William J. Cahill, J Vice President

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May 27, 1976

Indian Point Unit No. 2 Re **Regulatory Docket File** Docket No. 50-247 Facility Operating License No. DPR-26 Director of Nuclear Reactor Regulation Mr. Robert W. Reid, Chief Operating Reactors Branch/#4 Attn: RECEIVED Division of Operating Reactors U.S. NUCLEAR REGULATORE U.S. Nuclear Regulatory Commission 5-40-16 -28-76 COMMISSION Mail Section COMMISSION Washington, D.C. 20555 Mail Section Gentlemen:

Our letters to you of February 19, 1976 and April 22, 1976 addressed the potential for submerged electrical equipment within the Indian Point Unit No. 2 containment following a postulated loss-of-coolant accident as well as our compliance with the Commission's Branch Technical Position EICSB 18. Enclosure 1 to this letter describes and summarizes the final results of our investigation of submerged electrical components inside containment. Enclosure 2 provides updated listings of submerged components and the details of the investigation. These enclosures supplement the information provided in our earlier letters and complete our response in these matters.

In addition, as a result of recent telecons with the Regulatory Staff, we have been advised that additional information pertaining to various single failure criterion must be provided for the Staff to complete their 10 CFR 50, Appendix K, ECCS review for Indian Point Unit No. 2. These inquiries were the subject of a conference call on May 14, 1976 between members of your staff and our staff. As requested by Regulatory Staff, we are submitting herewith (Enclosure 3) a discussion of our position and planned actions concerning each of the items addressed during the May 14, 1976 conference call.

It is our opinion that most of the items in question do satisfy the single failure criterion. Those items for which we feel further assurance of redundancy is desireable and capable of being performed during the present refueling outage will be resolved by completing the modifications described in Enclosure 3 prior to startup following refueling.

It should be noted that these modifications will be in addition to many other modifications previously scheduled for the present refueling outage and currently being performed to improve the reliability of safety-related systems. Enclosure 4 contains a

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listing of these projects presently underway. However, as stated above and discussed in Enclosure 3, we will expand our planned activities to allow for performance of modifications in response to those single failure inquiries which we have identified as requiring specific action to further assure redundancy and compliance with single failure criteria.

Additionally, as requested during the May 14, 1976 telecon, enclosed are seven (7) copies of the following electrical one-line drawings:

(1) Dwg. 540 F 921 - Main One-Line Diagram.

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- (2) Dwg. 540 F 923 480 V One-Line Diagram.
- (3) Dwg. 9321-F-3006 (Rev. 29) Single line diagrams for Emergency 480 V Motor Control Centers MCC 26A & MCC 26B and 118 V AC Instrument Buses.
- (4) Dwg. 9321-F-3008 (Rev. 21) Single line Diagram for 125 V D.C. System.

Very truly yours,

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William J. Cahill, Jr. Vice President

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Indian Point Unit No. 2

In Con Edison's April 22, 1976 submittal, a listing of electrical components that could potentially become submerged during the post-LOCA period was provided. An additional electrical component that may also become submerged following a postulated LOCA should be added to the list. Level Transmitter LT-1003 on the Reactor Coolant Drain Tank has been determined to be located below the maximum calculated flood level. There are no consequences to ECCS performance or plant safety as a result of the flooding of that component.

Additionally, Con Edison's earlier listing indicated that various electrical penetrations would become submerged following a postulated LOCA. These electrical penetrations have now been specifically identified. Table 13 of Attachment C (Enclosure 2) provides a listing and evaluation of the effect on plant safety of those submerged electrical penetrations. As noted in Table 13, the following two proposed modifications will be completed during the present refueling outage.

(1) <u>Penetration H-69</u>: This penetration, which contains the power supply to motor control center MCC 28, is de-energized upon reactor trip due to an SI signal or undervoltage and plant safety, therefore, is not compromised by its submergence during the post-LOCA period. Nevertheless, fuses will be installed in series with the existing

-1-

circuit breaker in this line to provide redundant fault protection as an added measure of plant protection.

Penetration H-70: This penetration contains the (2) emergency lighting feed to lighting panel 218 within containment and is powered from DC power panel 22. the those As was done for the identical situation on Indian Sector Sec. Point Unit No. 3, a new circuit breaker in series د د د مک with new fuses will be installed in the emergency مر ایندور ایس والاسور می مراجع lighting circuit for Panel 218. This circuit breaker will be locked open except during access to containment and will assure that penetration H-70 is de-energized nan an Maria during accident conditions.

As demonstrated in Table 13 of Attachment C (Enclosure 2), submergence of containment penetrations H-58, H-59, H-60, H-61, H-63, H-64, H-66, H-67, H-68, H-69 and H-70 will not compromise their containment isolation function.

A final updated listing of safety-related submerged components is set forth with Attachment A (Enclosure 2) to this letter. Similarly, a final updated listing of non-safety related submerged components is set forth in Attachment B (Enclosure 2).

As requested by the NRC, an evaluation was made of the effect each submerged electrical component may have on power sources supplying safety-related components or on plant safety. This evaluation is presented in Tables 1 through 14 in Attachment C

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(Enclosure 2). Each table identifies the submerged component, the circuit and power source from which it is supplied, as well as all the other components on that circuit. For each component, the effect on ECCS performance, containment isolation and other safety-related functions affecting plant safety if that component or circuit were lost has been evaluated.

In each case, the circuits were investigated to identify existence of primary and/or backup protection. Failure of the primary protection device (fuse) was then postulated and all circuits subsequently lost (by clearing of associated breaker) were identified. The safety significance of these circuits was reviewed and determined. In all, almost 200 circuit functions were evaluated with acceptable results. In all cases, fuse sizing and breaker ratings are coordinated with the load requirements of the specific components or circuit.

In certain instances, the clearing (de-energizing) of some submerged components (due to a trip on SI signal or undervoltage) was considered in the post-LOCA evaluation of ECCS performance or plant safety. This tripping function is in addition to individual fault protection provided by either fuses or circuit breakers.

As noted in Tables 7 and 12, the following two proposed modifications will be completed during the present refueling outage in order to provide redundant fault protection and render these circuits consistent with the others:

-3-

Valves 1163, 1164, 1165, 1166, 1167 (Table 7): To

· (1)

a.

b.

c.

incorporate secondary fault protection, fuses will be installed in series with the existing circuit breaker for this circuit. This modification will provide an added measure of plant protection during the post-LOCA period.

(2) <u>LT-1003 (Table 12)</u>: A fuse will be installed in series with the existing circuit breaker for this circuit.
 Again, this will provide redundant fault protection and further assure plant safety.

Included in Tables 1 through 13 of Attachment C (Enclosure 2) are the times for actual submergence of each electrical component. These times for submergence to occur were determined based on the following factors:

The elevation of each submerged electrical component, as determined during the physical survey of that containment. The containment volume per inch of elevation up to the maximum calculated water level of Elevation 50'-1". (See February 19, 1976 Con Edison letter to NRC for details).

Injection rates into the reactor coolant system consistent with operational requirements of the SI and spray systems during the injection and recirculation phase. This assumes maximum operation of SI pumps, RHR pumps and spray pumps operating (i.e., maximum safeguards) during these periods.

It is noted that as part of the changeover to the recirculation phase, only one spray pump continues

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in operation delivering water from the RWST to the containment.

d.

e.

f.

RWST and spray additive tank (NaOH Tank) filled and emptying into containment.

Four accumulators filled to the maximum allowed by the Technical Specifications and emptying into containment. At time of break, all RCS spillage to containment (including inventory of accumulators) is assumed to occur at Time = 0 for purposes of determining earliest time at which component submergence occurs. Additional spillage due to SI injection and spray operation (Item "c" above) is conservatively assumed to start at T=0 for this calculation.

Based on Items, "a" through "f" above, the maximum water level at Elevation 50'-1" (e.g., 422, 479 gallons injected into containment and/or spilled to containment floor) is reached at approximately 47 minutes after the postulated accident. The flooding rate for Indian Point Unit No. 2 is identical to that for Indian Point Unit No. 3.

During a recent telecon, the NRC requested information concerning the seismic acceptability of any items relocated as a result of the submerged electrical component study. As discussed in our February 19, 1976 letter to the NRC, Valves 856A, B and D and portions of their associated piping are being relocated during the present refueling outage so the motor operators for these

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valves are located above the maximum calculated flood level. No modifications are being made to the valves or their operators. The new piping runs and associated supports have been reviewed in accordance with the Indian Point Unit No. 2 seismic Class I criteria and found acceptable.

The solenoids for Valves 891B and 891D and Flow Transmitters FT-925, FT-926 and FT-946B are simply being relocated upward on existing seismic Class I structures so as to be above the maximum flood level. These modifications will not affect the seismic capabilities of these components.

As discussed in our April 22, 1976 letter, there are eleven motor-operated valves required to be de-energized in order to comply with the NRC's Branch Technical Position EICSB 18. In addition, since redundant position indication in the central control room is required for these valves, separate limit switches are being installed on each of the eleven valves for that purpose. For Indian Point Unit No. 3, the supports on which the redundant position indication limit switches are mounted have been satisfactorily evaluated as seismic Class I structures. Since the modifications being made to Indian Point Unit No. 2 in this regard are identical to the Indian Point Unit No. 3 modifications, this seismic design acceptability also applies to Indian Point Unit No. 2.

During the same telecon, the NRC requested that the surveillance requirements incorporated in the Indian Point Unit No. 3 Technical Specifications, concerning periodic verification of valve

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mechanical stop adjustments for the motor-operated valves in the high-head safety injection lines to the cold legs, be be addressed for Indian Point Unit No. 2 as well. These valves (856A, C, D and E for IP2) are adjusted during preoperational flow tests to provide balanced flow to the reactor coolant system. To assure that these valves do not become maladjusted during Indian Point Unit No. 2 reactor operation, Con Edison concurs that the following additions be included in the Indian Point Unit No. 2 Technical Specifications:

- (1) conduct a flow test of the high-head safety injection system after any modification is made to either its piping and/or value arrangement.
- (2) verify that the mechanical stops on Valves 856A, C, D and E are set at the position measured and recorded during the most recent emergency core cooling system operational flow test or flow test conducted in accordance with (1) above. This surveillance procedure shall be performed following any maintenance on these valves or their associated motor operators and at a convenient outage if the position of the mechanical stops have not been verified in the preceeding three months.

These specifications were acceptable to the NRC staff for Indian Point Unit No. 3.

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ATTACHMENT A

Indian Point Unit No. 2

Safety-Related Submerged Components (Maximum Calculated Water Level Within Containment Elevation 50'-1")

Valves:	856A*	
	856B*	
	856D*	
	891B**	
	891D**	

Flow Transmitters: 925* 926* 946B*

Level Transmitter: 938***

Containment	Electrical	Penetrations:	н-58	[.] н-66
· ·	······································		н-59	Ĥ-67
			н-60	H-68
			H-61	н-69
	#		н-63	н-70

*	To be relocated				
**	Solenoids to be relocated				
* * *	Designed for submerged service in borated w	water at 2	295	F at	a
	pressure of 69 psig				

ATTACHMENT B

Indian Point Unit No. 2

Non-Safety Related Submerged Electrical Components (Maximum Calculated Flood Level Within Containment Elevation 50'-1")

•. •			
123	896B	955Ë	1164
200B	896C	955F	1165
2000	896D	1003A	1166
212	955C	1003B	1167
896A	955D	1163	1609
	123 200B 200C 212 896A	123896B200B896C200C896D212955C896A955D	123896B955E200B896C955F200C896D1003A212955C1003B896A955D1163

Reactor Coolant Drain Tank Pump 21 & Junction Box Reactor Coolant Drain Tank Pump 22 & Junction Box

Containment Sump Pump 29 & Level Switch Containment Sump Pump 210 & Level Switch

Junction Box - Rack #14, Zone #24 of WCPPS

LT-1003 TT-1058

TE-122 TE-126

LT-1133 LT-1134 LT-1135 LT-1136 LT-1137

ATTACHMENT C

Indian Point Unit No. 2

Submerged Electrical Component Study List of Tables

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						Table	No. of
	` De	scriptic	<u>on</u>		*	No.	Sheets
							· · · ·
Miscellanec	ous Comp	onents	• • •			1	1
Circuit No.	3, 125	V.D.C.	Distribut:	ion Panel	#21	2	6
ni n	5, "	H,	11	11	#21	- 3	. 3
11 II II	4 . "	11	11		#22	4	2
H U	12. "	tı.	11	11 -	#22	5	2
14 FF	15. "	н	28	2 H	#22	6	3
<u></u>	9 1	¥1 — -	н на		#23	. 7	ĩ
ange an arriver in the state	3, 118	V.A.C.	Instrument	Bus	#21	8	2
H . H	14. "	 II 	µ	11	#21	9	2
- H . H	15 "	н	· • •	FT .	#22	10	. 2
na series de la secono de la se	16 "	- H	ligen po u sers,	9	#23	11	2
1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	3 11	64	- 1 1	n	#24	12	, <i>24 ,</i> 1
Containmont	- Flootr	ical Per	otrations			13	1
Legend	* FIGCU	rcar rei	lectacions			14	2

INDIAN POINF UNIT NO. 2 TABLE 1 (PAGE 1 of 1),

PERFORMANCE REVIEW - SUBMERGED ELECTRICAL COMPONENTS WITHIN CONTAINMENT DURING POST-LOCA CONDITIONS-MISCELLANEOUS COMPONENTS

A CONTRACT OF					• • • • •			
Submerged Component	Function	Electrica: Normal	l Status Post	1s Effect on ECCS/ Plant Safety- Post-LOCA Period		Time after SI to reach Submergence	Power _. Source	Electrica Fault Protectio
		Operation	Period	Req'mt.	Effects	(Milluces)		
RCDT Pump #21 & J.Box	Drain Tank Pump (WDS)	Energized	De-ener- gized (Trip on SI signal or under- voltage	None	None	20 2'-10"	MCC #28 Compt. 1E	Individ- ually fuse 80A
RCDT Pump #22 & J, Box	II				H	20	MCC #28 Compt. 1K	Individ- ually fused 100A
Sump Pump #29 & Switch	Containment Sump Pump (W.D.S.) & Level Switch					7 (1'-2") 3 (6")	MCC #28 Compt. 4C	Individ- ually fused 30A
Sump Pump #210 & Switch	B					7 3	MCC #28 Compt. 4E	
Rack 14 Zone 24 J.Box	WC and PPS Indication Lights					8 (1'-4")	120V AC dist. Panel #21 Circuit #24	20A circuit breaker

PERFORMANCE REVIEW - SUBMERGED ELECTRICAL COMPONENTS WITHIN CONTAINMENT DURING POST-LOCA CONDITIONS (Note: Final Post LOCA Flood Level 4'-1" above Level 4'-1" above CIRCUIT #3 - 125V DC DIST. PANEL #21 (Circuit Protection - 20 Amp. Bkr.) Floor Elevation 46'-0")									
ubmerged omponent	Function	Valve Sta	tus	Effect on Plant Safe Post-LOCA	ECCS Perf, ety during Period	Compon Submer	ents aed	Time after SI condition to reach	Electrica Fault Protectio
		Normal Plant Operation	Post- LOCA Period	Req'mt.	Effect	Comp.	Elev. above	Submergence (Minutes)	
(alve 2008 A.O)	Letdown Orifice Stop Valve CVCS	Closed	Closed F.C.	None	None	L.S.	4'-1"	47	Individ. fused 3A
Valve 200C A.O.)		Open	0				3'-0"	21	п

OTHER PLANT COPONENTS (NON-SUBMERGED) PG FROM CIRCUIT #3 125V.D.C. DISTRIBUTION PAN ERED 1 #21

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Component	<u>Function</u>	Effect on ECCS Perf./ Plant Safety for Loss of Electrical Power to Component and (Component Status)
Valve 200A	Letdown Orifice Valve	None (Closed & F.C.)
519	Water to PRT (Cont. Iso. Va.)	None (Closed on "T" Signal & F.C.)
876A	Spray Additive Tank Outlet Va.	None (Valve opens on "P" Signal & F.O.; 876A Redundant to 876B)
1813	Cont. Spray Pump Test Line Valve to RWST	None (N.C. & F.C.)
201	Letdown Line (Cont. Iso. Va.)	None (Closed on "T" Signal & Fail Closed)
863	N ₂ to Accumulators (Cont. Iso. Va.)	Nonę (Fail Closed)
793	CCW Return from XLDHX (Cont. Iso., Va.)	None (Closed on "T" Signal & Fails Closed)
791	CCW Supply to XLDHX (Cont. Iso. Va.)	None (" " ")
1702	RCDT Pump Disch. to HUT (Cont. Iso. Va.)	None (" ")
1723	Cont. Sump Pump Disch. to HUT (Cont. Iso. Va.)	None (" ")
1410	IVSWS Header Supply Valve	None (Valve opens on SI Signal & F.O.;redundant to 1413)
1786	RCDT to Vent. Hdr. (Cont. Iso. Va.)	None (Valve closes on SI Signal & F.C.)
956A	Press. Sample Line to Samp. System (Cont. Iso. Va.)	None (Closed, "T" Signal to close & F.C.)
956G	Accum. Sample Line to Samp. System (Cont. Iso. Va.)	0
956E	RCS Sample Line to Samp. System (Cont. Iso. Va.)	

