LONG ISLAND LIGHTING COMPANY
SHOREHAM NUCLEAR POWER STATION
P.O. BOX 618, NORTH COUNTRY ROAD • WADING RIVER, N.Y. 11792

JOHN D. LEONARD, JR.
VICE PRESIDENT - NUCLEAR OPERATIONS

April 4, 1985

SNRC-1150

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

Emergency Diesel Generator Loading
Shoreham Nuclear Power Station
Docket No. 50-322

Reference: Letter from Mr. A. Schwencer (NRC) to Mr. J. D. Leonard (LILCO) dated February 5, 1985, titled "Request for Additional Information"

Dear Mr. Denton:

Previous submittals by LILCO have shown that by design, the maximum emergency service loads (MESL) on each diesel generator are such that loads greater than the qualified load of 3300 KW will not be imposed upon the diesel generators. As LILCO has stated, even if all the intermittent and/or cyclic loads previously identified were simply summed and added to the MESL, the predicted load would be 3331.4 KW, 3285.4 KW, and 3284.6 KW for EDG 101, 102 and 103, respectively. However, conservatisms inherent in the calculation of the MESL (e.g., the assumption of simultaneous breaks in four out of four low pressure core cooling systems to yield full runout flows) offset the intermittent and cyclic loads such that a margin below the qualified load would be maintained even assuming simultaneous operation of intermittent and cyclic loads. Additional assurance that loads in excess of the qualified load will not be imposed on the emergency diesel generators due to operator action is provided by emergency operating procedures and training of the licensed operators. LILCO's initial efforts to demonstrate reasonable assurance that operator actions would not cause the TDI emergency diesel generators to experience loads in excess of the qualified load consisted of reviewing and revising emergency operating procedures and identifying training requirements in the form of required reading, to be followed by classroom training as part of the normal requalification cycle. Following the Staff visit of January 16-17, 1985, LILCO further reviewed and revised the emergency procedures, conducted an in-house job analysis (i.e., developed training program objectives and requirements through

Limited dist.

A001
1/10

review of procedural steps performed by the operators), verified the manageability of the revised procedures at the Limerick simulator and developed the enclosed training lesson plan entitled "TDI-Emergency Diesel Generators 3300 KW Qualified Load Lesson Plan" (Attachment 5). Subsequently, technical personnel from our respective staffs met to discuss the status of the review of procedures and training, concerns previously expressed by the NRC Staff, and the bases and objectives of LILCO's efforts. Much of the information contained herein was discussed at that time.

The purpose of this letter is to provide the requested additional information in response to the letter from Mr. Schwencer referenced above, and to correct any misconception that procedures and training are being used to substitute for required design capabilities. This information presents the bases upon which LILCO concludes that reasonable assurance exists and can be demonstrated that loads in excess of the qualified load will not be imposed upon the TDI emergency diesel generators by the operators. That is, the emergency operating procedures will not lead the operators to load the diesel generators in excess of 3300 KW given that all loads essential to maintaining plant safety function are, by design accommodated within the 3300 KW qualified load. The procedures can be implemented without exceeding the qualified load. Further, the procedures provide adequate information to the operators to ensure proper equipment operation and provide sufficient guidance to ensure proper and timely load reduction in the unlikely event the qualified load is exceeded. The attachments to this letter include: (a) LILCO's response to the Request for Additional Information (Attachment 2), (b) LILCO Job Analysis (Attachment 3), (c) Shoreham Nuclear Power Station Diesel Generator Loading Analysis Plan, prepared by General Physics Corporation, (Attachment 4), (d) TDI - Emergency Diesel Generator 3300 KW Load Lesson Plan (Attachment 5), (e) Revised Procedures (Attachment 6), and (f) 1985 License Requalificatcn Schedule (Attachment 7). Together, these attachments form and present the bases for our conclusions.

Should you, or your Staff, have additional questions concerning our response, please contact my office.

