from the standby Class 1E power source.

Starting arrangement	Automatic, on pressure drop in the main fire loop below a pre-set point.

b. Fire Water Tanks

Number	2
Capacity	350,000 gallons each, 300,000 gallons in each tank are reserved for Fire Protection

c. Fire Underground — Attached is a drawing M095 showing the piping arrangement, valves and hydrants.

d. Sprinklers (in safety-related areas)

Area	Type of System	Actuation Method	Design Densities	Water Flow Alarms
Diesel Gen. Bldg. Gen.# 31,32, & 33	Wet-pipe Hydraulic design	Automatic	0.3 GPM/Ft^2 for entire area.	Yes
Penetration Area & Tunnel EL.33'-0"	Dry-pipe preaction	Automatic	30 GPM/Sprinkler (1.34 GPM/Ft.^{2} of cable tray area).	Yes
Penetration Area & Tunnel EL.43'-0"	Dry-pipe preaction	Automatic	30 GPM/Sprinkler (1.34 GPM/Ft.^{2} of cable tray area).	Yes
Primary Aux. Bldg. EL.55'-0"	Dry-pipe Preaction	Automatic	Minimun of 0.3 GPM/Ft.^{2} of cable tray area.	Yes

e. Hose Stations — Minimum nozzle pressure at design flow rates shall be in conformance with NFPA standard 14, not less than 65 psi at the outlet with 500 GPM flowing from the outlet.

f. Fire Detection Systems — Shall have emergency power supply. All circuits shall be electrically supervised. All components shall be UL approved and FM listed.

g. Fire Doors and Dampers

Location (see drawings A019 and A021)	Fire Rating
Control Bldg. to Turbing 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. EL. 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 Room to Turbine Bldg. EL. 53'-0"	Bullet resistant (class 4 as required by 10 CFR 73.55 (c) (6). Approved by American Nuclear Insurers (ANI).
East Wall of Control Room to Stair EL. 53'-0"	Bullet resistant (class 4) as requested by 10 CFR 73.55 (c)(6). Approved by American Nuclear Insurers (ANI).
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. Rooms, Two doors)	U.L. 3 Hour Rating

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. CO_2 System

System	Concentration	Application Time (Soak Time)	Actuation Method
Cable spreading rm. Control Bldg. EL. 33'-0"	50%	Total Flooding (10 min.)	Automatic - additional application manual
Relay Room Control Bldg. EL. 15'-0"	50%	Total Flooding (10 min.)	Automatic additional application manual

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. 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). This results in a spray density of 1.34 GPM/square foot of projected tray area which exceeds the NFPA Std. 15-1977 requirements of 0.3 GPM/square foot.

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

Attached is a revised response to Staff Position 14 contained in Attachment 2 to our letter to you of October 23, 1978. This revised response also supercedes our previous response to this question contained in Attachment 1 to our letter to you of February 6, 1979.

STAFF POSITION 14 Switchgear Room Separation

Provide the results of a study which describe the separation between redundant auxiliary feedwater pump, charging pump, safety injection pump and service water pump cables within the switchgears room. Plan view drawings should be included which show the horizontal cable separation. Barriers should be provided between redundant cables of these systems to protect one set of cables from a fire in the redundant set where they are located vertically over one another or where there is less than three feet horizontal separation. The charging pumps and the safety injection pumps may be considered redundant to each other in the consideration of preserving at least one set of the equipment necessary for the functions of decay heat removal, reactor water makeup and boration for fires in this area. If the safety injection pumps are to be used and the pump head is insufficient to inject water at normal operating pressure, the capability to depressurize to allow injection should also be protected as described above.

Response

Review of cable routing in the switchgear room applying the separation criteria stated in the Staff Position indicates that adequate separation exists between redundant power cables between any combination of power cables of one load group and control cables of redundant load group, and between redundant control cables, except in two locations where control cables of redundant circuits are routed in cable tray, one above the other for a short distance and one location where redundant control cables converge at a control panel.

A detailed analysis follows:

Auxiliary Feedwater Pumps (2 motor-driven pumps, 1 turbine - driven pump)

Reference Drawings: 9321-F-30563, 30593, 30893, 31583, 32783

Power cables for motor driven pumps Nos. 31 and 33 are routed through independent paths from the 480 volt switchgear to the pump motors.

Pump No. 31 power cables are routed via conduit in the switchgear room and underground duct to the pump; power cables for Pump No. 33 are routed via conduit and cable tray in the switchgear room and via cable tray in the cable spreading room and cable tunnels. Control cables are routed through the switchgear room in cable trays with adequate separation according to the Staff Position cir-teria except for one portion of the routing near the north wall of the room between cable tray risers 80N and 88N where pump #33 control cables are routed in cable tray 14N, one foot above pump #31 control cables in cable tray 61N. It is proposed to install a barrier fabricated of 1" thick Marinite

beneath the upper tray extending for the length of tray run where this condition occurs, plus a 2'-0" extension on each end. The barrier will be 1'-0" wider than the tray width and will extend 6" beyond the side rails of the tray on each side. With this barrier in place a cable fire will not affect more than one of the two redundant pumps. The third pump, turbine driven Pump No. 32, has no power or control cables in the switchgear room and is unaffected by a cable fire.

