



LONG ISLAND LIGHTING COMPANY

SHOREHAM NUCLEAR POWER STATION

P.O. BOX 618, NORTH COUNTRY ROAD • WADING RIVER, N.Y. 11792

November 23, 1981

SNRC-638

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555



Shoreham Nuclear Power Station - Unit 1
Docket No. 50-322

- Reference: (1) Letter USNRC to LILCO, Mr. Robert L. Tedesco
to Mr. M. S. Pollock, August 31, 1981, Staff
Positions - Shoreham Nuclear Power Station
- (2) Letter SNRC-599 dated July 20, 1981

Dear Mr. Denton:

Enclosed herewith are sixty (60) copies of the items listed below,
submitted in response to concerns identified in the SER Supplement
No. 1 and in Ref. 1:

- (1) NUREG-0737 Item II.B.3 - Post Accident Sampling -
Loss of Offsite Power;
- (2) NUREG-0737 Item II.K.3.28 - Qualification of ADS
Accumulators - Leak Testing;
- (3) SSER No. 1 Open Item No. 62 - Remote Shutdown Panel
Single Failure; and
- (4) NUREG-0737 Item I.C.8 - Emergency Procedures - Revised
as a follow-up to NRC review and simulator verification.

It should be noted that NRC letter dated August 31, 1981 establishes
the Staff position that the remote shutdown system must be capable
of achieving cold shutdown assuming a single failure in the systems
required for effecting safe shutdown.

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We do not recognize the basis in regulation for application of the single failure criteria to the remote shutdown system. The Shoreham design is in compliance with the applicable regulation (General Design Criterion 19 of Appendix A to 10CFR50) as described in the FSAR which was first issued in September 1975. To our knowledge, the only area where this issue is discussed is Standard Review Plan (SRP) Section 7.4 which was subsequently issued in November 1975. That ambiguously worded reference to single failure criteria in the SRP was not interpreted by either the Staff or the industry as being applicable to the remote shutdown panel. This section of the SRP was recently revised in July 1981 where, for the first time, the NRC position was clearly stated.

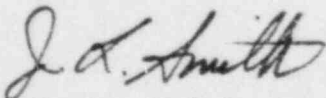
Nevertheless, we have analyzed the remote shutdown system considering single failure and have demonstrated the required shutdown capability is achievable as described in our response to SER Open Item No. 62.

The Shoreham Nuclear Power Station Emergency Procedures (as listed in Attachment 1) have been revised since last submitted via Ref. 2 to account for the following:

1. Incorporation of NRC comments based on the simulator demonstration at the Limerick simulator on 10/16/81 and the SNPS Control Room walk through on 10/17/81;
2. Rewriting of the procedures to the procedure format as recommended by the NRC; and
3. Incorporation of changes required per Revision 1B of the BWR Owners' Group Emergency Procedure Guidelines.

If you require additional information or clarification, please do not hesitate to contact this office.

Very truly yours,



J. L. Smith
Manager Special Projects
Shoreham Nuclear Power Station

RWG:mp

Enclosure

cc: J. Higgins

Attachment 1

Shoreham Nuclear Power Station - Unit 1
Emergency Procedures

<u>Title</u>	<u>SP Number</u>	<u>Revision</u>
Level Control Emergency Procedure	29.023.01	F
Cooldown Emergency Procedure	29.023.02	F
Containment Control Emergency Procedure	29.023.03	F
Level Restoration Emergency Procedure	29.023.04	F
Rapid RPV Depressurization Emergency Procedure	29.023.05	F
Reactor Pressure Vessel Flooding Emergency Procedure	29.023.09	F
Transient with Failure to Scram Emergency Procedure	29.024.01	E

II.B.3 - POST-ACCIDENT SAMPLING CAPABILITY

The NRC, in Supplement No. 1 to the SER, has stated the requirement that the Post-Accident Sampling System (PASS) have the capability of operating within thirty minutes of an accident in which there is core degradation, assuming loss of offsite power. The LILCO electric generation and transmission network is such that power can be restored to Shoreham in less than thirty minutes from any one of many offsite generator sources with black start capability. Procedures for restoration are being prepared, with Shoreham Nuclear Power Station considered as the first priority.