INDIAN POINT UNIT NO. 2

TABLE 2

OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT #3, 125V.D.C. DISTRIBUTION PANEL #21

Component	Function	Plant Safety for Loss of Electrical Power to Component and (Component Status)
Valve 956C	Press. Sample Line (Cont. Iso. Va.)	None (Closed, "T" Signal to close & F.C.)
FCV-417	Main F.W. Control Va. to Steam Gen. #21	None (closed due to SI or reactor trip signal & F.C.)
FCV-427	Main F.W. Control Va. to Steam Gen. #22	
882 856B 894B 894D 843	D.C. Power to Monitor Light Position Indication on Control Board	None (White monitor light for position status not illuminated; separate and redundant position indication available)
956J	Gross Failed Fuel Detector System Isolation Valve	None $(T'Signal to Close and F.C.)$
FCV-437	Main Feed Water Control Valve to Steam Generator #23	None (Closed on SI or reactor trip and F.C.)
FCV-447	Main Feed Water Control Valve to Steam Generator #24	None (Closed on SI or reactor trip and F.C.)

NDIAN POINT UNIT NO. 2.

TABLE 2

OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT #3 , 125V.D.C. DISTRIBUTION PANEL #21

Component	Function	Effect on ECCS Performance/ Plant Safety for Loss of Electrical Power to Com- ponent & (Component Status)
SOV-1534 (PCV-1234)	Rad. Monitor R-11 Air Sample Return to Con- tainment (SOV Controls Cont. Iso. Va. PCV-1234)	None (closed "T" Signal to close & F.C.) Loss of Power closes PCV- 1234
SOV-1536 (PCV-1236)	Rad. Monitor Air Sample from Containment (SOV Controls Cont. Iso. Va. PCV-1236)	None (Closed, "T" Signal to close & F.C.) Loss of Power closes PCV-1236
SOV-1538 (PCV-1238)	Penetration Pressuri- zation Air to Rad. Monitor Line (SOV-1538 Controls PCV-1238)	None (PCV-1238 open; Phase A Signal to open PCV-1238 and PCV-1238 fails open) PCV-1238 (SOV-1538) redun- dant to PCV-1239 (SOV-1539)
SOV-1540 (PCV-1240)	Penetration Pressuri- zation Air to Rad. Monitor Line (SOV-1540 controls PCV-1240)	None (PCV-1240 open; Phase A Signal to open PCV-1240 and PCV-1240 fails open) PCV-1240 (SOV-1540) re- dundant to PCV-1241 (SOV-1541)
SOV-1523 (PCV-1223)	Stm. Gen. 21 Sample Line from Containment (SOV Controls Cont. Iso. Va. PCV-1223)	None (Closed, "T" Signal to close & F.C.) Loss of Power closes PCV- 1223
SOV-1524 (PCV-1224)	Stm. Gen. 22 Sample Line from Containment (SOV Controls Cont. Iso. Va. PCV-1224)	None (Closed, "T" Signal to close & F.C.) Loss of Power closes PCV- 1224
SOV-1525 (PCV-1225)	Stm. Gen. 23 Sample Line from Containment (SOV Controls Cont. Iso. Va. PCV-1225)	None (Closed, "T" Signal to close & F.C.) Loss of Power closes PCV- 1225
SOV-1526 (PCV-1226)	Stm. Gen. 24 Sample Line from Containment (SOV Controls Cont. Iso. Va. PCV-1226)	None (Closed, "T" Signal to close & F.C.) Loss of Power closes PCV- 1226

INDIAN POINT UNIT NO. 2

OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT #3, 125V.D.C. DISTRIBUTION PANEL #21

Component	Function	Effect on ECCS Performance/ Plant Safety for Loss of Electrical Power to Com- ponent & (Component Status)
SOV-1527 (PCV-1227)	Stm. Gen. Blowdown Tank Spray Line (SOV-1527 Controls PCV-1227)	None (Fails closed) Loss of Power Closes PCV- 1227
SOV-1314 (PCV-1214)	Stm. Gen. 21 Blowdown Line from Cont. (SOV Controls Cont. Iso. Va. PCV-1214)	None ("T" Signal to Close & F.C.) Loss of Power Closes PCV-1214
SOV-1315 (PCV-1215)	Stm. Gen. 22 Blowdown Line from Cont. (SOV Controls Cont. Iso. Va. PCV-1215)	None ("T" Signal to Close & F.C.) Loss of Power Closes PCV-1215
SOV-1316 (PCV-1216)	Stm. Gen. 23 Blowdown Line from Containment (SOV Controls Cont. Iso. Va. PCV-1216)	None ("T" Signal to Close & F.C.) Loss of Power Closes PCV-1216
SOV-1317 (PCV-1217)	Stm. Gen. 24 Blowdown Line from Containment (SOV Controls Cont. Iso. Va. PCV-1217)	None ("T" Signal to Close & F.C.) Loss of Power Closes PCV-1217
SOV-1429 (PCV-1229)	Stm. Jet Air Ejector Disch. to Cont. Bldg. (SOV-1429 Controls Cont. Iso. Va. PCV-1229)	None (PCV-1229 closed; Phase A Signal to Close PCV-1229 and PCV-1229 Fails Closed)
SOV-1430 (PCV-1230)	Stm. Jet Air Ejector Disch. to Cont. Bldg. (SOV-1430 Controls Cont. Iso. Va. PCV-1230)	None (PCV-1230 Closed; Phase A Signal to Close) Loss of Power Closes PCV- 1230
SOV-1431 (PCV-1231)	Penetration Pressuri- zation Air to Stm. Jet Air Ejector Disch. Line (SOV-1431 Controls PCV- 1231)	None (PCV-1231 open; PCV-1231 (SOV-1431) re- dundant to PCV-1233 (SOV-1433)) Phase A Signal to Open PCV-1231 and PCV-1233).

LINDIAN POINT UNIT NO. 2

(Page 6 of 6) OTHER PLANT (PONENTS (NON-SUBMERGED) WERED FROM CIRCUIT #3 , 125V.D.C. DISTRIBUTION PANEL #21

Component	Function	Effect on ECCS Performance/ Plant Safety for Loss of Electrical Power to Com- ponent & (Component Status)
SOV-1428 (PCV-1228)	Instrument Air to Containment (SOV Controls Cont. Iso. Va. PCV-1228)	None (Closed, "T" Signal to Close & F.C.)
SOV-1433 (PCV-1233)	Penetration Pressuri- zation Air to Stm. Jet Air Ejector Disch. Line (SOV-1433 Controls PCV-1233)	None (PCV-1233 open; Phase A Signal to Open PCV-1233 & PCV-1231) PCV- 1233 F.O. & redundant to PCV-1231
SOV-1132 (PCV-1132)	Stm. Jet Air Ejector Stm. Supply (SOV-1132 Controls PCV-1132)	None (PCV-1132 Fails Open)
SOV-1133 (PCV-1133)	Priming Ejector Stm. Supply (SOV-1133 Controls PCV-1133)	None (PCV-1133 Fails Open)
Cont. Recirc. Fan & Motor	Bearing Vibration Coil Reset Circuit	None

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PERFORMA	NCE REVIEW - SI	IBME RGED ET	INDIA	N POINT UN	IT NO. 2		<u>ble 3</u>	(Page 1	of 3)
,			CIRCUIT #5 (Circuit P	- 125VDC I rotection -	DIST. PNL # 20 Amp.Bk	21 r.)	Note:	Final Post LOC Level 4'-1" Floor Elevatio	A Flood above n 46'-0"
רייניין איזעראיין איזעראיינעראייעראיינעראייעראייעראייעראייערא		Valve Status Normal		Effect on Plant Safe Post-LOCA	Effect on ECCS Perf/ Plant Safety during Post-LOCA Period		ients ged	Time after SI Condition to reach	Electrical Fault
Submerged Component Function	Function	Operation	Post-LOCA Period	Req'mt	Effect	Comp.	Elev. above Floor	(Minutes)	Protection
Valve 212 (A.O.)	Pressurizer Aux. Spray Line Valve (RCS)	Closed	Closed F.C.	Ńone	None	SOV	3'-1-1/	2"23	Indiv. Fusera
896A (A.O.)	Accumulator #21 Drain Valve (SIS)				n	L.S.	2'-3"	15	0
896C (A.O.)	Accumulator #23 Drain Valve (SIS)			0	0 	L.S.	,2'-3"	15	

TUDTUN LOTNI ONTI NO. 7

OTHER PLOT COMPONENTS (NON-SUBMERGO) POWERED FROM CIRCUIT NO. 5, 125 V.D.C. DISTRIBUTION PANEL #21

		Effect on EÇCS Perf./ Plant Safety for Loss of Electrical Power to Component and (Component Status)			
	Function	and	(Component Status)		
Valve 456	Power Operated Pressurizer Relief Valve	None	(Closed & F.C.)		
1 516	Pressurizer Relief Tank Vent Valve	None	(N.C. & F.C.)		
261A	R.C.P. #1 Seal Leak Off Valve	None	(N.O. & F.O.)		
261C		None	(N.O. & F.O.)		
553A	Primary Water to R.C.P. Standpipe	None	(N.C. & F.C.)		
553C		None	(N.C. & F.C.)		
215	Excess Letdown Divert Valve to Drain Tank or SWHX	None	(Fail to SWHX)		
268	V.C.T. Vent Valve	None	(N.C. & F.C.)		
204A	Charging Line Valve	None	(N.O. & F.O.)		
LCV-112A	Inlet Valve to V.C.T. (3-way valve)	None	(Fail to VCT)		
FCV-110A	Flow Control Valve for Reactor Makeup Control System	None	(N.C. & F.O.)		
FCV-110B		None	(Closed & F.C.)		
FCV-111A		None	(Closed & F.C.)		
FCV-111B		None	(Closed & F.C.)		
890C	Accum. #23 Fill Line Valve	None	(Closed & F.C.)		
890A	" #21 " "	None	(Closed & F.C.)		
839A	S.I.S. Test Line Valve	None	(Closed & F.C.)		
839B		None	(Closed & F.C.)		

<u>OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED</u> FROM CIRCUIT NO. 5, 125 V.D.C. DISTRIBUTION PANEL #21

Component	Function	Effect on ECCS Perf./ Plant Safety for Loss of Electrical Power to Component and (Component Status)
839E	S.I.S. Test Line Valve	None (Closed & F.C.)
839F	$ (\mathbf{x}_{1}, \mathbf{y}_{2}, $	None (Closed & F.C.)
891A	Accum. #21 Vent Valve (Cont.Iso.Va.)	None (Closed & F.C.)
891C	#23 " " " "	None (Closed & F.C.)
SOV-1170	Ser.Wtr. from Cont. Fan Coolers; SOV-1170 controls S.W. Bypass Valve TCV-1104	TCV-1104 opens on SI and (fails open); TCV-1104 (SOV-1170) redundant to Va. TCV-1105(SOV-1171)
SOV-1276	Ser.Wtr. from Diesel-Generators; SOV-1276 controls S.W. Bypass Valve FCV-1176	FCV-1176 opens on SI Signal and (Fails Open); FCV-1176 (SOV-1276)re- dundant to Valve FCV- 1176A (SOV-1276A)
SOV-1171	Ser.Wtr. from Cont. Fan Coolers; SOV-1171 controls S.W. Bypass Valve TCV-1105	TCV-1105 opens on SI and fails open; TCV-1105 (SOV-1171) redundant to Valve TCV-1104 (SOV-1170)
SOV-1276A	Ser.Wtr. from Diesel Generators; SOV-1276A controls S.W. Bypass Valve FCV-1176A	FCV-1176A opens on SI Signal and fails open; FCV-1176A (SOV-1276A) redundant to valve FCV-1176 (SOV-1276)

PERFORMA	NCE REVIEW - SI	UBMERGED EL	ECTRICAL C	OMPONENTS	HITHIN CONT	 PAINMENT	DURING	(Faye 1 FOST-LOCA CON	DITIONS
			CIRCUIT #4 (Circuit P	- 125VDC	DIST. PNL # - 20 Amp.Bk	‡22 r.)	Note:	Final Post LOC Lavel 4'-1" Floor Elevatio	A Flood abova n 46'-0"
ann sharan far Asila (d ' o J'a Brad Laid A (d).		Valve	Status	Effect on Plant Safe	Effect on ECCS Perf/ Plant Safety during		ients	Time after SI Condition	Electrical
ubmerged omponent Function	Function	Normal Plant Operation	Post-LOCA Pèriod	Post-LOCA Req'mt	Period Effect	Submer Comp.	ged Elev. above Floor	to reach Submergence (Minutes)	Fault Protectio:
955C (A.O.)	Accumulator #21 Sample Valve (SS)	Closed	Closed F.C.	None	None	L.S.	3'-1"	22	Indiv. Fused
955D (AO)	Accumulator #22 Sample Valve (SS)		1	II II II II II II II II II II II II II	0		1'-11"	12	
955E (AO)	Accumulator #23 Sample Valve (SS)	11	II				1'-9"	11	н.
955F (AO)	Accumulator #24 Sample Valve (SS)		0				1'-11"	12	

OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT # 4, - 125VDC DIST. PNL. #22

Component	Function	Effect on ECCS Performance/ Plant Safety for Loss of Electrical Power to Com- ponent & (Component Status)				
Valve 951	Pressurizer Sample Line Valve	None (Closed & F.C.)				
953		$ \begin{array}{l} \mathbf{H}_{\mathbf{n}} = \left\{ \mathbf{H}_{\mathbf{n}} = \mathbf$				
955A	R.C. Sample Line Valve					
955B						
959	RHRS LOOP Sample Line Valve					

 PERFORMANCE REVIEW - SUBMERGED ELECTRICAL COMPONENTS WITHIN CONTAINMENT DURING POST-LOCA CONDITIONS

 CIRCUIT # 12 - 125V.D.C. DISTRIB. PNL. 22 (Note: Final Post-LOCA Flood

 (Circuit Protection - 20 Amp. Bkr.)