Very truly yours,

John D. Leonard, Jr.
Vice President - Nuclear Operations

BEG:klk

cc: P. Eselgroth
All Parties Listed in Attachment 1

ATTACHMENT I

Lawrence Brenner, Esq.
Administrative Judge
Atomic Safety and Licensing
Board Panel
U. S. Nuclear Regulatory
Commission
Washington, DC 20555

Dr. George A. Ferguson
Administrative Judge
Atomic Safety and Licensing
Board Panel
School of Engineering
Howard University
2300 6th Street, N.W.
Washington, DC 20059

Bernard M. Bordenick, Esq.
David A. Repka, Esq.
U. S. Nuclear Regulatory
Commission
Washington, D. C. 20555
*For Federal Express
7735 Old Georgetown Road
To Mailroom
Bethesda, MD 20814

James Dougherty, Esq.
3045 Porter Street NW
Washington, DC 20008

Ralph Shapiro, Esq.
Cammer and Shapiro, P.C.
9 East 40th Street
New York, NY 10016

Secretary of the Commission
U.S. Nuclear Regulatory
Commission
Washington, D.C. 20555

Atomic Safety and Licensing
Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Jay Dunkleberger Esq.
New York State Energy Office
Agency Building 2
Empire State Plaza
Albany, New York 12223

Herbert H. Brown, Esq.
Lawrence Coe Lanpher, Esq.
Alan R. Dynner, Esq.
Kirkpatrick, Lockhart, Hill
Christopher & Phillips
8th Floor
1900 M. Street, N. W.
Washington, DC 20036

Dr. Peter A. Morris
Administrative Judge
Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

MHB Technical Associates
1723 Hamilton Avenue
Suite K
San Jose, CA 95125

Stephen B. Latham, Esq.
Twomey, Latham & Shea
33 West Second Street
P. O. Box 398
Riverhead, NY 11901

Fabian G. Palomino, Esq.
Special Counsel to the Governor
Executive Chamber, Room 229
State Capitol
Albany, NY 12224

Atomic Safety and Licensing
Appeal Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Robert E. Smith Esq.
Guggenheimer & Untermyer
80 Pine Street
New York, New York 10005

Jonathan D. Feinberg, Esq.
New York State
Department of Public Service
Three Empire State Plaza
Albany, New York 12223

Martin Bradley Ashare
Attn: Patricia A. Dempsey, Esq.
Suffolk County Attorney
H. Lee Dennison Building
Veterans Memorial Highway
Hauppauge, New York 11788

ATTACHMENT 2

A. GENERAL

Question 1: For a postulated Loss of Offsite Power Coincident with a Loss of Coolant Accident (LOOP/LOCA) at least five procedures appear to be used simultaneously. These are Level Control - SP 29.023.01, Emergency Shutdown - SP 29.010.01, Containment Control - SP 29.023.03, Loss of Offsite Power - SP 29.015.01, and Loss of Coolant Accident Coincident with a Loss of Offsite Power - SP 29.015.04.

a. Explain how the operators are to physically manage these procedures.

b. Explain how the operators establish priorities between the various procedures, and between the necessary actions contained in the various procedures.

c. What evaluations have been performed to determine the operators capacity to manage the necessary procedures, including correctly prioritizing procedures and actions?

Response

1.a. A postulated Loss of Offsite Power Coincident with a Loss of Coolant Accident would require the on-shift operating crew initially to manage four (4) basic procedures concurrently. These procedures are:

1. SP 29.015.01 Revision 9, Loss of Off-Site Power
2. SP 29.010.01 Revision 4, Emergency Shutdown
3. SP 29.023.01 Revision 5, Level Control
4. SP 29.023.03 Revision 9, Containment Control

The fifth procedure, SP 29.015.04, Loss of Coolant Accident Coincident with a Loss of Offsite Power, has been deleted. This deleted procedure was developed following establishment of the qualified load for the emergency diesel generators. It did not, however, contain any needed information or procedural actions not otherwise provided by other existing procedures. Thus, it was an unnecessary procedure.