Charging Pumps (3 motor-driven pumps)

Safety Injection Pumps (3 motor-driven pumps)

Reference Drawings: 9321-F-30563, 30593, 31493, 31583, 32783

The charging pumps and safety injection pumps will be analyzed simultaneously, however, emphasis is placed on the operating capability of the charging pumps, since the capability to depressurize (if necessary) to operate the safety injection pumps is not addressed.

Power cables for redundant pumps are routed through the switchgear room in conduit and cable trays in adequately separated paths. Control cables are routed in cable trays in adequately separated paths except for two locations where cables of redundant circuits are routed one above the other with a vertical separation of 1'-0". One of these locations is the same as discussed under auxiliary feedwater pumps and will be remedied by the barriers installed to correct that condition. A cable fire in either of these locations could disable a maximum of two of the three charging pumps (or safety injection pumps). The cable tray barrier proposed for auxiliary feedwater pump circuit separation will also provide separation of charging pump circuits. With this barrier in place, a cable fire will not affect more than one of the three charging pumps.

It is proposed, in order to provide an additional margin of safety and degree of operating flexibility, to install a second barrier similar to the above between trays 75N and 78N near the south wall of the room between cable trays risers 91N and 42K. These trays also carry redundant control cables, one above the other.

Service Water Pumps (9 Motor-Driven Pumps)

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

There are six main service water pumps located at the water intake and three back-up services water pumps located at the discharge canal. Power cables to all pumps are routed in underground duct runs from the switchgear to the pump motors and are not affected by a cable fire in the switchgear room. Control cables are routed through cable trays in the switchgear room. There are several locations in the switchgear room where concentrations of control cables occur and adequate separation between cables of redundant pumps does not exist. By analysis, the two

worst case locations were found to be the southeast corner of the room in the trays carrying cables to the Service Water Pump Remote Control Panel and the middle of the north side of the room in trays in the vicinity of a cable tray riser. A fire in the first location could result in the loss of control power of the six main service water pumps, leaving the three back-up pumps available. A fire at the second worst case location could disable three of the main service water pumps and the three back-up pumps, leaving three of the main pumps available. The barriers proposed for installation under the auxiliary feedwater pump and charging pump descriptions would reduce the maximum effects of a fire in the second worst case location to disabling of two of the main service water pumps and the three back-up pumps, leaving four of the main pumps available. Fires in other locations would not have a more severe effect than those discussed above.

The amount of pumping capacity available in case of a worst case fire, after modifications have been completed, exceeds the Staff Position requirement to preserve at least one set of equipment necessary for the functions of decay heat removal, reactor water makeup and boration for fires in this area.

Fire stops on two cable trays 55N and 60N to prevent propogation of fire that could affect redundant service water pumps shall be provided at the east end of 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

Attached is a revised response to Staff Position 15 contained in Attachment 2 to our letter to you of October 23, 1978. This revised response also supercedes our previous response to this question contained in Attachment 1 to our letter to you of February 6, 1979.

STAFF POSITION 15 Cable Spreading Room

Modifications should be made in the cable spreading room to protect against loss of redundant safe shutdown instrumentation and against the loss of control of redundant diesel generators and the control of the diesel bus breakers from both the control room and local control stations. This could be accomplished by the installation of a sprinkler system in the cable spreading room.

If a CO_2 system is chosen to protect the cable spreading room in lieu of the above described sprinkler system, the following should also be provided:

1. The sprinkler system in the cable tunnels should be extended toward the cable spreading area to cover the cable to the point where cables enter the cable spreading room from the switchgear room below, and

2. Modifications to the safe shutdown instrumentation (pressurizer pressure and level and steam generator level) and to the 31 diesel generator control system should be made to assure that at least one channel of the instrumentation and emergency power to safe shutdown loads is independent of a damaging cable spreading room fire.