Upon restoration of offsite power, the PASS would be able to function normally, as described in our response to TMI Item II.B.3.

ADS ACCUMULATOR TEST REQUIREMENTS

In accordance with the response submitted for TMI Item II.K.3.28, and previous discussions with NRC personnel, the ADS accumulators will be tested initially and periodically thereafter on a schedule consistent with the Shoreham integrated leak rate test to verify their pressure retaining capability in the immediate period following a postulated LOCA. As previously specified, the accumulators will be tested for a period of 10 minutes by initially pressurizing the accumulators to 90 psig and verifying that each accumulator does not decay below 70 psig.

In addition, the accumulator system integrity will be further qualified by extending the pressure decay test, and verifying that the pressure does not decay below 55 psig at the end of 30 minutes. The acceptance criterion was determined by applying a 25 psid allowance for valve operation to the 30 psig containment pressure. Analyses have shown that the containment pressure will not exceed 30 psig within 30 minutes after initiation of the accident for a steam pipe break size of 0.1 ft² or less.

Questions from Staff Position Letter dated August 31, 1981.

In the event of loss of habitability of the control room for reasons other than fire, we are concerned that random single failures in the instruments and controls of systems controlled from the remote panel or in the systems themselves may prevent attaining cold or hot shutdown from the shutdown panel.

It is our position that you demonstrate a capability to attain and maintain hot shutdown and subsequently cold shutdown from outside the control room, assuming a single failure in the systems required for affecting safe shutdown. Offsite power should be assumed to be unavailable.

Your response to this issue should address the following specific requirements. These requirements must be met in order to demonstrate compliance with 10 CFR Part 50, Appendix A (GDC-19), Appendix K, and Appendix R.

1. The design should provide redundant safety grade capability to achieve and maintain hot shutdown from a location(s) remote from the control room, assuming no fire damage to any required systems and equipment and assuming no accident has occurred. Credit may be taken for manual actuation (exclusive of continuous control) of systems from locations that are reasonably accessible from the Remote Shutdown Panel. Credit may not be taken for manual actions involving jumpering, rewiring, or disconnecting circuits.
2. The design should provide redundant safety grade capability for attaining subsequent cold shutdown through the use of suitable procedures.
3. The design should be such that the manual transfer of control to the remote location(s) should not disable any automatic actuation of ESF functions while the plant is attaining or maintained in hot shutdown, other than where ESF features are manually placed in service to achieve or maintain hot shutdown. It is permissible to disable automatic LPCI actuation in this manner only when necessary in order to enable control of the RHR system from the remote location and while operating this system to effect cold shutdown from hot shutdown.
4. The design should provide, as a minimum, non-redundant safety grade systems necessary to achieve and maintain hot shutdown from either the control room or from a remote location(s) assuming a postulated fire in any fire area, including the control room or the Remote Shutdown Panel. Credit may be taken for manual actuation (exclusive of continuous control) of systems from locations that are reasonably accessible from the control room or the Remote Shutdown Panel, as applicable. Credit may not be taken

for manual actions involving jumpering, rewiring, or disconnecting circuits.

5. The design should provide, as a minimum, non-redundant safety grade systems necessary to achieve and maintain cold shutdown from either the control room or from a remote location(s). The design should be such that in the event of fire damage in any fire area, systems could be repaired or made operable within 72 hours if required for cold shutdown.

Response:

- 1,2) The remote shutdown system for Shoreham is described in detail in FSAR Sections 7.4.1.4, 7.4.2.4, 7.5.1.4, and 7.5.1.5. The remote shutdown panel (RSP) contains the necessary instrumentation and controls to bring the reactor to cold shutdown in an orderly fashion.