Each on-shift operating crew responsible for the implementation of these procedures normally consists of:

1. Watch Engineer (SRO License)
2. Watch Supervisor (SRO License)
3. Shift Technical Advisor (Degreed Engineer)

4. Nuclear Station Operator (RO License)
5. Two (2) Nuclear Assistant Station Operators (RO Licenses)
   Three (3) Equipment Operators

The specific responsibilities of each member of an on-shift operating crew during abnormal plant conditions are detailed in Station Procedure 21.004.01, Revision 8, Main Control Room - Conduct of Personnel. The operating crews are trained in this procedure. During an emergency, the first licensed operator to the reactor panel is responsible for the immediate actions associated with a scram, maintaining level and pressure control within the reactor, and if necessary, verifying the initiation of emergency core cooling. The second licensed operator is responsible for announcing the event over the page party system, verifying the AC power distribution within the plant, ensuring the availability of an adequate heat sink and supporting the first licensed operator as appropriate. The Watch Supervisor is responsible for reviewing the procedures and assuring that the operators are performing their functions as prescribed by procedure. The Watch Engineer has or assumes the control room command function with the responsibility to ensure that proper and adequate steps are being taken to place the plant in a safe condition following whatever situation has arisen. As described in response 1.b. below, the operators enter the various procedures through recognition of pre-identified symptoms and entry conditions. The immediate actions of event oriented procedures, and the actions of symptom oriented procedures necessary to clear entry conditions, are given priority over subsequent actions in the event oriented procedures.

Operator training has been ongoing for a number of years. The procedures used by the operators following a LOOP or a LOOP/LOCA are not new and have not been changed significantly as a result of the 3300 KW qualified load. In general, these procedures have been modified to include information related to component or load group KW loads to assist the operators in any decision making that might involve diesel generator loading. The operators' prior training in, and familiarity with, these procedures and their implementation is not significantly affected by establishment of the qualified load or by the addition of this information to the procedures. Manageability of the above referenced emergency procedures has been demonstrated through classroom training, Shoreham in-plant drills and use of these procedures by the operators during prior Limerick simulator training. After modifications were made to the emergency procedures to reflect the 3300 KW qualified load, senior LILCO personnel, from operations and training divisions, reverified the manageability of these revised procedures through a job analysis and utilization of the procedures at the Limerick simulator.

1.b. Procedural actions within and among the procedures are prioritized by an operating crew in the same manner as in the past. Both event and symptom-oriented emergency procedures are

used to place the plant in a safe condition. In event oriented procedures operators are trained: (i) to recognize the symptoms associated with the event-oriented emergency procedures, (ii) to verify that the prescribed automatic actions have occurred or initiate such actions manually, and (iii) to take other immediate actions required by each procedure. The operator completes these immediate actions prior to implementing the subsequent actions of event-oriented emergency procedures. Shoreham symptom-oriented emergency procedures were developed from the BWR Owner's Group Emergency Procedures Guidelines. In these procedures, operators are trained to recognize conditions which require entry into a symptom-oriented emergency procedure. The operator continues with the actions prescribed in the symptom-oriented emergency procedure until the entry conditions no longer exists.

Therefore, the immediate actions of the event-oriented emergency procedures and the actions to clear any entry conditions of the symptom-oriented emergency procedures are given priority and generally precede the subsequent actions of the event-oriented emergency procedures.

Within any given procedure, the expected sequence of operations is generally that presented in the procedure. Place keeping aids are provided in the procedures to assist the operators in tracking the status of the procedural steps. In addition, a table has been added to SP 29.015.01, Loss of Offsite Power, to guide and prioritize the operators' actions in the unlikely event the qualified load is exceeded for some unspecified reason. This table presents, by location of component controls, those nonessential loads which are designed to be tripped automatically from the electrical busses following a LOOP/LOCA. This table provides information to the operators to assist in load reduction decisions.

The Watch Engineer, with the control room command function, overviews the plant status and the performance of the operating crew. In this position, he ensures all required actions are being performed in an acceptable sequence in response to existing plant conditions.

1.c. LILCO has taken a number of steps to assure that the operators can manage necessary procedures. First, LILCO conducted a job analysis of the revised procedures subsequent to the January 17, 1985 Staff visit. (see Attachment 3). Second, based upon the results of this analysis, a specific training program module was developed which includes the Lesson Plan provided as Attachment 5 to this letter. In addition, senior personnel reviewed the manageability of the revised procedures during exercises at the Limerick simulator conducted specifically for this purpose.