Submerged		Valve or Component Status Normal		Effect on ECCS Perf. Plant Safety during Post-LOCA Period		Components Submerged		Time after SI Condition to Reach	Electri
Component	Function	Plant Operation	Post-LOCA Period	Req'mt	Effect	Comp.	above Floor	Submergence (Minutes)	Fault Protect
Valve LCV-1003A (A.O.)	RCDT Level Control Valve to RCDT Pump Suction (WDS)	Open	Closed F.C.	None	Norle	SOV L.S.	3'-5" 2'-5"	30 16	Individ Fused 3A
Valve LCV-1003B (A.O.)	0			0	H				
Valve 1609 (A.O.)	Drain Valve to Cont. Sump from RCDT or PRT (WDS)	Closed					3'-5" 2'-5-1/	" ' . 2"	

INDIAN POINT UNIT NO. 2

TABLE 5

OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT #12, 125V.D.C. DISTRIBUTION PANEL 22

Component	Function	Effect on ECCS Performance/ Plant Safety for Loss of Electrical Power to Com- ponent & (Component Status)				
Valve PCV-1036A	G.D.T. Inlet Valve	None (Fail Closed)				
PCV-1036B	G.D.T. Outlet Valve to Gas Analyzer					
PCV-1037A	G.D.T. Inlet Valve					
PCV-1037B	G.D.T. Outlet Valve					
PCV-1038A	G.D.T. Inlet Valve	$ = \left\{ \begin{array}{llllllllllllllllllllllllllllllllllll$				
PCV-1038B	G.D.T. Outlet Valve					
PCV-1039A	G.D.T. Inlet Valve					
PCV-1039B	G.D.T. Outlet Valve					
Valve SOV-1629	G.D.T. Outlet Valve to HUT Valves					
SOV-1630	G.D.T. Outlet Valve to HUT Valves					
SOV-1631	G.D.T. Outlet Valve to HUT Valves					
SOV-1632	G.D.T. Outlet Valve to HUT Valves					
SOV-1677	W.G.C. Va. to Shutdown G.D.T. Isolation					
RCV-018	Liq. RWS Disch. Valve to River					

PERFOR	MANCE REVIEW -	SUBMERGED CI (Ci	ELECTRICAL RCUIT #15 .rcuit Prot	COMPONENTS - 125V.D.C. ection - 20	WITHIN CO DIST, PNL OAmp. Bkr.	<u>NTAINMEN #22</u> (NC)	NT DURIN Dte: F Le F	NG POST-LOCA CO inal Post-LOCA evel 4'-1" abov loor Elev. 46'-	NDITIONS Flood e 0")
Submerged Component Function	<u></u>	Valve Status Normal		Effect on ECCS Perf. Plant Safety during Post-LOCA Period		Components Submerged		Time after SI Condition to Reach	Electrica
	Operation	Post-LOCA Period	Reqimt	Effect	Comp.	above Floor	Submergence (Minutes)	Fault Protectio	
Valve 896B (A.O.)	Accumulator #22 Drain Line Valve to RCDT (SIS)	Closed	Closed F.C.	None	None	L.S.	2'-3"	15	Individual fused 3A:
Valve 896D (A.O.)	Accumulator #24 Drain Line Valve to RCDT (SIS)						2'-3"	15	
•									

INDIAN POINT UNIT NO. 2

TABLE 6

OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT #15, 125V.D.C. DISTRIBUTION PANEL #22

Oomenent		Effect on ECCS Performance, Plant Safety for Loss of
Component	Function	ponent & (Component Status)
alve PCV-453C	Power Operated Pressuri- zer Relief Valve	None (Fail Closed)
553B	Primary Water to R.C.P. Stand Pipe	None (Fail Closed)
553D	Primary Water to R.C.P. Stand Pipe	None (Fail Closed)
261B	R.C.P. #1 Seal Leak Off Valve	None (Open & F.O.)
261D	R.C.P. #1 Seal Leak Off Valve	None (Open & F.O.)
246	R.C.P. #1 Seal Bypass Valve	None (Closed & F.C.)
523	PRT Drain Valve	None (Closed & F.C.)
213	Excess Letdown Line Valve	None (Closed & F.C.)
204B	Charging Line Valve	None (Open & F.O.)
LCV-459	Letdown Line Valve	None (Closed & F.C.)
310	Letdown Divert Flow Valve (DBDM or Bypass)	Nonę (Fail to DBDM)
560	Primary Water to PRT	None (Closed & F.C.)
RCV-017	CCW Surge Tank Vent Valve	None (Fail Closed)
839C	SIS Test Line Valve	None (Closed & F.C.)
839D	SIS Test Line Valve	None (Closed & F.C.)
839G	SIS Test Line Valve	None (Closed & F.C.)
839н	SIS Test Line Valve	None (Closed & F.C.)
TCV-149	Letdown Divert Flow Valve (VCT or Demin- eralizer	None (Fail to VCT)

INDIAN POINT UNIT NO. 2 OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT #15, 125V.D.C. DISTRIBUTION PANEL #22 Effect on ECCS Performance/ Plant Safery for Loss of Electrical Power to Com-Component Function ponent & (component Status) Accumulator Fill Line#22 None (Closed & F.C.) **Jalve**, 890B 890D #24 Ϊ₽-Accumulator Gas Fill #22 891B #24 891D

TABLE 6

PERFOR	RMANCE REVIEW -	SUBMERGED <u>CI</u> (Ci	ELECTRICAL RCUIT #9 .rcuit Prot	COMPONENTS - 125V.D.C. ection - 20	WITHIN COL DIST. PNL Amp. Bkr.	NTAINMEN . 23 (NC)	T DURIN Dte: Fill Le F	NG POST-LOCA CO Inal Post-LOCA evel 4'-1" abov Loor Elev. 46'-	NDITIONS Flood 0")
ubmerged		Valve Status Normal		Effect on Plant Safe Post-LOCA	Effect on ECCS Perf. Plant Safety during Post-LOCA Period		onents erged	Time after SI Condition to Reach Submergence	Electrica
omponent	Function	Plant Post-LOCA - Operation Period		Reqimt	Effect	Comp.	above Floor	Submergence (Minutes)	Fault <u>Protectic</u>
Valve 1163 (A.O.)	Cont. Recirc. Fan Condensate Measuring System (WDS)	Open	Open	None	None	SOV L.S.	3'-1" 1'-3"	22 7	20A C.B. 30A Fuse*
Valve 1164 (A.O.)	U						3'-1" 1'-3"	22 7	• • •
Valve 1165 (A.O.)							3'-1" 1'-3"	22' 7	0
Valve 1166 (A.O.)							3'-1" 1'-3"	22 7	•
Valve 1167 (A.O.)							3'-1" 1'-3"	22 7	1

*Fuse to be installed during present outage Note: No other components powered from this circuit

PERFOR	MANCE REVIEW -	SUBMERGED CI (Ci	ELECTRICAL RCUIT # 3 rcuit Prot	COMPONENTS - 118V.A.C. ection - 15	INST. BUS Amp. Bkr.	<u>#21</u> (No	ote: F-i Le F]	nal Post-LOCA CO vel 4'-1" abov loor Elev. 46'-	Flood e o")
A (5 11 JA (9 11 JA (Valve or Component	t Status	Effect on	ECCS Perf.	Comp	onents	Time after SI	
bmerged	Function	Normal Plant Operation	Post-LOCA Period	Plant Safe Post-LOCA Req [¶] mt	ty during Period Effect	Subm Comp.	erged Elev. above Floor	Reach Elec Submergence Fa (Minutes) Prot	Electrical Fault Protectior
TE-122	Excess Let- down Heat Exchanger Temp. (CVCS)	Energized	Energized	None	Nonə	RTD	1'-11"	12	Individual Fused 3/8A
TE-126	Regenerative Heat Ex- changer Temp. (CVCS)	Energized	Energized	None	None	RTD	2'-1"	14	Individual Fused 3/8A
•									

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Note: The external power supply provided for these transmitters limits the maximum current to the milli-amp range even when instrument is immersed or shorted.

INDIAN POINT UNIT NO. 2

Table 8 (Page 2 of 2)

OTHER PLANT CMPONENTS (NON-SUBMERGED) FOWERED FROM CIRCUIT # 3,- 118VAC INST. BUS #21

Effect on ECCS Performance/ Plant Safety for Loss of Component Electrical Power to Com-Function ponent & (Component Status) Racks "A5" and "A6" CVCS none TIC-100 Batch Tank Temp. TIC-149 Non-Regenerative Heat Exchanger Demin. Bypass VCT Level LT-112 Boric Acid Blend FT-110 110 Ħ FM-110 **TIC-103** B.A.T. Heater Control TIC-107 CI-1136 Flash Evaporator Distillate

		(Ci	rcuit Prot	ection - 15	Amp. Bkr.	<u>#21</u> (200	Le F	evel 4'-l" abov loor Elev. 46'-	/e <u>0</u> ")
1774-28-28-782-87-284-985-985-985-985-985-985-985-985-985-985		Valve Status		Effect on	Effect on ECCS Perf.		onents	Time after SI	244 1
Submerged Component	Function	Normal Plant	Post-LOCA	Plant Safe Post-LOCA	ty during Period	Subm	Elev.	Reach Submergence	Electrica Fault
-		Operation	Period	Req mt	Effect	Comp.	Floor	(Minutes)	Protectic
HCV-123	Excess Let- down Heat Exchanger Control Valve (CVCS)	Closed	Closed F.C.	None	None	L.S.	2'-3-1	2" 15	Individua Fused 31/8A

Note: The external power supply provided for this controller limits the maximum current to the milli-amp range even when instrument is immersed or shorted.

LINDIAN PUINT UNIT NU. 2

OTHER PLANT COPONENTS (NON-SUBMERGED) PERED FROM CIRCUIT #14, 118V.A.C. INSTRUMENT BUS #21

	r	
Component	Function	Effect on ECCS Performance/ Plant Safety for Loss of Electrical Power to Com-
		ponent & (Component Status)
∃C-130	Non-Regen. Hx CCW Temperature Control Switch	None
IC-135	Letdown Line Pressure Control Switch	None
IC-104	Boric Acid Tank Recirc. Control Switch	None .
IC-105	Boric Acid Tank Recirc. Control Switch	None
IC-142	Charging Line Flow Control Switch	None
IC-123	Excess Letdown Hx Flow Control Switch	None
IC-133	RHRS Alternate Flow to CVCS Control Switch	None



TABLE 10 (Page 2 of 2)

OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT #15, 118 V.A.C. INSTRUMENT BUS #22

Component	Function	Effect on ECCS Performance/ Plant Safety for Loss of Electrical Power to Com- ponent & (Component Status)								
AR-1102	Cont. Dew Point Measuring System Recorder	None								
AR-1102-R	U V 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	None								
LC-1210-S	Provides Level Control Signal to LCV-1163 for Fan Cooler, Weir #21									
LC-1211-S	Provides Level Control Signal to LCV-1164 for Fan Cooler, Weir #22									
LC-1212-S	Provides Level Control Signal to LCV-1165 for Fan Cooler, Weir #23									
LC-1213-S	Provides Level Control Signal to LCV-1166 for Fan Cooler, Weir #24									
LC-1214-S	Provides Level Control Signal to LCV-1167 for Fan Cooler, Weir #25									
PERFOR	MANCE REVIEW -	SUBMERGED	ELECTRICAL	COMPONENTS	WITHIN COL	NTAINMEN	IT DURIN	IG POST-LOCA CO	NDITIONS	
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		<u>C1</u> (Ci	RCUIT #16 .rcuit Prot	<u>- 118VAC IN</u> ection - 15	ST. BUS # 2 Amp. Bkr.	2 <u>3</u> (NO	Dte: Fi Lo F	evel 4'-1" abov loor Elev. 46'-	e • •	
ubmerged Function		Valve or Stat Normal Plant	Component tus Effect on ECCS Perf. Plant Safety during Post-LOCA Period			Compo Submo	onents erged Elev. above	Time after SI Condition to Reach Submergence (Minutes)	Electrica Fault	
TT-1058	RCDT Temp. Transmitter (WDS)	Energized	Energized	None	None	Trans.	1'-6"	9 9	Individual Fused 1/4	
•										
•										

Note: The external power supply provided for this transmitter limits the maximum current to the milli-amp range even when instrument is immersed or shorted.

INDIAN POINT UNIT NO. 2

OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT #16, 118 V.A.C. INSTRUMENT BUS # 23

	a de la composition d La composition de la c La composition de la c	
Component	Function	Effect on ECCS Performance/ Plant Safety for Loss of Electrical Power to Com- ponent & (Component Status)
FT-1126-3	WC&PPS High Flow Zone 3	None
FT-1126-3A	WC&PPS Low Flow Zone 3	Ncne
SOV-1196	Sol. Valve to Bypass Flow Transmitters Zone 3	None
SOV-1213	Sol. Valve to Bypass Low Flow Transmitters Zone 3	None
PC-1203S	Provides Signal to SOV-1203 to Admit N2 on Low Pressure Zone 3	None
SOV-1203	Sol. Valve to Actuate PCV-1203 to Admit N ₂ to System Zone 3	None
		3

• • • • • • • • • • • • •		<u>CI</u> (Ci	RCUIT #3 .rcuit Prot	- 118VAC IN ection - 15	ST. BUS # 2 Amp. Bkr.	24 (NC)	ote: F: Le F	inal Post-LOCA evel 4'-1" abov loor Elev. 46'-	Flood e 0 ")
ubmerged	Function	Valve or Stat Normal	Component	Effect on ECCS Perf. Plant Safety during Post-LOCA Period		Components Submerged Elev.		Time after SI Condition to Reach	Electrica
omponene		Operation	Period	Req [•] mt	Effect	Comp.	above Floor	(Minutes)	Protectio
LT-1003	Reactor Cool- ant Drain Tank Level Transmitter	Energized	Energized	None	None	J. Box	3'-5½"	30	15a CB ; an 20A* Quse

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NOTE: No other components powered from this circuit. *To be installed during present refueling outage. INDIAN POINT UNLT NO. 4 TABLE 13 (Page 1 Of 1)

PERFORMANCE REVIEW - SUBMERGED ELECTRICAL COMPONENTS WITHIN CONTAINMENT DURING POST-LOCA

CONDITIONS - ELECTRICAL PENETRATIONS

			Electrical Status		ECCS/ Plant ost LOCA	Time after		Electric
netration Function		Normal Post		Period		SI to Reach Submergence	Power' Source	Fault Protecti
		Operation	Period	Req'mt.	Effects	(Minutes)		•
H-58 H-59 " H-60 H-61	Reactor Control Rod Drive Cables	Energized	De- Energized (Trip on SI or under voltage)	None	None	16 2'-4"	M.G. Set #21 M.G. Set #22 MCC #29	Reactor Trip Ekr Der ewg Penetrat
H-63 H-64 H-67 H-68	Pressurizer Heater Cables					16	480V Buses 2A, 3A; 5A	800a Ckt. Bkr
H-66	Containment Leak Rate Test	De- Energized	De- energized			16		
H-70	Containment Lighting Fdrs, Panels 215 221 216	Energized "	De-energ. (Trip on SI or U.V.)			16	120/208V Ltghus " "	• 100a C.H "
	217 218	" Deenergized	" De- energized				480V Ltg. Bus DC Pwr. Panel #22	90a C.: 40a* C &60a* fu:
H-69	Feed to MCC #28 (Cont.)			.0		16	480V Swgr. #21 Section 16B	350a C. & 400a Fuse *

*These disconnecting devices will be { ____ { open during operation . }

Table 14 age 1 of 2)

LEGEND

W.D.S	Waste Disposal System
W.C. & P.P.S	Weld Channel and Penetration Pressurization System
SI –	Safety Injection
CVCS -	Chemical Volume and Control System
A0 -	Air Operated
FC -	Fail Closed
LS -	Limit Switch
SIS	Safety Injection System
FW -	Feed Water
RCDT -	Reactor CoolantDrain Tank
PRT	Pressurizer Relief Tank
IVSWS - •	Isolation Valve Seal Water System
RCS _	Reactor Coolant System
RWST _	Refueling Water Storage Tank
CCW -	Component Cooling Water
FO _	Fail Open
NC -	Normally Closed
NO -	Normally Open
VCT –	Volume Control Tank
RCP -	Reactor Coolant Pump
GDT –	Gas Decay Tank
WGC -	Waste Gas Compressor
HUT –	Hold Up Tank
RWS -	Radioactive Waste System
SS –	Sampling System

RHRS -	Residual Heat Removal System	
Phase A Signal -	"SI" or "T" - Containment Reclaud "S" Open Valve on SI	on Signal;
Phase B Signal -	Containment Spray or "P" Contain Signal	ent Isolation
SWHX -	Seal Water Heat Exchange	
XLDHX -	Excess Letdown Heat Exchanger	
DBDM -	Deborating Demineralizer	
.FAI -	Fail As Is	
J. Box -	Junction Box	
sov –	Solenoid Valve	
SW -	Service Water	

Indian Point Unit No. 2

ITEM 1 - VALVES 851A&B - CROSSOVER VALVES FOR HIGH HEAD SI PUMPS 21 & 23

- A. <u>Ouestion</u>: The Staff inquired whether a single failure in conjunction with a partial loss of offsite power could potentially close both crossover valves and render the high head system incapable of providing flow in both SI lines from a minimum of two SI pumps.
- B. <u>Response</u>: Our analysis indicates that no single failure could negate the proper functioning of the safety system. During an SI coincident with a loss of offsite power, the onsite Diesels 21, 22 & 23 will start and within 10 seconds will be ready to accept safeguard load from their 480V safeguard buses. In the loading sequence, SI pump 21 will start in.14.1 seconds after loss of offsite power (this time includes the 10 seconds for the diesel to come up to speed and close on to the safeguard bus). SI pump 22 will start in 13.3 seconds and SI pump 23 in 13 seconds. The motor operated ćrossover valves 851A (851B) are normally open and will not close until 17.5 seconds (18.5 seconds) after the associated SI pump motor fails to start.