In addition, an analysis has been performed to consider single failure of systems controlled from the RSP. The analysis concludes the following:

1. The plant can be brought to hot shutdown without leaving the RSP.
2. The plant can be brought to cold shutdown with some control away from the RSP.
3. The above will be achieved with the use of additional local instrumentation considering the assumed system failures.

The following assumptions were used in concluding the above:

1. single failure of any system controlled from the RSP, including loss of any single power supply train,
2. no accident,
3. no fire damage,
4. loss of offsite power,
5. credit taken for accessibility of equipment and controls not in control room or relay room and outside primary containment, and
6. credit taken for automatic operation of systems not on RSP.

See Attachment 1 for a detailed summary of the single failure analysis performed for the remote shutdown system.

- 3) Automatic actuation of ESF systems is not required while the plant is attaining, or maintained in hot shutdown. Once the operator takes control of the systems on the RSP the auto-actuation circuits for these systems will be disabled. However, other ESF systems not controlled from the RSP which have automatic features will function automatically, as required, even after the operator has transferred control to the RSP.

During operation from the control room, the RSP is administratively inaccessible and therefore transfer to this location is not possible. The only other controls transferable to local control are the diesel controls. However, auto-actuation is not blocked while in this mode.

- 4,5) SNPS complies - see SNRC-572 dated 5/21/81 paragraphs III.G and III.L.

ATTACHMENT 1

SINGLE FAILURE ANALYSIS - REMOTE SHUTDOWN SYSTEM

1. Assumed single failures
 - a. Total failure of any system located on remote shutdown panel and its associated instrumentation. (Tables 1 and 2)
 - b. Failure of blue diesel generator. (Tables 3 and 4)
 - c. Failure of orange diesel generator. (Tables 3 and 4)
 - d. Failure of red battery. (Tables 3 and 4)
 - e. Failure of blue battery. (Tables 3 and 4)
 - f. Failure of red diesel generator. (Tables 3 and 4)
 - g. Failure of MG bus. (Tables 3 and 4)
2. Determine the following:
 - a. Assuming any one of the above single failures, which of the systems remaining on the remote shutdown panel could be used to reach hot and cold shutdown.
 - b. Assuming any one of the above single failures, which components of systems not on the remote shutdown panel would be required to reach hot and cold shutdown.

System Failure

Table 1

<u>RSP System for Which Total Failure is Assumed</u>	<u>Systems On RSP Which Can be Used for Shutdown</u>	<u>Alternate Systems Not Located on RSP Which are Required to Reach Shut down</u>
Residual Heat Removal System	RCIC/SRV's to achieve hot shutdown	Not required
	Cold Shutdown (Note 1)	RHR "A" System and Service Water "A" System
Reactor Core Isolation Cooling (RCIC)	SRV/RHR (LPCI) to achieve hot and cold shutdown	HPCI (Auto between Lev 2 and Lev 3) (Note 2)
Fuel Pool Cooling System	Not required for hot/cold shutdown	
Reactor Building Closed Loop Cooling Water System (RBCLCW)	RCIC/SRV's Required to achieve hot shutdown	
	SRV/LPCI/Service water required to achieve cold shutdown	Not required
Nuclear Boiler System (3 SRV Valves)	RCIC/SRV's required to achieve hot hot shutdown	Not required
	RCIC to 50 psig then RHR shutdown cooling mode to achieve cold shutdown	Not required
Compressed Air System (SRV Accumulators)	RCIC/SRV's required to achieve hot shutdown	Not required
	To achieve cold shutdown RCIC will be used to 50 psig then RHR shutdown cooling mode	Not required

TABLE 1 (CONT'D)

<u>RSP System for Which Total Failure is Assumed</u>	<u>Systems On RSP Which Can be Used for Shutdown</u>	<u>Alternate Systems Not Located on RSP Which are Required to Reach Shutdown</u>
Reactor Recirculating System (Note 3)	RCIC/SRV's required to achieve hot shutdown	Not required
	SRV/LPCI/SW required to achieve cold shutdown	Not required
Service Water System	RCIC/SRV's to achieve hot shutdown	
	Cold Shutdown (Note 4)	Service Water System "A"