LILCO has contracted General Physics Corporation to perform a job task analysis as outlined in detail in Attachment 4. The purpose of this analysis is to conduct an evaluation of the applicable Shoreham emergency procedures, training programs and

instrumentation that relate to emergency operation of the Shoreham TDI emergency diesel generators within the qualified load of 3300 KW. Included in the analysis is the real time simulation of scenarios designed to observe the operators ability to manage the relevant procedures, with correct prioritization of procedures and actions. Operating crew tasks, decisions, and information and control requirements will be documented for LOOP and LOOP/LOCA events utilizing the diesel generators with the qualified load of 3300 KW. The availability and suitability of appropriate instrumentation and controls will be verified. The evaluation will determine whether the functions allocated to the control room operating crew can be accomplished effectively within the structure of the emergency procedures. In addition, the diesel generator training plan will be reviewed against the identified skills and knowledge needed to manage diesel generator loading during LOOP and LOOP/LOCA events. General Physics will furnish a report to LILCO which LILCO will evaluate.

The NRC Staff has reviewed the job task analysis plan and the ability of LILCO and General Physics Corporation to conduct the evaluation. The methodology utilized is similar to a number of evaluations already conducted at other Nuclear Power Stations, the results of which had been submitted to the NRC Staff for review. LILCO will submit a report delineating the results of this job task analysis, including any additional procedural or training modifications, to the NRC Staff.

All operating crews will receive additional training on diesel generator operation during LOOP and LOOP/LOCA events as part of the requalification training program. In addition to classroom lessons, this will include real time simulator training at the Limerick simulator and control room walkthroughs at Shoreham.

Question 2: The procedures evaluated call for stopping unspecified loads before starting others to limit the possibility of diesel generator overloads. What means are provided to allow the operators to determine priority loads, and to keep track of which loads are stopped and which ones are running? For loads which are stopped, what parameters must be monitored to alert operators that loads must be restarted?

Response:

2. The procedures referenced in question 1 were evaluated and revised. Specifically, SP 29.015.04, Loss of Coolant Accident Coincident With a Loss of Offsite Power, was deleted in its entirety and Appendix 12.1 of SP 29.015.01, Loss of Off-Site Power, was replaced with a new prioritized load list.

The procedures initially reviewed by the staff, advised the operators to remove load from a diesel generator before starting additional equipment if the addition of that equipment might cause the total load to exceed 3300 KW. Loads to be secured were not specified because the operators' choice must consider the particular plant status at the time that such a decision is made. To provide information to the operators, the KW load value of equipment and load groups were incorporated in Appendix 12.1. Given the conservatism in the maximum emergency service load (MESL), and thus the qualified load, along with the amount of redundant equipment and the independence between the load groups powered by each diesel generator, the procedure actions can be accomplished without exceeding 3300 KW on any diesel generator. Appendix 12.1 had provided a listing of all loads connectible to the emergency buses. The new table in SP 29.015.01 now provides only those non-essential loads which are tripped on a LOOP/LOCA signal. These loads are the loads to be given priority consideration if load must be reduced on the diesel generators. Following the automatic sequencing of loads on the diesel, the qualified load will not be exceeded because the automatic loads are included in the MESL. If the qualified load were to be exceeded following automatic loading of the diesel, it would be the result of equipment failing to trip as designed. Table 1 provides those loads which may have failed to trip. These non-essential loads may also be manually reconnected to the emergency buses in accordance with the criteria established in the subsequent actions of SP 29.015.01. At any subsequent time, the Table 1 loads can be removed without affecting the ability to perform safety functions. Thus, the revised table, prioritizes and groups the non-essential loads by operational location, and provides guidance to the operators for load reduction.

Operators are required to maintain an active account of significant plant evolutions in the main control room log. Manual addition or removal of loads on the emergency buses during a LOOP/LOCA event constitutes a significant evolution and therefore, must be in the control room log. Entry in the log is expected to be accomplished within fifteen (15) minutes of the emergency declaration. In addition, placekeeping aids are provided in the procedures which assist the operators in tracking equipment specified in action statements. Finally, the status of equipment controlled from the main control room is displayed by control room indication. The status of equipment controlled from outside the control room can, in many cases, be established from parameters indicated in the main control room.