Closure times of valves 851A and 851B are, therefore, consistent with times required for diesel electrical tie-in. No circuitry changes are necessary to assure against premature closure of these crossover valves.

-1-

- A. Question: The Starf questioned the redundancy of the pressure and valve interlocks.
- B. <u>Response</u>: The single pressure channel, PC-403, senses reactor coolant system pressure and opens permissive contacts in the opening circuitry of valves 730 and 731. Opening of either valve is thereby prevented by this permissive pressure interlock whenever the reactor coolant system is at pressure. This design feature serves as a back up to administrative controls which also precludes operation of these valves whenever the Reactor Coolant System is at pressure.

To provide further assurance against malfunction of the pressure interlock, a second independent pressure transmitter will be installed to provide a separate, independent signal to one of the two valves. The existing pressure transmitter will provide its signal to the other valve. This redundant design will assure that malfunction of a pressure interlock will not result in the simultaneous opening of both valves 730 and 731.

We have been advised, however, that the delivery of materials for this modification will require approximately four (4) months. Until this modification can be completed, valves 730 and 731 will be de-energized in the closed position whenever the reactor coolant system (RCS) pressure is above the RHR system design pressure. This precaution will assure that the valves will not be opened whenever high reactor coolant system pressure exists. The de-energizing of valves 730 and 731 in the closed position will, therefore, satisfy the intent of the proposed installation of redundant pressure interlocks.

-2-

Valves 730 and 731 are also interlocked with parallel valves 888 A and B (RHRHXs to High Head System Intertie). A potential single failure item has been postulated whereby electrical grounding of these interconnected interlocks would result in the inability to remotely open both valve 888A and 888B. It was determined that this interlock system should be modified to provide a more unitized interlock arrangement. Therefore, valve 730 will be interlocked with valve 888A and valve 731 will be interlocked with valve 888B. Availability of a path for delivery of recirculated fluid to the suction of the high head pumps will, therefore, be assured by this proposed unitization. This modification will be performed during the present refueling outage.

-3-

ITEM 3 - SWITCHOVER FROM INJECTION TO RECIRCULATION (8 SWITCH SEQUENCE

A. Question: The Staff inquired whether certain switches, if not properly positioned, could prevent automatic initiation of redundant safety equipment.

B. <u>Response</u>: Three separate forms of switch position indication exist to support the administrative controls which preclude operation of these switches until required under a postulated loss of coolant accident. These are:

1) The position of the switch handles themselves.

2) The single green light ("switch off") and at least three red lights (energized as successive switch functions are completed) associated with each switch, and

3) The "RECIRC. SWITCH OFF NORMAL" audible and yisual

annunciator alarm provided on panel SBIF.

However to further assure that redundant safeguard functions are not defeated in the unlikely event of a malpositioned switch, we will incorporate changes to these circuits similar to those provided at Indian Point Unit No. 3. In those cases where a single switch affects redundant components, contacts which open upon safety injection actuation will be added in series with the switch or interposing relay contacts. This will defeat the Recirc. Switch Function during the first phase of safety injection operation. Switches and associated functions to be interlocked in this manner are as follows:

Switch 3

"43/RS-3" trip to each RHR pump.

Switch 6

- 1) "43/RS-6" open signal to valves 888A & B.
- 2) "43/RS-6" close signal to valves 746 and 747.

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Switch 7

"43/RS-7" trip to each SI pump.

These changes will be completed during the present refueling outage.

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-5-

480V Bus Ties

Α.,

Question: The Staff questioned whether the 480V A.C. redundant

buses might be automatically tied together.

<u>Response</u>: The automatic closing feature associated with 480V safeguard bus tie breakers 2AT5A, 2AT3A & 3AT6A was previously removed. The subject circuit breakers can be closed only by

operator action. The existing design does <u>not</u> allow redundant 480 volt safeguard buses to be automatically tied together.

B. Onsite DC Power System

Question: The Staff questioned whether the failure of the DC auto transfer devices could result in cross-connecting the batteries.

<u>Response</u>: There are seven auto transfer circuits for Indian Point 2 safeguard equipment use. (Diesels 21, 22, 23, 480V buses 2A, 3A, 5A and 6A). Cables from redundant DC panels in separately routed cable trays supply the load via the auto transfer device. There is physical cable separation from

the redundant DC power sources to the auto transfer devices. There are two circuit interrupting devices between the auto transfer device and the DC bus. Since no single failure in the transfer device could cause the loss of either DC bus, we consider the present design reliable and no circuitry changes are deemed necessary. ITEM 4 (Continued)

C. 118V AC Instrument Buses

Question: The Staff raised the question that one of the instrument buses is not fed from a diesel-backed MCC. In addition the back up feed for the instrument buses is also from a non-safeguard power supply. The Staff is questioning the installation's capability to perform its safety function.

<u>Response</u>: All safety related components fed from the four 118V AC instrument buses (with the exception of the Containment Spray Pump initiation logic) fail in the safe (trip) direction on loss of power. Therefore, if an SI coincident with loss of off site power and a single failure is postulated the proper function of the safety system is not jeopardized.

Power supplies for the containment spray actuation logic are supplied by safeguards power sources such that minimum requirements for system redundancy as specified in Table 3.3 of the Indian Point Unit No. 2 Technical Specifications are satisifed.

-7-

ITEM 5 - DESCRIPTION OF SEPARATION AND REDUNDANCY FOR INSTRUMENT CHANNELS, POWER AND ONTROL CABLES

A. <u>Question</u>: The Staff requested more detail information on separation and redundancy.

B. <u>Response</u>: The Indian Point 2 reactor protection and engineered safety system cable circuits are routed in four instrument channels, three power channels and three control channels to provide and preserve the basic redundancy and independence

of systems. In addition, cables are further separated in trays in accordance with voltage level, size and function. Cables assigned to their channels will remain in their respective channels throughout the run. The physical channeling is

accomplished by either separate trays or trays with metal barriers and in some cases by separate conduit. In general, redundant circuits are separated horizontally rather than vertically.

The separation distances vary from 1", when the separation is maintained by the use of 4" high 16 gauge sheet metal barriers within the tray, to three feet. Where physical conditions prevented horizontal separation, vertical separation was utilized. The vertical channel separation varies from 7-1/2 inches to 19 inches.

The minimum vertical separation of 7-1/2 inches between redundant power trays and between power and control trays is supplemented with a 1/4" transite barrier. There are fire stops and fire

barriers of glass wool, ceramic fiber blankets, fiberglass and Flamastic 71A used throughout the plant to provide additional

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reliability.

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For	additional	information	refer to	Indian	Point	FSA
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Supp	plements3 &	12, Volume :	Questio	ons /.6	& /./.	•

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ITEM 6 - SAFETY INJECTION BLOCK SWITCH

- A. <u>Question</u>: The Staff inquired whether the existing single switch may permit bypassing of both redundant safeguards initiation circuits for low pressurizer pressure/low pressurizer level initiation signal.
- B. <u>Response:</u> Malpositioning of the Safety Injection Bypass Switch is prevented from defeating either train of Pressurizer Pressure/ Level Logic at pressure by automatic bypass removal circuitry (PC455C, PC456C & PC457C) which is designed in accordance with the single failure criteria. However, to preclude effects on both logic trains of low pressurizer pressure/level due to any failure of the common Safety Injection Block Switch, a second independent switch will be provided. Circuitry will be modified so that each switch is only associated with one of the two redundant logic trains. This modification will be performed

during the present refueling outage.

ITEM 7 - BYPASS OF REDUNDANT ENGINEERED SAFETY FEATURE LOGIC TRAINS

A. <u>Question</u>: The Regulatory Staff questioned whether the potential exists for bypassing both redundant ESF circuits during

testing.

B. <u>Response:</u> Unit No. 2 does not have similar test circuitry to to that provided for Unit No. 3, so this problem is not completely applicable. (Actuation relay continuity at Unit No. 2 is verified by ohmeter rather than the test relay and test light combinations in use at Unit No. 3). Individual logic relay matrices on each train may be bypassed by operation of any of their associated logic relay test switches (function by function bypasses rather than complete train bypass). However, to further support administrative procedures, which preclude operation of logic relay test switches of opposite trains simultaneously, separate annunciation for each train ("safeguards train A in test" and "safeguards train B in test") will be provided during the

present refueling outage.

ITEM 8 - LOW HEAD INJECTION LINE FLOW INSTRUMENTATION

A. Question: The staff inquired whether the single failure of a battery would result in the loss of two of the four low head line flow transmitters (FT-946 A,B,C and D). Since the emergency procedure for a postulated LOCA requires verifying flow in three of the four flow meters during the switchover to recirculation, sufficient information would not be available for the operator to proceed. B. Response: Indian Point Unit No. 2 Emergency Procedure E-2A presently requires verifying that 3 of the 4 transmitters indicate flows > 300 gpm before switching to low head re-The corresponding Indian Point Unit No. 3 circulation. emergency procedure was modified during licensing of that unit to allow the operator to proceed based on only 2 flow meters indicating flows > 600 gpm through each one. The Staff has indicated that a similar approach for Indian Point Unit No. 2 would be acceptable and, therefore, IP 2 Emergency Procedure E-2A will be modified to reflect this change.

ITEM 9 - DIESEL FUEL OIL TRANSFER PUMPS

- A. Question: The Souff inquired whether the ruel transfer pumps are powered from non-safeguard MCC's and may not be available when needed.
- B. <u>Response</u>: The diesel fuel oil transfer pumps are fed from MCC 27 and 29. Although both MCC's are automatically disconnected on an SI, the operators have approximately 1 hour as a minimum (nearly 2 hours assuming a full Day Tank) after the SI to restore the power supply to the subject pumps from the CCR. Since there is ample time available for required operator action, no changes to the existing design are deemed

necessary.

ITEM 10 - DIESEL FUEL OIL TRANSFER CIRCUITS

A. <u>Question</u>: The Staff questioned whether the failure of the manual sequencing switch could prevent fuel transfer to all three diesel Day Tanks.

B. <u>Response</u>: The operating sequence of the 2Hp fuel transfer
pumps is determined by positioning a sequence selector switch.
In our opinion, there are great advantages in having the
capability to supply fuel from any of the three oil storage

tanks to any of the dieselDayTanks such as the present design provides.

It should also be noted that the Day Tanks have nearly 2 hour fuel supply capacity when full and a minimum of 1 hour supply before the low level alarm alerts the operators in the CCR that a Day Tank is 50% full and the fuel transfer pumps failed to start. Even if there was a selector switch failure, which we feel is extremely unlikely, contacts could be bypassed on an emergency basis in the allotted time.

We believe that the present system flexibility to supply fuel for the dieselDayTanks is advantageous and reliable. Therefore, no changes to the system design are deemed necessary.

ITEM	4 11 - VALVES 743 AND 1870: MINIFLOW VALVES FOR RHR PUMPS
Α.	Question: A postulated single failure involving motor operated
	valve 743 or 1870 could potentially result in the spurious
	closure of one of these RHR Pump miniflow valves.
в.	<u>Response</u> : To assure that a postulated single failure of
	valve 743 or 1870 would not cause interruption of RHR pump
	miniflow, it was determined that these two valves should
	be locked in the open position with their supplies physically
	disconnected. Proper safeguards positioning of the two
	valves would, thereby, be assured.

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ENCLOSURE 4 Indian Point Unit No. 2

- 1. Modification Resulting From Submerged Electrical Study:
 - (a) Relocation of valves 856 A, B & D and associated piping.
 (b) Relocation of solenoids for accumulator N₂ fill line
 isolation valves 891 B & D.
 - (c) Relocation of Flow Transmitters FT-925, 926 and 946 B.
 - (d) Installation of additional fuses and/or circuit breakers for four circuits powering electrical equipment that could potentially become submerged following a postulated LOCA. These improvements will provide redundant fault protection for the four lines and render them consistent with the other circuits.
- 2. Ventilation System Modifications:
 - (a) PAB Exhaust installation of carbon filters.
 - (b) FSB Exhaust installation of carbon filters.
 - (c) Post Accident Ventilation System installation of carbon filters.
 - (d) Installation of flow instrument in plant vent.
- 3. Appendix J 10 CFR 50:

Performance of Type A,B and C Containment Leak Tests in accordance with Appendix J to 10 CFR 50. In addition, pressure gauges are being installed in both the personnel and equipment airlocks to assure repressurization of the hatch seals following each closure of the airlock doors.

- 4. Miscellaneous Modifications:
 - (a) Installation of feedwater low flow bypass valves.
 - (b) Modification to accumulator level transmitters as necessary to
 - comply with new accumulator levels required by the Final

Acceptance Criteria (FAC) for ECCS.

- (c) Installation of Metal Impact and Loose Parts Monitoring System for the Reactor Coolant System.
- (d) Modifications to improve design of Westinghouse BFD relays and W-2 switches.
- (e) Installation of Blowdown Tank Vent Iodine Sampling System.
- (f) Modifications to correct thermal overstressing of tubing

in the sample line containment penetration.

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William J. Cahill, Jr. Vice President

Consolidated Edison Company of New York, Inc. 4 Irving Place, New York, N Y 10003 Telephone (212) 460-3819

May 27, 1976

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Indian Point Unit No. 2 Re 👘 Docket No. 50-247 Facility Operating License No. DPR-26

Regulatory Docket File

Director of Nuclear Reactor Regulation Attn: Mr. Robert W. Reid, Chief Operating Reactors Branch

U.S. Nuclear Regulatory Commission Washington, D.C. 20555

Gentlemen:

SITIO Our letters to you of February 19, 1976 and April 22, addressed the potential for submerged electrical equipment within the Indian Point Unit No. 2 containment following a postulated loss-of-coolant accident as well as our compliance with the Commission's Branch Technical Position EICSB 18. Enclosure 1 to this letter describes and summarizes the final results of our investigation of submerged electrical components inside containment. Enclosure 2 provides updated listings of submerged components and the details of the investigation. These enclosures supplement the information provided in our earlier letters and complete our response in these matters.

In addition, as a result of recent telecons with the Regulatory Staff, we have been advised that additional information pertaining to various single failure criterion must be provided for the Staff to complete their 10 CFR 50, Appendix K, ECCS review for Indian Roint Unit No. 2. These inquiries were the subject of a conference call on May 14, 1976 between members of your staff and our staff. As requested by Regulatory Staff, we are submitting herewith (Enclosure 3) a discussion of our position and planned actions concerning each of the items addressed during the May 14, 1976 cónference call.