Response

The Power Authority of the State of New York (PASNY) has considered the alternatives presented in Staff Position P-15 and has decided to install a CO_2 fire extinguishing system to protect the cables in the cable spreading room. This will be backed by the hose station located Southeast of the cable spreading room outside the door. In order to comply with condition 1 of the Staff Position P-15, the Authority has decided to provide a three hour rated fire wall, (concrete and steel panels filled with silicone foam insulation) which will be constructed across the east end of the cable spreading room so that approximately 20 feet of the power cables will be on the west side of the wall in the cable spreading room area and turn down through the floor to the switchgear room below. The cables in the electrical tunnel area will be protected by the automatic sprinklers. For the extended cables (approx. 20 feet), the Authority has decided to cover trays 18N and 19N with one fire barrier of three hour rated enclosure (proposed material is pyrocrete) from the point of entry of cables from the switchgear room in the floor where it will be totally closed to the point of the entry in the wall where the enclosure will be opened to the tunnel side. This will allow the dissipation of the heat generated in the cables into the tunnel. Similar arrangements will be provided for the 22N tray. In order to comply with condition 2 of the Staff Position P-15 the following modifications will be made to assure that at least one channel of safe shutdown instrumentation and emergency power to safe shutdown loads in independent of the damage in the cable spreading room due to fire.

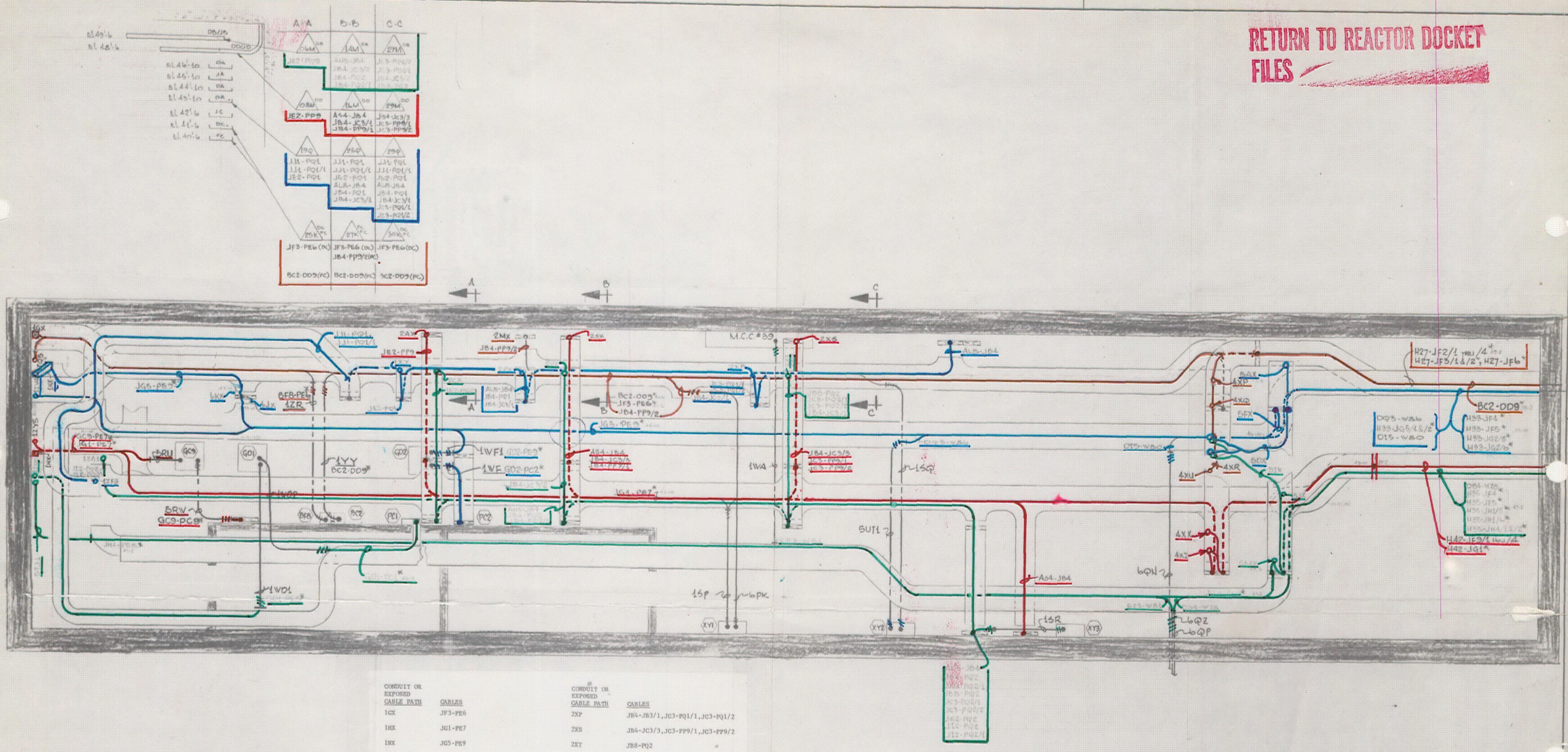
A means will be provided to completely isolate the control circuits of Diesel Generator #31 and Diesel Generator #31 480 volt circuit breaker from the effects of a cable spreading room fire. This will consist of manually operated switches mounted in cabinets at the diesel generator control panel and the 480 volt switchgear which will disconnect all control wires passing through the cable spreading room area. Local control of the diesel generator will be possible in this mode of operation and will not be affected by a cable spreading room fire.