NOTE:

1. Depending on which mode is lost the operator may:
 - a. Use alternate system on RSP (i.e., long term cooling alternate path ADS/LPCI/Service Water.
 - b. Use valves on RSP and start "D" pump locally.
 - c. Start RHR "A" system locally.
2. The HPCI system could be used in the auto mode with the ADS valves on the RSP in a feed and bleed mode down to 100 psig - then RHR in long term cooling mode.
3. Required to prevent short cycling the core in RHR long term cooling for cold shutdown.
4. Two service water pumps are on the RSP, loss of one is acceptable. A complete loss of service water "B" the operator would start/line up "A" System to cross tie with "B" system.

TABLE 2INSTRUMENT FAILURE

<u>Description and Instrument</u>	<u>Indications On RSP Which Can Be Used For Shutdown</u>	<u>Alternate Indications Not Located On RSP Which Could Be Used To Reach Shutdown</u>
RCIC Flow 1C61-FI104	Reactor Water Level 1C61-LI004	Not Required
RCIC Turbine Speed	Reactor Water Level 1C61-LI004	Not Required
RHR "B" Flow 1C61-FI001B	Supp Pool Temp Reactor Water Level Reactor Press	Not Required
SRV Air Header Press 1C61-PI06	Not Required for Shutdown	
RHR Conductivity 1C61-CI016	Not Required for Shutdown	
Reactor Water Level 1C61-LI004	None	B21-NO26 A Note 1
Drywell Temp 1C61-TI021	Not Required for Shutdown	Not Required for Shutdown
Reactor Press 1C61-PI006	None	
Drywell Press 1C61-PI012	Not Required for Shutdown	Not Required for Shutdown
Service Water Header Press 1C61-PI011	Not Required for Shutdown	Not Required for Shutdown
Supp Pool Temp 1C61-TI022A 1C61-TI022B	No Problem, Redundant Channels Provided	
Supp Pool Level 1C61-LI026	Not Required for Shutdown	

Note - If loss is due to electrical power failure, operator may use local transmitter B21-NO26B. If loss is due to mechanical failure, operator may use the additional instrument B21-NO26A located on the the rack.

LIST OF POWER SUPPLIES

TABLE 3

<u>DG-101 (Red)</u>	<u>DG-102 (Blue)</u>	<u>DG-103 (Orange)</u>	<u>Battery A</u>	<u>Battery B</u>	<u>MG-Bus112V</u>
E11-F022 1E11*MOV054 RHR Reactor Head Spray Valve	E51F007 1E51*MOV041 Stm Supply Line Inboard Isolation VV	1P41*MOV031D Pump Disch. Valve 1P41*P003D RB Serv. Wtr. PMP "D" (Power)	RCIC Turbine Trip E51-F010 1E51*MOV031 Pump Suction From Cond Stor Tank Valve	E11-F008 1E11*MOV048 Outboard Shut- down Isolation Valve	E11-F015B 1E11*MOV037B RHR Injec- tion VV
E11-F006A 1E11*MOV032A Shutdown Cool- ing Valve	E11-F004B 1E11*MOV031B RHR Pump "B" Suction Valve		E51-F022 1E51*MOV037 Test Bypass to Cond Storage Tank Valve	E11-F023 1E11*MOV053 Reactor Head Spray Isola- tion Valve	E11-F017B 1E11*MOV036B RHR Injec- tion VV
E11-F006C *MOV032C Shutdown Cool- ing Valve	E11-F006B1 1E11*MOV032B Shutdown Cool- ing VV		E51-C002 1E51*VBM062 RCIC Pump Drive	E11-C002B RHR B Pump (Breaker Con- trol Pwr	E11-F007B 1E11*MOV045B RHR Pump Minimum Flow Bypass Valve
E11F009 1E11*MOV047 RHR Shutdown Cooling Inboard Isolation Valve	E11*MOV011B 1E11*MOV044B RHR Heat Exch To Suppr Pool Valve		E51-F031 1E51*MOV032 Pump Suct From Suppr Pool Valve	1P41*P-003B RB Service Water B PMP (Breaker Control Power)	
Power Supply C61-K012 1C61*E/S101 Remote Shutdown Panel	E11-F024B 1E11*MOV042B Containment Spray Valve		E51-F008 1E51*MOV042 Steam Supply Line Outbd Isolation Valve		
SRU-2 (Sheet 13) C61-K017(1C61- P1012) C61-K018(1C61- T1021) C61-K019(1C61- T1022A) Drywell-Temp/ Press Suppr Pool-Temp.	E11-F006D 1E11*MOV032D Shutdown Cool- ing VV		E51-F045 1E51*MOV043 Steam To Tur- bine VV.		
SRU-3 (Sheet 3) C61-K016 1C61-L1004 Reactor Vessel Level	E11-F026B 1E11*MOV043B RHR Heat Exch Flow to RCIC Valve		E51-F001 1E51*MOV045 Turb Exh To Suppr Pool Valve Barometric Cond Condensate Pump 1E51*P-077		