It is our opinion that most of the items in question do satisfy the single failure criterion. Those items for which we feel further assurance of redundancy is desireable and capable of being performed during the present refueling outage will be resolved by completing the modifications described in Enclosure 3 prior to startup following refueling.

It should be noted that these modifications will be in addition to many other modifications previously scheduled for the present refueling outage and currently being performed to improve the reliability of safety-related systems. Enclosure 4 contains a

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listing of these projects presently underway. However, as stated above and discussed in Enclosure 3, we will expand our planned activities to allow for performance of modifications in response to those single failure inquiries which we have identified as requiring specific action to further assure redundancy and compliance with single failure criteria.

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Additionally, as requested during the May 14, 1976 telecon, enclosed are seven (7) copies of the following electrical one-line drawings:

- (1) Dwg. 540 F 921 Main One-Line Diagram.
- (2) Dwg. 540 F 923 480 V One-Line Diagram.
- (3) Dwg. 9321-F-3006 (Rev. 29) Single line diagrams for Emergency 480 V Motor Control Centers MCC 26A & MCC 26B and 118 V AC Instrument Buses.
- (4) Dwg. 9321-F-3008 (Rev. 21) Single line Diagram for 125 V D.C. System.

Very truly yours,

(alu

William J. Cahill, Jr. Vice President

Enc.

Indian Point Unit No. 2

In Con Edison's April 22, 1976 submittal, a listing of electrical components that could potentially become submerged during the post-LOCA period was provided. An additional electrical component that may also become submerged following a postulated LOCA should be added to the list. Level Transmitter LT-1003 on the Reactor Coolant Drain Tank has been determined to be located below the maximum calculated flood level. There are no consequences to ECCS performance or plant safety as a result of the flooding of that component.

Additionally, Con Edison's earlier listing indicated that various electrical penetrations would become submerged following a postulated LOCA. These electrical penetrations have now been specifically identified. Table 13 of Attachment C (Enclosure 2) provides a listing and evaluation of the effect on plant safety of those submerged electrical penetrations. As noted in Table 13, the following two proposed modifications will be completed during the present refueling outage.

(1) <u>Penetration H-69</u>: This penetration, which contains the power supply to motor control center MCC 28, is de-energized upon reactor trip due to an SI signal or undervoltage and plant safety, therefore, is not compromised by its submergence during the post-LOCA period. Nevertheless, fuses will be installed in series with the existing

-1-

circuit breaker in this line to provide redundant fault protection as an added measure of plant protection.

(2) <u>Penetration H-70</u>: This penetration contains the emergency lighting feed to lighting panel 218 within containment and is powered from DC power panel 22. As was done for the identical situation on Indian Point Unit No. 3, a new circuit breaker in series with new fuses will be installed in the emergency lighting circuit for Panel 218. This circuit breaker will be locked open except during access to containment and will assure that penetration H-70 is de-energized during accident conditions.

As demonstrated in Table 13 of Attachment C (Enclosure 2), submergence of containment penetrations H-58, H-59, H-60, H-61, H-63, H-64, H-66, H-67, H-68, H-69 and H-70 will not compromise their containment isolation function.

A final updated listing of safety-related submerged components is set forth with Attachment A (Enclosure 2) to this letter. Similarly, a final updated listing of non-safety related submerged components is set forth in Attachment B (Enclosure 2).

As requested by the NRC, an evaluation was made of the effect each submerged electrical component may have on power sources supplying safety-related components or on plant safety. This evaluation is presented in Tables 1 through 14 in Attachment C

-2-

(Enclosure 2). Each table identifies the submerged component, the circuit and power source from which it is supplied, as well as all the other components on that circuit. For each component, the effect on ECCS performance, containment isolation and other safety-related functions affecting plant safety if that component or circuit were lost has been evaluated.

In each case, the circuits were investigated to identify existence of primary and/or backup protection. Failure of the primary protection device (fuse) was then postulated and all circuits subsequently lost (by clearing of associated breaker) were identified. The safety significance of these circuits was reviewed and determined. In all, almost 200 circuit functions were evaluated with acceptable results. In all cases, fuse sizing and breaker ratings are coordinated with the load requirements of the specific components or circuit.

In certain instances, the clearing (de-energizing) of some submerged components (due to a trip on SI signal or undervoltage) was considered in the post-LOCA evaluation of ECCS performance or plant safety. This tripping function is in addition to individual fault protection provided by either fuses or circuit breakers. As noted in Tables 7 and 12, the following two proposed modifications will be completed during the present refueling outage in order to provide redundant fault protection and render these circuits consistent with the others:

-3-

Valves 1163, 1164, 1165, 1166, 1167 (Table 7): To incorporate secondary fault protection, fuses will be installed in series with the existing circuit breaker for this circuit. This modification will provide an added measure of plant protection during the post-LOCA period.

(1)

b.

c.

(2) <u>LT-1003 (Table 12)</u>: A fuse will be installed in series with the existing circuit breaker for this circuit. Again, this will provide redundant fault protection and further assure plant safety.

Included in Tables 1 through 13 of Attachment C (Enclosure 2) are the times for actual submergence of each electrical component. These times for submergence to occur were determined based on the following factors:

- The elevation of each submerged electrical component, as determined during the physical survey of that containment.
 - The containment volume per inch of elevation up to the maximum calculated water level of Elevation 50'-1". (See February 19, 1976 Con Edison letter to NRC for details).
 - Injection rates into the reactor coolant system consistent with operational requirements of the SI and spray systems during the injection and recirculation phase. This assumes maximum operation of SI pumps, RHR pumps and spray pumps operating (i.e., maximum safeguards) during these periods.

It is noted that as part of the changeover to the recirculation phase, only one spray pump continues

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in operation delivering water from the RWST to the containment.

d. RWST and spray additive tank (NaOH Tank) filled and emptying into containment.

e. Four accumulators filled to the maximum allowed by the Technical Specifications and emptying into containment.

f. At time of break, all RCS spillage to containment (including inventory of accumulators) is assumed to occur at Time = 0 for purposes of determining earliest time at which component submergence occurs. Additional spillage due to SI injection and spray operation (Item "c" above) is conservatively assumed to start at T=0 for this calculation.

Based on Items "a" through "f" above, the maximum water level at Elevation 50'-1" (e.g., 422, 479 gallons injected into containment and/or spilled to containment floor) is reached at approximately 47 minutes after the postulated accident. The flooding rate for Indian Point Unit No. 2 is identical to that for Indian Point Unit No. 3.

During a recent telecon, the NRC requested information concerning the seismic acceptability of any items relocated as a result of the submerged electrical component study. As discussed in our February 19, 1976 letter to the NRC, Valves 856A, B and D and portions of their associated piping are being relocated during the present refueling outage so the motor operators for these

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valves are located above the maximum calculated flood level. No modifications are being made to the valves or their operators. The new piping runs and associated supports have been reviewed in accordance with the Indian Point Unit No. 2 seismic Class I criteria and found acceptable.

The solenoids for Valves 891B and 891D and Flow Transmitters FT-925, FT-926 and FT-946B are simply being relocated upward on existing seismic Class I structures so as to be above the maximum flood level. These modifications will not affect the seismic capabilities of these components.

As discussed in our April 22, 1976 letter, there are eleven motor-operated valves required to be de-energized in order to comply with the NRC's Branch Technical Position EICSB 18. In addition, since redundant position indication in the central control room is required for these valves, separate limit switches are being installed on each of the eleven valves for that purpose. For Indian Point Unit No. 3, the supports on which the redundant position indication limit switches are mounted have been satisfactorily evaluated as seismic Class I structures. Since the modifications being made to Indian Point Unit No. 2 in this regard are identical to the Indian Point Unit No. 3 modifications, this seismic design acceptability also applies to Indian Point Unit No. 2.

During the same telecon, the NRC requested that the surveillance requirements incorporated in the Indian Point Unit No. 3 Technical Specifications, concerning periodic verification of valve

-6-

mechanical stop adjustments for the motor-operated valves in the high-head safety injection lines to the cold legs, be be addressed for Indian Point Unit No. 2 as well. These valves (856A, C, D and E for IP2) are adjusted during preoperational flow tests to provide balanced flow to the reactor coolant system. To assure that these valves do not become maladjusted during Indian Point Unit No. 2 reactor operation, Con Edison concurs that the following additions be included in the Indian Point Unit No. 2 Technical Specifications:

- (1) conduct a flow test of the high-head safety injection system after any modification is made to either its piping and/or value arrangement.
- (2) verify that the mechanical stops on Valves 856A, C, D and E are set at the position measured and recorded during the most recent emergency core cooling system operational flow test or flow test conducted in accordance with (1) above. This surveillance procedure shall be performed following any maintenance on these valves or their associated motor operators and at a convenient outage if the position of the mechanical stops have not been verified in the preceeding three months.

These specifications were acceptable to the NRC staff for Indian Point Unit No. 3.

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ATTACHMENT A

Indian Point Unit No. 2

Safety-Related Submerged Components (Maximum Calculated Water Level Within Containment Elevation 50'-1")

<u>Valves</u>: 856A* 856B* 856D* 891B** 891D**

Flow Transmitters: 925* 926* 946B*

Level Transmitter: 938***

Containment	Electrical	Penetrations:	н-58	н-66
			н-59	H-67
			н-60	H-68
		· · · · · · · · · · · · · · · · · · ·	H-61	н-69
	•		н-63	H-70

* To be relocated

** Solenoids to be relocated

*** Designed for submerged service in borated water at 295 F at a pressure of 69 psig

ATTACHMENT B

Indian Point Unit No. 2

Non-Safety Related Submerged Electrical Components (Maximum Calculated Flood Level Within Containment Elevation 50'-1")

Valves:	123	896B	955Ë	1164
<u></u>	200B	896C	955F	1165
	200C	896D	1003A	1166
	212	955C	1003B	1167
	896A	955D	1163	1609

Reactor Coolant Drain Tank Pump 21 & Junction Box Reactor Coolant Drain Tank Pump 22 & Junction Box

Containment Sump Pump 29 & Level Switch Containment Sump Pump 210 & Level Switch

Junction Box - Rack #14, Zone #24 of WCPPS

LT-1003 TT-1058

TE-122 TE-126

LT-1133 LT-1134 LT-1135 LT-1136 LT-1137

ATTACHMENT C

Indian Point Unit No. 2

Submerged Electrical Component Study List of Tables

		•	Des	scriptio	on	· ·		Table <u>No.</u>	No. of Sheets
Miscella	anec	ous (Compo	onents				· 1	1
Circuit	NO.	3,	125	V.D.C.	Distributio	on Panel	#21	2	6
87 87	\$1	5,	1Î		11	U j	#21	3	3
11	j 1	4.	ţ1	11	17	tr	#22	4	2
\$ 8	11	12.	£3	bi .	\$1	11	#22	5	2
и	FT	15.	· #	"	ġa.	**	#22	6	3
F1	11	9.	17	11	\$7	11	#23	7	1
Ħ.	11	3.	118	V.A.C.	Instrument	Bus	#21	8	2.
11	Ħ	14.	11	4 81	ŧ1.	11 .	#21	9	2
11	11	15.	11	11	**	11	#22	10	$\frac{1}{2}$
11	11	16.	11	11	11	F F	#23	11	2
\$ \$	11	3.	11	. 1 1	FT .	11	#24	12	, 2
Contain	nent	: E]e	ectri	ical Pe	netrations			13	1
Legend								14	2

INDIAN POINT UNIT NO. 2 TABLE 1 (PAGE 1 of 1),

PERFORMANCE REVIEW - SUBMERGED ELECTRICAL COMPONENTS WITHIN CONTAINMENT DURING POST-LOCA CONDITIONS-MISCELLANEOUS COMPONENTS

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·			-	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·				
Submerged	Function	Electrical Status		Effect on ECCS/ Plant Safety-		Time after SI to reach	Power Source	Electrical Fault	
Component	runction	Normal	Post .	Post-LOCA Period		Submergence (Minutes)		Protection	
		Operation	Period	Req'mt.	Effects	(Minutes)			
RCDT Pump #21 & J.Box	Drain Tank Pump (WDS)	Energized	De-ener- gized (Trip on SI signal or under- voltage	None	None	20 2'-10"	MCC #28 . Compt. 1E	Individ- ually fused 80A	
RCDT Pump #22 & J.Box						20	MCC #28 Compt. 1K	Individ- ually fused 100A	
Sump Pump #29 & Switch	Containment Sump Pump (W.D.S.) & Level Switch					7 (1'-2") 3 (6")	MCC #28 Compt. 4C	Individ- ually fused 30A	
Sump Pump #210 & Switch	B				B	7 3	MCC #28 Compt. 4E	0 in original sectors in the sector of the s	
Rack 14 Zone 24 J. Box	WC and PPS Indication Lights			11	n	8 (1'-4")	120V AC dist. Panel #21 Circuit #24	20A ĉircuit breaker	
PERI	FORMANCE REVIEW	I – SUBMERG	INDIAN PO ED ELECTRI	INT UNIT NC	<u>. 2</u> NTS WITHIN	TADLE CONTAI	2 NMENT I	(PAGE I UI 6 DURING	
--	--	------------------------------	--------------------------------	-------------------------	--------------------------	-----------------	-----------------------	--	-----------------------------------
		<u>CIRCUIT</u> (Circui	<u>#3 - 125V</u> t Protecti	DC DIST. I	ANEL #21 . Bkr.)	0 41)	Let Fl	evel 4'-1" a loor Elevation	bove -) 46'-0")
Submerged Component	Function	Valve Sta	tus	Effect on Plant Safe	ECCS Perf/ ety during	Compor	ients	Fime after SI condition to reach	Electrical Fault Protection
		Normal Plant Operation	Post- LOCA Period	Req'mt.	Effect	Comp.	ged Elev. above	Submergence (Minutes)	
Valve 200B (A.O)	Letdown Orifice Stop Valve CVCS	Closed	Closed F.C.	None	None	L.S.	Eloor	47	Individ. fused 3A
Valve 200C (A.O.)		Open					3'-0"	21	11
99499999999999999999999999999999999999									

TABLE 2 (PAGE 2 of

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OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT #3, 125V.D.C. DISTRIBUTION PANEL #21

<u>Component</u>	Function	Plant Safety for Loss of Electrical Power to Component and (Component Status)
Valve 200A	Letdown Orifice Valve	None (Closed & F.C.)
519	Water to PRT (Cont. Iso. Va.)	None (Closed on "T" Signal & F.C.)
876A	Spray Additive Tank Outlet Va.	None (Valve opens on "P" Signal & F.O.; 876A Redundant to 876B)
1813	Cont. Spray Pump Test Line Valve to RWST	None (N.C. & F.C.)
201	Letdown Line (Cont. Iso. Va.)	None (Closed on "T" Signal & Fail Closed)
863	N ₂ to Accumulators (Cont. Iso. Va.)	None (Fail Closed)
793	CCW Return from XLDHX (Cont. Iso., Va.)	None (Closed on "T" Signal & Fails Closed)
791	CCW Supply to XLDHX (Cont. Iso. Va.)	None (" ")
1702	RCDT Pump Disch. to HUT (Cont. Iso. Va.)	None (" ")
1723	Cont. Sump Pump Disch. to HUT (Cont. Iso. Va.)	None (" ")
1410	IVSWS Header Supply Valve	None (Valve opens on SI Signal & F.O.; redundant to 1413)
1786	RCDT to Vent. Hdr. (Cont. Iso. Va.)	None (Valve closes on SI Signal & F.C.)
956A	Press. Sample Line to Samp. System (Cont. Iso. Va.)	None (Closed, "T" Signal to close & F.C.)
956G	Accum. Sample Line to Samp. System (Cont. Iso. Va.)	
956E	RCS Sample Line to Samp. System (Cont. Iso. Va.)	

OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT #3, 125V.D.C. DISTRIBUTION PANEL #21

		Plant Safety for Loss of Electrical Power to Component
Component	<u>Function</u>	and (Component Status)
Valve 956C	Press. Sample Line (Cont. Iso. Va.)	None (Closed, "T" Signal to close & F.C.)
FCV-417	Main F.W. Control Va. to Steam Gen. #21	None (closed due to SI or reactor trip signal & F.C.)
FCV-427	Main F.W. Control Va. to Steam Gen. #22	антана (1997) 1997 — Правил Алариа, 1997 — Правил Алариа, 1997 — Правил Алариа, 1997 — Правил Алариа, 1997 — Правил Алариа, 1997 — Правил Алариа, 1997 — Правил Алариа, 1997 — Правил Алариа, 1997 — Правил Алариа, 1997 — Правил Алариа, 1
882 856B 894B 894D 843	D.C. Power to Monitor Light Position Indication on Control Board	None (White monitor light for position status not illuminated; separate and redundant position indication available)
956J	Gross Failed Fuel Detector System Isolation Valve	None (T'' Signal to Close and F.C.)
FCV-437	Main Feed Water Control Valve to Steam Generator #23	None (Closed on SI or reactor trip and F.C.)
FCV-447	Main Feed Water Control Valve to Steam Generator #24	None (Closed on SI or reactor trip and F.C.)

(PAGE 3 of 6)

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Effect on ECCS Perf./



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Component	Function	Effect on ECCS Performance/ Plant Safety for Loss of Electrical Power to Com- ponent & (Component Status)
SOV-1534 (PCV-1234)	Rad. Monitor R-11 Air Sample Return to Con- tainment (SOV Controls Cont. Iso. Va. PCV-1234)	None (closed "T" Signal to close & F.C.) Loss of Power closes PCV- 1234
SOV-1536 (PCV-1236)	Rad. Monitor Air Sample from Containment (SOV Controls Cont. Iso. Va. PCV-1236)	None (Closed, "T" Signal to close & F.C.) Loss of Power closes PCV-1236
SOV-1538 (PCV-1238)	Penetration Pressuri- zation Air to Rad. Monitor Line (SOV-1538 Controls PCV-1238)	None (PCV-1238 open; Phase A Signal to open PCV-1238 and PCV-1238 fails open) PCV-1238 (SOV-1538) redun- dant to PCV-1239 (SOV-1539)
SOV-1540 (PCV-1240)	Penetration Pressuri- zation Air to Rad. Monitor Line (SOV-1540 controls PCV-1240)	None (PCV-1240 open; Phase A Signal to open PCV-1240 and PCV-1240 fails open) PCV-1240 (SOV-1540) re- dundant to PCV-1241 (SOV-1541)
SOV-1523 (PCV-1223)	Stm. Gen. 21 Sample Line from Containment (SOV Controls Cont. Iso. Va. PCV-1223)	None (Closed, "T" Signal to close & F.C.) Loss of Power closes PCV- 1223
SOV-1524 (PCV-1224)	Stm. Gen. 22 Sample Line from Containment (SOV Controls Cont. Iso. Va. PCV-1224)	None (Closed, "T" Signal to close & F.C.) Loss of Power closes PCV- 1224
SOV-1525 (PCV-1225)	Stm. Gen. 23 Sample Line from Containment (SOV Controls Cont. Iso. Va. PCV-1225)	None (Closed, "T" Signal to close & F.C.) Loss of Power closes PCV- 1225
SOV-1526 (PCV-1226)	Stm. Gen. 24 Sample Line from Containment (SOV Controls Cont. Iso. Va. PCV-1226)	None (Closed, "T" Signal to close & F.C.) Loss of Power closes PCV- 1226

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(PAGE 5 of 6)

ABLE 2

OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT #3, 125V.D.C. DISTRIBUTION PANEL #21

Component	Function	Effect on ECCS Performance/ Plant Safety for Loss of Electrical Power to Com- ponent & (Component Status)
SOV-1527 (PCV-1227)	Stm. Gen. Blowdown Tank Spray Line (SOV-1527 Controls PCV-1227)	None (Fails closed) Loss of Power Closes PCV- 1227
SOV-1314 (PCV-1214)	Stm. Gen. 21 Blowdown Line from Cont. (SOV Controls Cont. Iso. Va. PCV-1214)	None ("T" Signal to Close & F.C.) Loss of Power Closes PCV-1214
SOV-1315 (PCV-1215)	Stm. Gen. 22 Blowdown Line from Cont. (SOV Controls Cont. Iso. Va. PCV-1215)	None ("T" Signal to Close & F.C.) Loss of Power Closes PCV-1215
SOV-1316 (PCV-1216)	Stm. Gen. 23 Blowdown Line from Containment (SOV Controls Cont. Iso. Va. PCV-1216)	None ("T" Signal to Close & F.C.) Loss of Power Closes PCV-1216
SOV-1317 (PCV-1217)	Stm. Gen. 24 Blowdown Line from Containment (SOV Controls Cont. Iso. Va. PCV-1217)	None ("T" Signal to Close & F.C.) Loss of Power Closes PCV-1217
SOV-1429 (PCV-1229)	Stm. Jet Air Ejector Disch. to Cont. Bldg. (SOV-1429 Controls Cont. Iso. Va. PCV-1229)	None (PCV-1229 closed; Phase A Signal to Close PCV-1229 and PCV-1229 Fails Closed)
SOV-1430 (PCV-1230)	Stm. Jet Air Ejector Disch. to Cont. Bldg. (SOV-1430 Controls Cont. Iso. Va. PCV-1230)	None (PCV-1230 Closed; Phase A Signal to Close) Loss of Power Closes PCV- 1230
SOV-1431 (PCV-1231)	Penetration Pressuri- zation Air to Stm. Jet Air Ejector Disch. Line (SOV-1431 Controls PCV- 1231)	None (PCV-1231 open; PCV-1231 (SOV-1431) re- dundant to PCV-1233 (SOV-1433)) Phase A Signal to Open PCV-1231 and PCV-1233).

TABLE 2

OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT #3, 125V.D.C. DISTRIBUTION PANEL #21

Component	Function	Effect on ECCS Performance/ Plant Safety for Loss of Electrical Power to Com- ponent & (Component Status)
SOV-1428 (PCV-1228)	Instrument Air to Containment (SOV Controls Cont. Iso. Va. PCV-1228)	None (Closed, "T" Signal to Close & F.C.)
SOV-1433 (PCV-1233)	Penetration Pressuri- zation Air to Stm. Jet Air Ejector Disch. Line (SOV-1433 Controls PCV-1233)	None (PCV-1233 open; Phase A Signal to Open PCV-1233 & PCV-1231) PCV- 1233 F.O. & redundant to PCV-1231
SOV-1132 (PCV-1132)	Stm. Jet Air Ejector Stm. Supply (SOV-1132 Controls PCV-1132)	None (PCV-1132 Fails Open)
SOV-1133 (PCV-1133)	Priming Ejector Stm. Supply (SOV-1133 Controls PCV-1133)	None (PCV-1133 Fails Open)
Cont. Recirc. Fan & Motor	Bearing Vibration Coil Reset Circuit	None

			CIRCUIT #5 (Circuit Pr	- 125VDC I rotection -	DIST. PNL # 20 Amp.Bk	<u>21</u> r.)	Note:	Final Post LOC Level 41-1" Floor Elevatio	A Flood, above n 46'-0"
No	y ve sy ni gen vy ny sy di Vila do sina da fas fas	Valve	Status	Effect on Plant Safe	ECCS Perf/ ty during	Compon	ents	Time after SI Condition	Electrical
ubmerged Component	Function	Normal Plant Operation	Post-LOCA Period	Post-LOCA	Period Effect	Submer Comp.	ged Elev. above	to reach Submergence (Minutes)	Fault Protection
Valve 212 (A.O.)	Pressurizer Aux. Spray Line Valve (RCS)	Closed	Closed F.C.	None	None	SOV	3'-1-1/	2" 23	Indiv. Fused-3a
896A (A.O.)	Accumulator #21 Drain Valve (SIS)		1	U		L.S.	2'-3"	15	
896C (A.O.)	Accumulator #23 Drain Valve (SIS)			0 		L.S.	2'-3"	15	H
HALL OF THE CARDING CARD									
1999 - S Talan (1996) - Alan (1997) - Alan (19] = <u></u>		(1997) (1						

Table 3 (Page 2 of 3)

OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT NO. 5, 125 V.D.C. DISTRIBUTION PANEL #21

Component	Function	Effect on ECCS Perf./ Plant Safety for Loss of Electrical Power to Component and (Component Status)
Valve 456	Power Operated Pressurizer Relief Valve	None (Closed & F.C.)
516	Pressurizer Relief Tank Vent Valve	None (N.C. & F.C.)
261A	R.C.P. #1 Seal Leak Off Valve	None (N.O. & F.O.)
261C	a a a a a a a a a a a a a a a a a a a	None (N.O. & F.O.)
553A	Primary Water to R.C.P. Standpipe	None (N.C. & F.C.)
553C		None (N.C. & F.C.)
215	Excess Letdown Divert Valve to Drain Tank or SWHX	None (Fail to SWHX)
268	V.C.T. Vent Valve	None (N.C. & F.C.)
204A	Charging Line Valve	None (N.O. & F.O.)
LCV-112A	Inlet Valve to V.C.T. (3-way valve)	None (Fail to VCT)
FCV-110A	Flow Control Valve for Reactor Makeup Control System	None (N.C. & F.O.)
FCV-110B		None (Closed & F.C.)
FCV-111A		None (Closed & F.C.)
FCV-111B		None (Closed & F.C.)
890C	Accum. #23 Fill Line Valve	None (Closed & F.C.)
890A	#21 " "	None (Closed & F.C.)
839A	S.I.S. Test Line Valve	None (Closed & F.C.)
839B		None (Closed & F.C.)

Table 3 (Page3 of 3)

OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT NO. 5, 125 V.D.C. DISTRIBUTION PANEL #21

<u> </u>		
		Effect on ECCS Perf./
		Plant Safety for
		Loss of Electrical
		Power to Component
Co. monort	Trunction	and (Component Status)
Component	Function	and (component status)
000-		
8395	S.I.S. Test Line Valve	None (Closed & F.C.)
839F	11 11 11 11	None (Closed & F.C.)
891A	Accum. #21 Vent Valve (Cont.Iso.Va.)	None (Closed & F.C.)
•		
891C	" #23 " " " " "	None (Closed & F.C.)
SOV-1170	Ser.Wtr. from Cont. Fan Coolers;	TCV-1104 opens on SI and
	SOV-1170 controls S.W. Bypass Valve	(fails open); TCV-1104
	TCV-1104	(SOV-1170) redundant to
•		$V_{a} = T_{c}V_{-1}105(S_{c}V_{-1}171)$
an a		
COT 1276	Con Mtm from Diogol Concrators.	FCV-1176 opens on ST
500-1276	Ser.WCI. HOM Dieser-Generators,	Fignal and (Fails Open).
	SUV-1276 CONTROLS S.W. Bypass valve	Boy 1176 (COV 1276) mo
	FCV-1176	FCV-11/6 (SOV-12/6)re-
		dundant to Valve FCV-
		1176A (SOV-12/6A)
a an		ار در اینکه میرود با میکند. از منابع از منابع میرود با میرود به میرود به میرود به میرود به میرود میکند کارد. به میرو از مراکبه اینکه میرود با میکند از منابع میرود با میکند میرود به میرود به میرود به میرود با میکند.
· · · ·		
SOV-1171	Ser.Wtr. from Cont. Fan Coolers;	TCV-1105 opens on SI
	SOV-1171 controls S.W. Bypass Valve	and fails open; TCV-1105
	TCV-1105	(SOV-1171) redundant to
		Valve TCV-1104 (SOV-1170)
SOV-1276A	Ser.Wtr. from Diesel Generators;	FCV-1176A opens on SI
	SOV-1276A controls S.W. Bypass Valve	Signal and fails open;
	FCV-1176A	FCV-1176A (SOV-1276A)
		redundant to valve
		$F_{CV} = 1176$ (SOV = 1276)
 A state of the sta		

· · · · · · · · · · · · · · · · · · ·			INDIA	N POINT UNI	<u>IT NO. 2</u>	<u>Ta</u>	ble 4	'(Page 1	of 2)
PERFORMAL	NCE REVIEW - SU	JBMERGED_EL	ECTRICAL CO CIRCUIT #4 (Circuit Pr	OMPONENTS V - 125VDC I rotection -	VITHIN CONT DIST. PNL # - 20 Amp.Bk	AINMENT 22 r.)	DURING Note:	FOST-LOCA CON Final Post LOCA Lavel 4'-1" Floor Elevation	DITIONS A Flood abova n 46'-0"
Submerged Component		Valve Status		Effect on Plant Safe	ECCS Perf/ ety during	Compon	ents	Time after SI Condition	Electrical
	Function	Plant Operation	Post-LOCA Period	Req'mt	Effect	Comp.	Elev. above Floor	Submergence (Minutes)	Protection
955C (A.O.)	Accumulator #21 Sample Valve (SS)	Closed	Closed F.C.	None	None	L.S.	3'-1"	22	Indiv. Fused-3a
955D (AO)	Accumulator #22 Sample Valve (SS)			H	"		1'-11!'	12	
955E (AO)	Accumulator #23 Sample Valve (SS)				•		1'-9"	11	u 1
955F (AO)	Accumulator #24 Sample Valve (SS)	U	U	U.	u	41	1'-11"	12	

Table 4 (Page 2 of 2)

OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT # 4, - 125VDC DIST. PNL. #22

Component	Function	Effect on ECCS Performance/ Plant Safety for Loss of Electrical Power to Com- ponent & (Component Status)
Valve 951	Pressurizer Sample Line	None (Closed & F.C.)
057		n n
0557	D. C. Comple Tipe Value	n n
955A	R.C. Sample Line valve	
0555		1
955B		
050	During teen Comple time	
	KHRS LOOP Sample Line	
	Valve	

INDIAN POINT UNIT NO. 2 TABLE 5 (PAGE 1 of 2)

Submerged Component		Valve or Component Status Ef		Effect on Plant Safe	ECCS Perf.	Comp	onents	Time after SI Condition to	
	Function	Normal Plant Operation	Post-LOCA Period	Post-LOCA Regimt	Period	Comp.	Elev. above	Reach Submergence (Minutes)	Electrica Fault Protection
Valve LCV-1003A (A.O.)	RCDT Level Control Valve to RCDT Pump Suction (WDS)	Open	Closed F.C.	None	Norie	SOV L.S.	3'-5" 2'-5"	30 16	Individua Fused 3A
Valve LCV-1003B (A.O.)					1	1			•
Valve 1609 (A.O.)	Drain Valve to Cont. Sump from RCDT or PRT (WDS)	Closed			"	11	3'-5" 2'-5-1,	2"	1
					•				

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THE THESE TREAMANES

OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT #12, 125V.D.C. DISTRIBUTION PANEL 22

Component	Function	Effect on ECCS Performance/ Plant Safety for Loss of Electrical Power to Com- ponent & (Component Status)
Valve PCV-1036A	G.D.T. Inlet Valve	None (Fail Closed)
PCV-1036B	G.D.T. Outlet Valve to Gas Analyzer	
PCV-1037A	G.D.T. Inlet Valve	17 11
PCV-1037B	G.D.T. Outlet Valve	11 11 ft
PCV-1038A	G.D.T. Inlet Valve	н н н
PCV-1038B	G.D.T. Outlet Valve	11 11 11
PCV-1039A	G.D.T. Inlet Valve	EI II
PCV-1039B	G.D.T. Outlet Valve	0
Valve SOV-1629	G.D.T. Outlet Valve to HUT Valves	
SOV-1630	G.D.T. Outlet Valve to HUT Valves	11 II I
SOV-1631	G.D.T. Outlet Valve to HUT Valves	
SOV-1632	G.D.T. Outlet Valve to HUT Valves	fi in the second se
SOV-1677	W.G.C. Va. to Shutdown G.D.T. Isolation	
RCV-018	Liq. RWS Disch. Valve to River	