Notwithstanding this, LILCO has committed to perform an independent job task analysis. The analysis will address the tracking of loads during LOOP and LOOP/LOCA events. If the existing methods for load tracking are determined to be inadequate, the results of the analysis will be used to develop an appropriate load tracking tool for the operator's use.

With regard to the operators' ability to monitor equipment status, existing control room indicators, process instrumentation and annunciators provide an adequate method of alerting operators that loads must be restarted. The status of parameters which indicate the need or desirability for starting equipment identified in all of the procedure action statements is clearly displayed in the main control room.

Question 3: Based on the information that was provided by the licensee and the information evaluated during the onsite inspection, it does not appear that an acceptable procedure and training program has been developed to address the EDG loading issue. This has led the staff to question the basis for the licensee's determination that the procedures and training will keep the EDGs from exceeding 3300 KW.

At the time of the onsite inspection, the licensee had not started to develop a training program for the issue. There has apparently been no in-depth evaluation or analysis (including Job Task Analysis) of the actions necessary to keep EDG load less than 3300 KW within the context of the procedures used during execution of the actions. In addition, there is no evidence that the licensee has developed or conducted an in-depth evaluation of operator or team performance, and of their capability to accomplish the necessary actions without error. This evaluation should have included an operational evaluation under realistic conditions with consideration for the uncertainty and stress that face operators during a LOOP/LOCA event. Therefore, LILCO must:

a. Develop a program for training the operators on the concern of maintaining EDG load less than 3300 KW during a LOOP/LOCA, including the procedures which address this concern. Provide the staff a description of the training program for control room and auxiliary operators.

b. Perform an evaluation, including detailed analyses if necessary, to determine if the procedures and training are adequate to keep the EDG loading less than 3300 KW during a LOOP/LOCA. Provide the staff a description of the evaluation and its results. The evaluation needs to include real-time evaluation of control room personnel and auxiliary operators.

Response

3. It is not the position of LILCO that procedures and training are being used to prevent EDG loading from exceeding the 3300 KW qualified load limit. Rather, it is our position that by design, diesel generator loading is such that the maximum emergency

service load (MESL) experienced by each diesel generator is less than the 3300 KW qualified load. As LILCO has stated, even if all the intermittent and/or cyclic loads are addressed conservatively, by simply summing the loads and adding them to the MESL, the predicted load for only one of the three EDG's (DG 101) would exceed the qualified load and then by only 31.4 KW for less than 3 minutes. Further, numerous conservatisms exist in the MESL. For example, all of the AC powered ECCS pumps are assumed to be at runout condition in establishing the MESL. This condition could only exist with simultaneous breaks in all core spray and low pressure coolant injection lines. Such a condition is highly unlikely and well beyond the design basis of the plant. Some nameplate load values have been used in calculating the MESL even though in plant measurements have been made showing that actual load values are smaller. Also, some nameplate values have been used for components even though the component cannot be called upon to operate at design conditions following a LOOP/LOCA. These and other conservatisms by far offset the intermittent and cyclic loads, such that a margin below the qualified load will be maintained, even assuming simultaneous operation of these loads with the equipment that constitutes the MESL. The remaining connectible loads which are not included in the MESL are automatically tripped by safety related devices, or receive no automatic start signals following a LOOP/LOCA. Although it is not possible to simulate with precision all of the conditions of a LOOP/LOCA, the IET does provide a reasonably close approximation of the design electrical loads carried by the emergency diesel generators following a LOOP/LOCA. Accordingly, the results of the IET provide significant additional assurance that actual diesel generator loads will not approach the 3300 KW qualified load limit. Thus, by design, diesel generator loading will not exceed 3300 KW.

Procedures and training compliment the design and provide additional assurance that loads in excess of the qualified load will not be imposed on any of the EDG's due to planned or erroneous operator actions. They are not used as a substitute for any design capability that would otherwise be required by regulation.