An instrument panel which will be powered from Diesel Generator #31 via lighting bus 32, will be installed at the end of the tunnel in the penetration area to mount instruments for pressurizer pressure and level and steam generator level. A selector switch will be provided which will select either the control room panel or the new panel. Normally it will be positioned to the control room panel, however, under emergency conditions when normal instrumentation is lost, the operator will go to the selector switch and position it to the new instrument panel. This way one channel of the instrumentation and emergency power to safe shutdown loads will be available independent of any damaging fire in the cable spreading room.

An annunicator circuit will be provided to sound an alarm in the control room if the switches (Diesel isolating switches and instrument panel selector switch) are not in the normal position.

A marked up drawing is attached showing the instrument and power cables routing for Diesel Generator #31.

RETURN TO REACTOR DOCKET FILES



CONDUIT OR EXPOSED CABLE PATH	CABLES
1CX	JF3-PE6
1HX	JG1-PE7
1NX	JG5-PE9
1SP	JC3-PP9/1,JC3-PP9/2,JB4-PP9/1, JE2-PP9
1SQ	JB4-PQ1,JC3-PQ1/1,JC3-PQ1/2, JE2-PQ1,JJ1-PQ1,JJ1-PQ1/1
1SR	JB4-PQ2,JB4-PQ2/1,JB8-PQ2, JC3-PQ2/1,JC3/PQ2/2,JE2-PQ2, JI2-PQ2,JI2-PQ2/1
1TQ5	BF8-PE6
1WA	ER3-WB1
1WD1	GD1-PE8
1WD2	GD1-PC1
1WF	GD2-PC2
1WF1	GD2-PE9
1XY	JE2-PQ1
1YY	BC2-DD9
1ZA1	JI2-PQ2,JI2-PQ2/1
1ZF3	JJ1-PQ1,JJ1-PQ1/1
1ZR	BF8-PE6
1ZU5	GD1-PE8
1ZV4	GD2-PE9
1ZY5	GC9-PE7
2AX	JE2-PP9
2CX	JE2-PQ2
2MX	JB4-PP9/2
2PX	AL8-JB4,JB4-JC3/1,JB4-PQ1
2SX	AS4-JB4,JB4-JC3/3,JB4-PP9/1
2UX	AN5-JB4,JB4,JC3/2,JB4-PQ2, JB4-PQ2/1

CONDUIT OR EXPOSED CABLE PATH	CABLES
2XP	JB4-JB3/1,JC3-PQ1/1,JC3-PQ1/2
2XS	JB4-JC3/3,JC3-PP9/1,JC3-PP9/2
2XT	JB8-PQ2
2XU	JB4-JC3/2,JC3-PQ2/1,JC3-PQ2/2
4XP	H27-JF2/1,H27-JF2/2,H27-JF2/3, H27-JF2/4
4XQ	H27-JF3/1,H27-JF3/2,JF3-PE6
4XR	H27-JF6
4XU	H27-JF6
4XX	H42-JF9/1,H42-JF9/2,H42-JF9/3, H42-JF9/4
4XZ	H42-JG1,JG1-PE7
5AX	H33-JG2/5,H33-JG2/6
5OX	H33-JF4,H33-JF5
5FX	H33-JG5/1,H33-JG5/2,JG5-PE9
5IX	H35-JF4,H35-JF5
5JX	H35-JH1/5,H35-JH1/6
5MX	H35-JB4/1,H35-JB4/2,JB4-PE8
5RU	GC9-PE7
5RW	GC9-PC9
5TJ1	JB4-PE8
5UT1	DQ3-WB6
6PK	JB4-PP9/2
6QN	DI5-WB0
6QP	DB4-WT8
6QZ	EF3-WB1

- DIESEL GEN #31, CHANNEL IV, INSTR BUS #33
- DIESEL GEN #32, CHANNEL I, INSTR BUS #32
- DIESEL GEN #34 CHANNEL II INSTR BUS #31
- _____, CHANNEL III, INSTR BUS #34

* INDICATES INSTRUMENT BUS CABLE.

50-286
LTR 4-16-79
7904230262

REV. NO.	DATE	DESCRIPTION	ENGR.	SUP. ENG.
	3/28/79	FIRST ISSUE		

ENGINEER

STATE REG. NO.

POWER AUTHORITY OF THE STATE OF NEW YORK
INDIAN POINT NUCLEAR GENERATING STATION UNIT No 3
WAH 67

CABLE SPREADING ROOM COMPOSITE PLAN INSTR. BUS & DIESEL GEN. CABLES

united engineers & constructors inc

SCALE: 1/4"=1'-0" 6604-164-D-SK1