(PAGE 2 of 2)

			•			F.	loor Elev. 46'-	0")
	Valve Sta	ltus	Effect on	ECCS Perf.	Comp	onents	Time after SI	
Function	Normal Plant Operation	Post-LOCA Period	Plant Safe Post-LOCA	Period Fffect	Subm	erged Elev. above	Reach Submergence	Electrical Fault
Accumulator #22 Drain Jine Valve To RCDT (SIS)	Closed	Closed F.C.	None	None	L.S.	2'-3"	15	Individual fused 3A:
Accumulator #24 Drain Line Valve to RCDT (SIS)					U	2'-3"	15	• • •
								•
	Function ccumulator 22 Drain ine Valve o RCDT (SIS) ccumulator 24 Drain ine Valve o RCDT (SIS)	Function Normal Plant Operation Ccumulator 22 Drain ine Valve o RCDT (SIS) Ccumulator 24 Drain ine Valve o RCDT (SIS)	FunctionNormal Plant OperationPost-LOCA Periodccumulator 22 Drain ine Valve o RCDT (SIS)Closed F.C.ccumulator 24 Drain ine Valve o RCDT (SIS)"	FunctionNormal Plant OperationPost-LOCA PeriodPlant Safe Post-LOCA Req'mtccumulator 22 Drain ine Valve o RCDT (SIS)Closed F.C.Noneccumulator 24 Drain ine Valve o RCDT (SIS)""	FunctionNormal Plant OperationPost-LOCA PeriodPlant Safety during Post-LOCA Periodccumulator 22 Drain ine Valve o RCDT (SIS)Closed F.C.NoneNoneccumulator 24 Drain ine Valve o RCDT (SIS)"""	Function Normal Plant Operation Post-LOCA Period Plant Safety during Post-LOCA Period Subm Post-LOCA Period ccumulator 22 Drain ine Valve o RCDT (SIS) Closed F.C. None None L.S. ccumulator 24 Drain ine Valve o RCDT (SIS) " " " " " ccumulator 24 Drain ine Valve o RCDT (SIS) " " " " " "	Function Normal Plant Operation Post-LOCA Period Plant Safety during Post-LOCA Period Submerged above ccumulator 22 Drain ine Valve o RCDT (SIS) Closed Closed F.C. None None L.S. 2'-3" ccumulator 24 Drain ine Valve o RCDT (SIS) " " " " " 2'-3"	Function Normal Plant Plant Operation Post-LOCA Period Plant Safety during Post-LOCA Period Submerged Reach Submergence (Minutes) Condition to Reach Submergence (Minutes) ccumulator 22 Drain ine Valve, o RCDT (SIS) Closed F.C. None None L.S. 2'-3" 15 ccumulator 24 Drain ine Valve, o RCDT (SIS) " " " " 2'-3" 15

IAN POINT UNIT NO. 2

(PAGE 2 of 3)

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Component	Function	Effect on ECCS Performance/ Plant Safety for Loss of Electrical Power to Com- ponent & (Component Status)
Valve PCV-453C	Power Operated Pressuri- zer Relief Valve	None (Fail Closed)
553B	Primary Water to R.C.P. Stand Pipe	None (Fail Closed)
553D	Primary Water to R.C.P. Stand Pipe	None (Fail Closed)
261B	R.C.P. #1 Seal Leak Off Valve	None (Open & F.O.)
261D	R.C.P. #1 Seal Leak Off Valve	None (Open & F.O.)
246	R.C.P. #1 Seal Bypass Valve	None (Closed & F.C.)
523	PRT Drain Valve	None (Closed & F.C.)
213	Excess Letdown Line Valve	None (Closed & F.C.)
204B	Charging Line Valve	None (Open & F.O.)
LCV-459	Letdown Line Valve	None (Closed & F.C.)
310	Letdown Divert Flow Valve (DBDM or Bypass)	Nonę (Fail to DBDM)
560	Primary Water to PRT	None (Closed & F.C.)
RCV-017	CCW Surge Tank Vent Valve	None (Fail Closed)
839C	SIS Test Line Valve	None (Closed & F.C.)
839D	SIS Test Line Valve	None (Closed & F.C.)
839G	SIS Test Line Valve	None (Closed & F.C.)
839H	SIS Test Line Valve	None (Closed & F.C.)
TCV-149	Letdown Divert Flow Valve (VCT or Demin- eralizer	None (Fail to VCT)



OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT #15, 125V.D.C. DISTRIBUTION PANEL #22

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Effect on ECCS Performance/ Plant Safery for Loss of Electrical power to Com-Component Function ponent & (component Status) Accumulator Fill Line#22 None (Closel & F.C.) Valve. 890B ... 890D #24 .. 891B Accumulator Gas Fill #22 891D " #24

			INDIAN P	OINT UNIT N	<u>0.2</u>	TAT	3LE .7	(PAGE 1	of 1)
PERFOR	MANCE REVIEW -	SUBMERGED CI (Ci	ELECTRICAL RCUIT #9 rcuit Prot	COMPONENTS - 125V.D.C. ection - 20	WITHIN CON DIST. PNL Amp. Bkr.	NTAINMEN	NT DURIN Dte: F- Le F	NG POST-LOCA CO inal Post-LOCA evel 4'-1" abov loor Elev. 46'-	NDITIONS Flood e 0")
Submerged Component	~ Function	Valve Sta Normal Plant Operation	atus Post-LOCA Period	Effect on Plant Safe Post-LOCA Req'mt	ECCS Perf. ty during Period Effect	Compo Submo	onents erged Elev. above Floor	Time after SI Condition to Reach Submergence (Minutes)	Electrical Fault Protection
Valve 1163 (A.O.)	Cont. Recirc. Fan Condensate Measuring System (WDS)	Open	Open	None	None	SOV L.S.	3'-1" 1'-3"	22 7	20A C.B. 30A Fuse*
Valve 1164 (A.O.)				U			3'-1" 1'-3"	22 7	
Valve 1165 (A.O.)							3'-1" 1'-3"	22' 7	1
Valve 1166 (A.O.)				U		.0	3'-1" 1'-3"	22 7	"
Valve 1167 (A.O.)			1) 1)	0	"	11	3'-1" 1'-3"	22 7	1
*Fuse to	be installed du	ring prese	nt outage						

Note: No other components powered from this circuit

PERFOR	MANCE REVIEW -	INDIAN P ELECTRICAL RCUIT # 3 rcuit Prot	DINT UNIT NO. 2TABLE 8(PAGE 1 of 2)COMPONENTS WITHIN CONTAINMENT DURING POST-LOCA CONDITIONS-118V.A.C. INST. BUS #21(Note: Final Post-LOCA Floodection - 15 Amp. Bkr.)Level 4'-1" above Floor Elev. 46'-0")						
Submerged Component	Function	Valve or Component Normal Plant Operation	t Status Post-LOCA Period	Effect on Plant Safe Post-LOCA Req'mt	ECCS Perf. ty during Period Effect	Comp Subm Comp.	onents erged Elev. above Floor	Time after SI Condition to Reach Submergence (Minutes)	Electrical Fault Protection
TE-122	Excess Let- down Heat Exchanger Temp. (CVCS)	Energized	Energized	None	None	RTD	1'-11"	12	Individually Fused 3/8A
TE-126	Regenerative Heat Ex- changer Temp. (CVCS)	Energized	Energized	None	None	RTD	2'-1"	14	Individually Fused 3/8A
									ullet
•									

Note: The external power supply provided for these transmitters limits the maximum current to the milli-amp range even when instrument is immersed or shorted.

able 8 (Page 2 of 2)

OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT # 3,- 118VAC INST. BUS #21

Component	Function	Effect on ECCS Performance/ Plant Safety for Loss of Electrical Power to Com- ponent & (Component Status)
Racks "A5" and "A6"	cvcs	none
TIC-100	Batch Tank Temp.	
TIC-149	Non-Regenerative Heat Exchanger Demin. Bypass	
LT-112	VCT Level	
FT-110	Boric Acid Blend	
FM-110	H H H	
TIC-103	B.A.T. Heater Control	
TIC-107		
CI-1136	Flash Evaporator Distillate	

<u> </u>		<u>C1</u> (C1	RCUIT #14, rcuit Prot	<u>118V.A.C.</u> ection - 15	INST. BUS Amp. Bkr.	<u>#21</u> (No)	ote: F La F	inal Post-LOCA evel 4'-1" abou loor Elev. 46'-	Flood . /e 0")
Submerged		Valve Status		Effect on Plant Safe	ECCS Perf.	Comp Subm	onents erged	Time after SI Condition to	Electrical
Component	Function	Plant Operation	Post-LOCA Period	Reqimt	Effect	Comp.	Elev. above Floor	Submergence (Minutes)	Fault Protection
HCV-123	Excess Let- down Heat Exchanger Control Valve (CVCS)	Closed	Closed F.C.	None	None	L.S.	2'-3-1	2" 15	Individual Fused 3 ⁱ /8A
			•						

Note: The external power supply provided for this controller limits the maximum current to the milli-amp range even when instrument is immersed or shorted.

TABLE 9

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OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT #14, 118V.A.C. INSTRUMENT BUS #21

			Effect on ECCS Performance/ Plant Safety for Loss of
Component		Function	Electrical Power to Com-
			ponent & (Component Status)
HC-130		Non-Regen. Hx CCW	None
		Temperature Control	
		Switch	
HC-135		Letdown Line Pressure	None
		Control Switch	None
NC 104			
nc-104		Boric Acid Tank Recirc.	None
		CONTROL SWITCH	
HC-105		Boric Acid Tank Recirc.	None
		Control Switch	
HC-142		Charging Line Flow	None
	·* • • • • •	Control Switch	NOUE
UC 100			
HC-123		Excess Letdown Hx Flow	None
		Concrot Switch	
HC-133		RHRS Alternate Flow	None
		to CVCS Control Switch	
	1.00		

			<u>CIRCUIT #</u> (Circuit P	15 - 118VACrotection -	C INST. BUS - 15 Amp. B	<u>#22</u> kr.)	(Note:	Final Post LC Level 4'-1" a Floor Elev. 4	CA Flood bove 6'-0")
		Valve or C Statu	Component 15	Effect on Plant Safe	ECCS Perf.	Compor	nents	Time after SI Condition to	Electrical
ubmerged component	Function	Normal Plant Operation	Post-LOCA Period	Req'mt.	Effect	Comp.	Elev. above Floor	Reach Submergence (Minutes)	Fault Protection
LT-1133.	Condensate Collection SysCont. Fan Coolers (WDS)	Energized	Energized	None	None	? Trans- mitter	3"-2"	23	Individual Fused 3/8A
LT-1134						• •	3'-2"	23	11
LT-1135						U	3'-2"	23	11
LT-1136		4	u	0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		II	3'-2"	23	"
LT-1137		n		0	• •	H	3'-2"	23	•

TABLE 10 (Page 2 of 2)

OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT #15, 118 V.A.C. INSTRUMENT BUS #22

Component	Function	Effect on ECCS Performance/ Plant Safety for Loss of Electrical Power to Com- ponent & (Component Status)
AR-1102	Cont. Dew Point Measuring System Recorder	None
AR-1102-R	U	None
LC-1210-S	Provides Level Control Signal to LCV-1163 for Fan Cooler, Weir #21	
LC-1211-S	Provides Level Control Signal to LCV-1164 for Fan Cooler, Weir #22	
LC-1212-S	Provides Level Control Signal to LCV-1165 for Fan Cooler, Weir #23	
LC-1213-S	Provides Level Control Signal to LCV-1166 for Fan Cooler, Weir #24	0
LC-1214-S	Provides Level Control Signal to LCV-1167 for Fan Cooler, Weir #25	

PERFO	MANCE REVIEW -	SUBMERGED C: (C:	<u>ELECTRICAL</u> RCUIT #16 Ircuit Prot	COMPONENTS - 118VAC II ection - 1	S WITHIN CO NST. BUS # 2 5 Amp. Bkr.	NTA INME 23 (N)	NT DURIN ote: F La F	NG POST-LOCA CC inal Post-LOCA evel 4'-1" abou loor Elev. 46'-	NDITIONS Flood (0")						
ubmerged	Function	Valve or Sta Normal	Valve or Component Status Normal		Valve or Component Status Effect on ECCS Perf. Plant Safety during Post-LOCA Period		Effect on ECCS Perf. Plant Safety during Post-LOCA Period		t on ECCS Perf. Safety during LOCA Period		Effect on ECCS Perf. Plant Safety during Post-LOCA Period		onents erged Elev.	Time after SI Condition to Reach	Electrical
omponent	FUNCTION	Operation	Post-LOCA Period	Req mt	Effect	Comp.	above Floor	Submergence (Minutes)	Fault Protection						
TT-1058	RCDT Temp. Transmitter (WDS)	Energized	Energized	None	None	Trans.	1'-6"	9	Individual Fused 1/4A see note						

Note: The external power supply provided for this transmitter limits the maximum current to the milli-amp range even when instrument is immersed or shorted.

TABLE 11 (Page 2 of 2)

OTHER PLANT COMPONENTS (NON-SUBMERGED) POWERED FROM CIRCUIT #16, 118 V.A.C. INSTRUMENT BUS # 23

Component	Function	Effect on ECCS Performance/ Plant Safety for Loss of Electrical Power to Com- ponent & (Component Status)
FT-1126-3	WC&PPS High Flow Zone 3	None
FT-1126-3A	WC&PPS Low Flow Zone 3	Ncne
SOV-1196	Sol. Valve to Bypass Flow Transmitters Zone 3	None
SOV-1213	Sol. Valve to Bypass Low Flow Transmitters Zone 3	None
PC-1203S	Provides Signal to SOV-1203 to Admit N2 on Low Pressure Zone 3	None
SOV-1203	Sol. Valve to Actuate PCV-1203 to Admit N ₂ to System Zone 3	None

· · · ·		<u>C1</u> (Ci	RCUIT #3 .rcuit Prot	- 118VAC IN ection - 15	IST. BUS # 2 Amp. Bkr.)	4 (No	ote: Fi Le Fl	nal Post-LOCA evel 4'-1" abov loor Elev. 46'-	Flood e 0 ")
ubmerged omponent	Function	Valve or Component Status Normal Plant Post-LOCA		Effect on ECCS Perf. Plant Safety during Post-LOCA Period		Components Submerged Elev.		Time after SI Condition to Reach	Electrical
LT-1003	Reactor Cool- ant Drain Tank Level Transmitter	Operation Energized	Period , Energized	Req [•] mt None	Effect	Comp. J. Box	above Floor 3'-5½"	(Minutes) 30	Protection 15a CB ; and 20A* Fu
									1 - Alter and Angel A. S Sectoring and A Sectoring and S Sectoring and A Sectoring and A Sectori
••••••••••••••••••••••••••••••••••••••									

<u>NOTE:</u> No other components powered from this circuit. *To be installed during present refueling outage.

TABLE 13 (Page 1 of 1)

PERFORMANCE REVIEW - SUBMERGED ELECTRICAL COMPONENTS WITHIN CONTAINMENT DURING POST-LOCA

CONDITIONS - ELECTRICAL PENETRATIONS

	Function	Electrical Status		Effect on ECCS/ Plant Safety - Post LOCA		Time after	Power' Source	Electrical
enetration		Normal Plant Operation	Post LOCA Period	Req'mt. Effects		SI to Reach Submergence ·(Minutes)	Power, Source	Protection
H-58 H-59 H-60 H-61	Reactor Control Rod Drive Cables	Energized	De- Energized (Trip on SI or under voltage)	None -	None	16 2'-4"	M.G, Set #21 M.G. Set #22 MCC #29	Reactor Trip Bkrs. Dereneigiz Penetr
H-63 H-64 H-67 H-68	Pressurizer Heater Cables		1			16 ·	480V Buses 2A, 3A, 5A	800a Ckt. Bkrs.
H-66	Containment Leak Rate Test	De- Energized	De- energized			16		
H-70	Containment Lighting Fdrs Panels 215 221 216 217 218	Energized " " Deenergized	De-energ. (Frip on SI or U.V.)		n D U U	16	120/208V Ltg hus " 480V Ltg. Bus	100a c.B.
	210	Deellergized	energized	••••••••••••••••••••••••••••••••••••••	•		#22 480V Swar #21	40a+ C.B. &60a [*] fuse
H-69	Feed to MCC #28 (Cont.)	•		.0	0	16	Section 16B	& 400a Fuse *

*These disconnecting devices will be } { 40a C.B. to be locked } installed during the present outage. open during operation.