3a. Operator training is accomplished by several methods including, but not limited to, required reading, formal classroom instruction, simulator training, and crew and/or section meetings. Operator training associated with maintaining EDG load below 3300 KW during a LOOP/LOCA was initiated by required reading. A training lesson plan has been developed to support formal classroom instruction. The lesson plan is provided as Attachment 5 to this letter. Attachment 7 to this letter provides the schedule for implementation of classroom and simulator training.

The lesson plan will be used in the requalification training program. It has been structured to address the 3300 KW qualified load through a combination of classroom discussions and classroom

problem sets which exercise the operators' ability to evaluate plant conditions and make proper predictions and decisions. The lesson plan includes situations involving diesel generator failures as well as multiple equipment failures. Particular attention is paid to operator responses associated with maintaining the load on each diesel generator below 3300 KW. This includes prioritization and selection of loads to be removed if actions being contemplated by an operator may otherwise result in the 3300 KW qualified load being exceeded.

As suggested by the NRC Staff, the lesson plan included as Attachment 5 will be modified to include a discussion of the actions taken to determine the MESL for each diesel generator. In addition, the training plan addressing the 3300 KW qualified load will be reviewed and compared to the data obtained from the job task analysis discussed in paragraph 3b below. Operator skills and knowledge requirements identified by this analysis will form the basis for review of the lesson plan objectives and material content. The results of this review will be used to improve the lesson plan as appropriate.

During requalification training at the Limerick simulator, each operating crew will be drilled in LOOP and LOOP/LOCA scenarios. These scenarios will be developed to challenge, artificially if necessary, the diesel load in the context of removing load to reduce the load level below the qualified load or allow equipment to be started without exceeding the qualified load. To the extent this may not be fully achievable at the simulator, it will be accomplished in control room walkthroughs and/or classroom discussion or exercises.

3b. LILCO has performed a job analysis pertaining to the 3300 KW qualified load. It is provided in Attachment 3 to this letter. This analysis was based upon the revised procedures to be used in LOOP/LOCA events. The job analysis identified the actions called for by the procedures. The training necessary to ensure the operators had the skills and knowledge to perform the actions was then assessed and compared to the existing operator training program. The revised emergency procedures were also evaluated at the Limerick simulator. The simulator exercises demonstrated that the qualified load of 3300 KW is not challenged during the course of recovery from a LOOP/LOCA, and that emergency diesel generator loads can be effectively monitored and controlled by the operators while responding to a LOOP/LOCA utilizing the emergency procedures. The results of these steps were then used to review and assess the revised procedures and to develop additional training to address operation of the diesel generators within the qualified load of 3300 KW. This provided LILCO with assurance that the procedures, as revised, would not cause the operators to put loads in excess of 3300 KW on a diesel generator.

Beyond the evaluations already performed, LILCO has retained General Physics Corporation to develop and implement a job task analysis plan to provide additional evaluation of the applicable procedures, training and instrumentation relating to the management of emergency operation of the diesel generators and the 3300 KW qualified load. The Job Task Analysis Plan is provided in Attachment 4 to this letter.

The Job Task Analysis Plan is currently being implemented by LILCO and General Physics Corporation. It is based on similar job task analyses previously conducted by General Physics Corporation and submitted for NRC Staff review. The plan provides for data collection and evaluation from which objective criteria are developed to reevaluate the procedures, training, instruments and controls, and operating crew performance as they relate to operation of the diesel generators within the qualified load of 3300 KW. Potential improvements indicated by this program will be considered by LILCO for implementation as appropriate. At the completion of the program, LILCO will provide the NRC Staff with a report of the results of this evaluation.

LILCO is confident this program will provide the evaluation, using objective criteria, needed to demonstrate to the Staff that: (1) the operators effectively manage the emergency procedures; (2) there is reasonable assurance that procedures and training will not lead the operators to exceed 3300 KW, while maintaining plant safety functions; and (3) there is reasonable assurance that if the load on a diesel generator was for some unspecified reason above 3300 KW, the procedures, instrumentation and training provide the necessary guidance to ensure appropriate load reduction well within one hour.