TABLE 3 (CONT'D)

<u>DG-101 (Red)</u>	<u>DG-102 (Blue)</u>	<u>DG-103 (Orange)</u>	<u>125V Battery A</u>	<u>125V Battery B</u>	<u>MG-Bus112y</u>
G61-R011 1C61*PI006 Nuclear Boiler Pressure	E11-F003B 1E11*MOV035B Heat Exch. Shell Side Out- let Valve		E51-F-046 1E51*MOV038 Lube Oil Cool- ing Water Valve		
1P50*MOV103A SRV Comp. Air Outbd Isol Valve	1P41*MOV037B RBCLCW Heat Exch Outlet Valve		Turbine Trip & Trottle Valve 1E51*MOV044		
1P50*MOV105A Srv comp. Air Inboard Isol Valve	E11-F048B 1E11*MOV034B Heat Exch Shell Side Bypass Valve		Barometric Cond. Vacuum Pump 1E51*P-076		
1P50*MOV113A Srv Comp Air Normal Supply Valve	E51-F085 1E51*MOV047 Warm Up Line Isolation Valve		B210F013C 1B21*RV092C Manual Blowdown Valve		
1P50*MOV114A SRV Comp Air Emergency Sup- ply Valve	E11-F028B 1E11*MOV040B Containment Spray Isolation Valve		B21-F013D 1B21*RV092D Manual Blowdown Valve		
	E11-F047B 1E11*MOV033B Heat Exch Shell Side Inlet Valve		E51-F013 1E51*MOV035 Pump Discharge VV. from E51-F012		
	B31-F023B 1B31*MOV031B Recirc Pump Suction Valve		E51-F012 1E51*MOV034 Pump Discharge Valve		
	E11-F010 1E11*MOV050 RHR Cross Header Shutoff Valve		E51-F019 1E51*MOV036 Minimum Flow To Suppr. Pool Valve		
	E11-F016B 1E11*MOV038B Containment Spray Isolation Valve		E51-F084 1E51*MOV049 Turbine Exhaust Vac. Breaker valve		
	E11-F002B 1P41*MOV034B Heat Exch Ctg Wtr Disch VV				

TABLE 3 (CONT'D)