Table 14 (Page 1 of 2)

LEGEND

Waste Disposal System
Weld Channel and Penetration Pressurization System
Safety Injection
Chemical Volume and Control System
Air Operated
Fail Closed
Limit Switch
Safety Injection System
Feed Water
Reactor CoolantDrain Tank
Pressurizer Relief Tank
Isolation Valve Seal Water System
Reactor Coolant System
Refueling Water Storage Tank
Component Cooling Water
Fail Open
Normally Closed
Normally Open
Volume Control Tank
Reactor Coolant Pump
Gas Decay Tank
Waste Gas Compressor
Hold Up Tank
Radioactive Waste System
Sampling System

Table 14 (Page 2 of 2)

RHRS -	Residual Heat Removal System
Phase A Signal -	"SI" or "T" - Containment Isolation Signal; "S" Open Valve on SI
Phase B Signal -	Containment Spray or "P" Containment Isolation Signal
SWHX -	Seal Water Heat Exchanger
XLDHX -	Excess Letdown Heat Exchanger
DBDM -	Deborating Demineralizer
FAI -	Fail As Is
J. Box -	Junction Box
sov -	Solenoid Valve
SW -	Service Water

ENCLOSURE 3

Indian Point Unit No. 2

ITEM 1 - VALVES 851A&B - CROSSOVER VALVES FOR HIGH HEAD SI PUMPS 21 & 23

- A. <u>Ouestion</u>: The Staff inquired whether a single failure in conjunction with a partial loss of offsite power could potentially close both crossover valves and render the high head system incapable of providing flow in both SI lines from a minimum of two SI pumps.
- B. <u>Response</u>: Our analysis indicates that no single failure could negate the proper functioning of the safety system. During an SI coincident with a loss of offsite power, the onsite Diesels 21, 22 & 23 will start and within 10 seconds will be ready to accept safeguard load from their 480V safeguard buses. In the loading sequence, SI pump 21 will start in 14.1 seconds after loss of offsite power (this time includes the 10 seconds for the diesel to come up to speed and close on to the safeguard bus). SI pump 22 will start in 13.3 seconds and SI pump 23 in 13 seconds. The motor operated crossover valves 851A (851B) are normally open and will not close until 17.5 seconds (18.5 seconds) after the associated SI pump motor fails to start.

Closure times of valves 851A and 851B are, therefore, consistent with times required for diesel electrical tie-in. No circuitry changes are necessary to assure against premature closure of these crossover valves.

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ITEM 2 - RHR VALVES 7 and 731 AND ASSOCIATED INTERLOCKS

- A. <u>Question</u>: The Staff questioned the redundancy of the pressure and valve interlocks.
- B. <u>Response</u>: The single pressure channel, PC-403, senses reactor coolant system pressure and opens permissive contacts in the opening circuitry of valves 730 and 731. Opening of either valve is thereby prevented by this permissive pressure interlock whenever the reactor coolant system is at pressure. This design feature serves as a back up to administrative controls which also precludes operation of these valves whenever the Reactor Coolant System is at pressure.

To provide further assurance against malfunction of the pressure interlock, a second independent pressure transmitter will be installed to provide a separate, independent signal to one of the two valves. The existing pressure transmitter will provide its signal to the other valve. This redundant design will assure that malfunction of a pressure interlock will not result in the simultaneous opening of both valves 730 and 731.

We have been advised, however, that the delivery of materials for this modification will require approximately four (4) months. Until this modification can be completed, valves 730 and 731 will be de-energized in the closed position whenever the reactor coolant system (RCS) pressure is above the RHR system design pressure. This precaution will assure that the valves will not be opened whenever high reactor coolant system pressure exists. The de-energizing of valves 730 and 731 in the closed position will, therefore, satisfy the intent of the proposed installation of redundant pressure interlocks.

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Valves 730 and 731 are also interlocked with parallel valves 888 A and B (RHRHXs to High Head System Intertie). A potential single failure item has been postulated whereby electrical grounding of these interconnected interlocks would result in the inability to remotely open both valve 888A and 888B. It was determined that this interlock system should be modified to provide a more unitized interlock arrangement. Therefore, valve 730 will be interlocked with valve 888A and valve 731 will be interlocked with valve 888B. Availability of a path for delivery of recirculated fluid to the suction of the high head pumps will, therefore, be assured by this proposed unitization. This modification will be performed during the present refueling outage.

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ITEM 3 - SWITCHOVER FUM INJECTION TO RECIRCULATING (8 SWITCH SEQUENCE

A. <u>Question</u>: The Staff inquired whether certain switches, if not properly positioned, could prevent automatic initiation of redundant safety equipment.

B. <u>Response</u>: Three separate forms of switch position indication exist to support the administrative controls which preclude operation of these switches until required under a postulated loss of coolant accident. These are:

- 1) The position of the switch handles themselves,
- The single green light ("switch off") and at least three red lights (energized as successive switch functions are completed) associated with each switch, and
 The "RECIRC. SWITCH OFF NORMAL" audible and visual annunciator alarm provided on panel SBIF.

However to further assure that redundant safeguard functions are not defeated in the unlikely event of a malpositioned switch, we will incorporate changes to these circuits similar to those provided at Indian Point Unit No. 3. In those cases where a single switch affects redundant components, contacts which open upon safety injection actuation will be added in series with the switch or interposing relay contacts. This will defeat the Recirc. Switch Function during the first phase of safety injection operation. Switches and associated functions to be interlocked in this manner are as follows:

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Switch 3

"43/RS-3" trip to each RHR pump.

Switch 6

- 1) "43/RS-6" open signal to valves 888A & B.
- 2) "43/RS-6" close signal to valves 746 and 747.

Switch 7

"43/RS-7" trip to each SI pump.

These changes will be completed during the present refueling outage.

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ITEM 4 - AUTOMATIC TR SFER CIRCUITS

480V Bus Ties

Ά.

Question: The Staff questioned whether the 480V A.C. redundant buses might be automatically tied together.

<u>Response</u>: The automatic closing feature associated with 480V safeguard bus tie breakers 2AT5A, 2AT3A & 3AT6A was previously removed. The subject circuit breakers can be closed only by operator action. The existing design does <u>not</u> allow redundant 480 volt safeguard buses to be automatically tied together.

B. Onsite DC Power System

Question: The Staff questioned whether the failure of the DC auto transfer devices could result in cross-connecting the batteries.

<u>Response</u>: There are seven auto transfer circuits for Indian Point 2 safeguard equipment use. (Diesels 21, 22, 23, 480V buses 2A, 3A, 5A and 6A). Cables from redundant DC panels in separately routed cable trays supply the load via the auto transfer device. There is physical cable separation from the redundant DC power sources to the auto transfer devices. There are two circuit interrupting devices between the auto transfer device and the DC bus. Since no single failure in

the transfer device could cause the loss of either DC bus, we consider the present design reliable and no circuitry changes are deemed necessary.

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ITEM 4 (Continued)

C. 118V AC Instrument Buses

<u>Question:</u> The Staff raised the question that one of the instrument buses is not fed from a diesel-backed MCC. In addition the back up feed for the instrument buses is also from a non-safeguard power supply. The Staff is questioning the installation's capability to perform its safety function.

<u>Response</u>: All safety related components fed from the four 118V AC instrument buses (with the exception of the Containment Spray Pump initiation logic) fail in the safe (trip) direction on loss of power. Therefore, if an SI coincident with loss of off site power and a single failure is postulated the proper function of the safety system is not jeopardized.

Power supplies for the containment spray actuation logic are supplied by safeguards power sources such that minimum requirements for system redundancy as specified in Table 3.3 of the Indian Point Unit No. 2 Technical Specifications are satisifed.

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ITEM 5 - DESCRIPTION OF SEPARATION AND REDUNDANCY FOR INSTRUMENT CHANNELS, POWER AND CONTROL CABLES

A. Question: The Staff requested more detail information on separation and redundancy.

B. <u>Response</u>: The Indian Point 2 reactor protection and engineered safety system cable circuits are routed in four instrument

channels, three power channels and three control channels to provide and preserve the basic redundancy and independence

of systems. In addition, cables are further separated in trays in accordance with voltage level, size and function. Cables

assigned to their channels will remain in their respective

channels throughout the run. The physical channeling is accomplished by either separate trays or trays with metal barriers and in some cases by separate conduit. In general, redundant

circuits are separated horizontally rather than vertically.

The separation distances vary from 1", when the separation is maintained by the use of 4" high 16 gauge sheet metal barriers within the tray, to three feet. Where physical conditions prevented horizontal separation, vertical separation was utilized.

The vertical channel separation varies from 7-1/2 inches to 19 inches.

The minimum vertical separation of 7-1/2 inches between redundant power trays and between power and control trays is supplemented with a 1/4" transite barrier. There are fire stops and fire barriers of glass wool, ceramic fiber blankets, fiberglass and

Flamastic 71A used throughout the plant to provide additional

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reliability.

For additional information refer to Indian Point FSAR Supplements3 & 12, Volume 5, Questions 7.6 & 7.7.

ITEM 6 - SAFETY INJECTION BLOCK SWITCH

- A. <u>Question</u>: The Staff inquired whether the existing single switch may permit bypassing of both redundant safeguards initiation circuits for low pressurizer pressure/low pressurizer level initiation signal.
- B. <u>Response:</u> Malpositioning of the Safety Injection Bypass Switch is prevented from defeating either train of Pressurizer Pressure/ Level Logic at pressure by automatic bypass removal circuitry (PC455C, PC456C & PC457C) which is designed in accordance with the single failure criteria. However, to preclude effects on both logic trains of low pressurizer pressure/level due to any failure of the common Safety Injection Block Switch, a second independent switch will be provided. Circuitry will be modified so that each switch is only associated with one of the two redundant logic trains. This modification will be performed

during the present refueling outage.

ITEM 7 - BYPASS OF REDUNDANT ENGINEERED SAFETY FEATURE LOGIC TRAINS

- A. <u>Question</u>: The Regulatory Staff questioned whether the potential exists for bypassing both redundant ESF circuits during testing.
- B. <u>Response:</u> Unit No. 2 does not have similar test circuitry to to that provided for Unit No. 3, so this problem is not completely applicable. (Actuation relay continuity at Unit No. 2 is verified by ohmeter rather than the test relay and test light combinations in use at Unit No. 3). Individual logic relay matrices on each train may be bypassed by operation of any of their associated logic relay test switches (function by function bypasses rather than complete train bypass). However, to further support administrative procedures, which preclude operation of logic relay test switches of opposite trains simultaneously.

separate annunciation for each train ("safeguards train A in test" and "safeguards train B in test") will be provided during the

present refueling outage.

ITEM 8 - LOW HEAD INJECTION LINE FLOW INSTRUMENTATION

- A. Question: The Staff inquired whether the single failure of a battery would result in the loss of two of the four low head line flow transmitters (FT-946 A,B,C and D). Since the emergency procedure for a postulated LOCA requires verifying flow in three of the four flow meters during the switchover to recirculation, sufficient information would not be available for the operator to proceed.
- B. <u>Response</u>: Indian Point Unit No. 2 Emergency Procedure E-2A presently requires verifying that 3 of the 4 transmitters indicate flows > 300 gpm before switching to low head recirculation. The corresponding Indian Point Unit No. 3 emergency procedure was modified during licensing of that unit to allow the operator to proceed based on only 2 flow meters indicating flows > 600 gpm through each one. The Staff has indicated that a similar approach for Indian Point Unit No. 2 would be acceptable and, therefore, IP 2 Emergency Procedure E-2A will be modified to reflect this change.

ITEM 9 - DIESEL FUEL UL TRANSFER PUMPS

- A: Question: The Staff inquired whether the fuel transfer pumps are powered from non-safeguard MCC's and may not be available when needed.
- B. <u>Response</u>: The diesel fuel oil transfer pumps are fed from MCC 27 and 29. Although both MCC's are automatically disconnected on an SI, the operators have approximately 1 hour as a minimum (nearly 2 hours assuming a full Day Tank) after the SI to restore the power supply to the subject pumps from the CCR. Since there is ample time available for required operator action, no changes to the existing design are deemed necessary.

ITEM 10 - DIESEL FUEL IL TRANSFER CIRCUITS

A: <u>Question</u>: The Staff questioned whether the failure of the manual sequencing switch could prevent fuel transfer to all three diesel Day Tanks.

B. <u>Response</u>: The operating sequence of the 2Hp fuel transfer pumps is determined by positioning a sequence selector switch. In our opinion, there are great advantages in having the capability to supply fuel from any of the three oil storage tanks to any of the diesel Day Tanks such as the present design provides.

It should also be noted that the Day Tanks have nearly 2 hour fuel supply capacity when full and a minimum of 1 hour supply before the low level alarm alerts the operators in the CCR that a Day Tank is 50% full and the fuel transfer pumps failed to start. Even if there was a selector switch failure, which we feel is extremely unlikely, contacts could be bypassed on an emergency basis in the allotted time.

We believe that the present system flexibility to supply fuel for the dieselDayTanks is advantageous and reliable.

Therefore, no changes to the system design are deemed necessary.

ITEM 11 - VALVES 743 AND 1870: MINIFLOW VALVES FOR RHR PUMPS

- A. <u>Question</u>: A postulated single failure involving motor operated valve 743 or 1870 could potentially result in the spurious closure of one of these RHR Pump miniflow valves.
- B. <u>Response</u>: To assure that a postulated single failure of valve 743 or 1870 would not cause interruption of RHR pump miniflow, it was determined that these two valves should be locked in the open position with their supplies physically disconnected. Proper safeguards positioning of the two valves would, thereby, be assured.

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Indian Point Unit No. 2

ENCLOSURE 4

- 1. Modification Resulting From Submerged Electrical Study:
 - (a) Relocation of valves 856 A, B & D and associated piping.
 - (b) Relocation of solenoids for accumulator N fill line isolation valves 891 B & D.
 - (c) Relocation of Flow Transmitters FT-925, 926 and 946 B.
 - (d) Installation of additional fuses and/or circuit breakers for four circuits powering electrical equipment that could potentially become submerged following a postulated LOCA. These improvements will provide redundant fault protection for the four lines and render them consistent with the other circuits.
- 2. Ventilation System Modifications:
 - (a) PAB Exhaust installation of carbon filters.
 - (b) FSB Exhaust installation of carbon filters.
 - (c) Post Accident Ventilation System installation of carbon filters.
 - (d) Installation of flow instrument in plant vent.
- 3. Appendix J 10 CFR 50:

Performance of Type A,B and C Containment Leak Tests in accordance with Appendix J to 10 CFR 50. In addition, pressure gauges are being installed in both the personnel and equipment airlocks to assure repressurization of the hatch seals following each closure of the airlock doors.

- 4. Miscellaneous Modifications:
 - (a) Installation of feedwater low flow bypass valves.
 - (b) Modification to accumulator level transmitters as necessary to comply with new accumulator levels required by the Final Acceptance Criteria (FAC) for ECCS.

- (c) Installation of Metal Impact and Loose Parts Monitoring System for the Reactor Coolant System.
- (d) Modifications to improve design of Westinghouse BFD relays and W-2 switches.
- (e) Installation of Blowdown Tank Vent Iodine Sampling System.
- (f) Modifications to correct thermal overstressing of tubing in the sample line containment penetration.

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