<u>DG-101 (Red)</u>	<u>DG-102 (Blue)</u>	<u>DG-103 (Orange)</u>	<u>125V Battery A</u>	<u>125V Battery B</u>	<u>MG-Bus112V</u>
	E11-F027B 1E1.*MOV041B Suppression Pool Isolation Valve		B21-F013F 1B21*RV092F Manual Blowdown Valve		
	1P42*MOV042B RBCLCW Heat Exch Inlet Valve		E51-F002 1E51*MOV046 Vacuum Pump to Suppr. Pool Valve		
	1P42*P-005B RBCLCW Pump		Inverter-125VDC/ 120VAC 60 Hz C61-K002		
	1G41*P-023B Spent Fuel Pool Cooling Pump		Power Supply-120VAC 60HZ/ 24VDC C61-K010 1C61*E/S022 Remote Shutdown Panel		
	Power Supply C61-K005 1C61*E/S 100 Remote Shut- down Panel		Controller C51-R001 1C61-FC104 Remote Shutdown RCIC Flow		
	SRU-1 (Sheet 3) C61-R013 1C61-C1016 RHR HX Shell Outlet C61-R005 1C61*FI001 RHR Main Flow		Square Root Conv. C61-K001 1C61-FK104 Remote Shutdown RCIC Flow		
	SRU-4 (Sheet 13) C61-R014 1C61-PI011 Serv. Wtr. Hdr. Press. C61-R015 1C61-TI022B Suppr. Pool Temp.		Controller*SH 11 1C61*PIC142 Lube Oil Cooler Containment		
	SRU-4 (Sheet 13) C61-R016 1C61-LI026 Suppr. Pool Level		1E51*PCV142 Lube Oil Cooler Containment		

TABLE 3 (CONT'D)

DG-101 (Red)	DG-102 (Blue)	DG-103 (Orange)	125V Battery A	125V Battery B	MG-Bus112X
	1E11*P-014B E11-C002B RHR "B" Pump (Power)		1E51*PT142 Lube Oil Cooler Containment		
	1P41*MOV031B RB Serv Wtr "B" Pump Disch VV		RCIC Turbine Flow Control & Indication		
	1P41*MOV035B TBCLCW Isola- tion VV				
	1P41*MOV032B RB Serv Wtr Header Isola- tion VV				
	1P41*P-003B "B" Service Wtr "B" Pump (Power)				

Power Supply Failure

Table 4

<u>Power Supply That is Lost</u>	<u>Systems on RSP For Shutdown</u>	<u>Alternate Systems Not on RSP That Will Be Required To Shutdown</u>
DG-101 (Red-AC)	RCIC/SRV's To Achieve Hot Shutdown <u>NOTE:</u> No vessel level is available at RSP. Operator has to go to H21-PC04 to verify level. Use SRV to reduce press to allow LPCI to flood core SRV/LPCI/SW to achieve cold shutdown	
DG-102 (Blue-AC)	RCIC/SRV's To Achieve Hot Shutdown Cold Shutdown - SRV Valves From RSP To Drop Press.	Not Required RHR "A", SW "A", and RBCLCW "A" Systems Will Have To Be Started Manually Locally.
DG-103 (Orange AC)	RCIC/SRV's To Achieve Hot Shutdown Use SRV's/RCIC to reduce RPV press to 50 PSIG Then RHR Shutdown Cooling Mode. <u>NOTE:</u> Single pump SW operation will require throttle of loads or cross-tie "A" pump.	

TABLE 4 (CONT'D)

<u>Power Supply That is Lost</u>	<u>Systems On RSP for Shutdown</u>	<u>Alternate Systems Not On RSP That Will Be Required to Shut Down</u>
125VDC Div I (Red)	RHR In Shutdown Cooling Mode/ SW To Achieve Cold Shutdown. <u>NOTE</u> This will extend cool down time.	HPCI in Auto Between Level 2 and Level 8/ SRV's to achieve hot shutdown
125VDC Div II (Blue)	SRV/LPCI/SW To Achieve Cold Shutdown <u>NOTE:</u> Manual closing of RHR "B" pump brkr or starting RHR "D" pump will be done locally at switchgear.	Not Required
MG-BUS 112Y (LPCI Yellow)	RCIC/SRV's to Achieve Hot Shutdown RCIC/SRV Down To 50 PSIG For Cold Shutdown	Not Required RHR "A" System In Shutdown Mode With RB Service Water "A" System