Question 4: There are currently no active means to alert the operators that the EDG load limit is either being approached, or that it has been exceeded. Describe the means for alerting the operators that the EDG load limit is being approached, and to alert the operators that the EDG load limit has been exceeded.

Response:

4. LILCO, in accordance with the Supplemental Safety Evaluation Report for Shoreham, dated December 18, 1984, will install a suitable alarm for each emergency diesel generator in the main control room to alert the operators if the total load on any emergency diesel generator exceeds 3300 KW. Engineering and design of these alarms are in progress. A review of the alarm from the standpoint of human factors is incorporated in the job task analysis currently being performed. As described in response to question 6 below, the diesel generator load meters in the main control room will be banded at 3300 KW. No additional

measures to highlight the approach to 3300 KW are warranted at this time. The emergency procedures have been written to alert the operator to be mindful of diesel generator loading and the effect of equipment operation on diesel generator loads. The adequacy of these measures is also being assessed by the job task analysis.

Question 5: The best reading accuracy that can be obtained on the installed EDG KW meter is 50 KW assuming the operators are at normal reading distance. Thus, before any load less than 100 KW is started, EDG loading, as indicated on the meter, will need to be reduced to at least 3200 KW, due to the inability to accurately determine EDG loading. Describe the impact that the readability of this meter has on the actions specified in the relevant procedures?

Response:

5. The relevant revised procedures have taken into account the operators' ability to read the installed emergency diesel generator wattmeter. Notes, action statements and caution statements containing KW load information are written in 50 KW increments. For example, caution statements preceding action statements for manual starting of loads provide the maximum acceptable wattmeter reading that could be observed before the load is energized. All values are rounded down to the next nearest 50 KW increment such that with wattmeter readings at or below the value shown in the caution statement, the manual load may be added to the emergency bus without exceeding a total load of 3300 KW on the diesel generator.

Question 6: Describe the means to be used to highlight the EDG qualified load limit on the EDG KW meters.

Response:

6. LILCO is providing a distinctive meter banding at 3300 KW on each of the EDG control room wattmeters, thus highlighting the qualified load.

Question 7: There is a general lack of consistency and integration between the procedures to be used during a LOOP or LOOP/LOCA event. This is evidenced in the operation of CRD and RHR/ LPSI pumps. The Level Control procedure calls for use of the CRD pumps as one of the primary means of level control; the Loss of Coolant Accident Coincident with a Loss of Offsite Power procedures requires the CRD pumps to be off if EDG load is found to be above 3300 KW; while the Loss of Offsite Power

procedure calls for starting a CRD pump. None of the listed procedures, which are all implemented concurrently on a LOOP/LOCA, identify to the operators that these conflicting requirements exist, nor are any criteria for prioritization identified for the operators. A similar situation exists in the Level Control and Loss of Instrument Air Procedures for LPSI/RHR pumps.

a. Describe the analyses performed to identify the necessary priorities and the method used for identifying all procedures and conditions for which similar conflicts may exist for a LOOP or LOOP/LOCA.

b. Describe the means by which the operators are alerted to these conflicts during performance of an individual procedure.

c. Describe the evaluation or analysis performed to determine that the operators are able to operate the equipment in the specified priority without error.

Response:

7. The procedures are designed to address anticipated and unanticipated events, including degraded conditions and multiple equipment failures. As such, each possible sequence of events cannot be detailed in the procedures. The existing combination of event and symptom-oriented procedures, however, provides the framework in which to address the broadest possible spectrum of occurrences to which the operators might be exposed, while still maintaining a reasonable number of reasonably sized procedures. After revision to highlight the 3300 KW qualified load, the procedures are not significantly different from those revisions which previously existed . Prior operator training and performance have demonstrated that the operators can and do utilize these procedures without conflict or confusion.

For example, the CRD pumps are not safety related components required for accident mitigation. As such, they do not automatically start following a LOOP/LOCA and are not included in the MESL. They can, however, provide a small amount of makeup water (55 gpm vs. 8500 gpm for a LPCI pump) to the reactor vessel through the control rod drive mechanisms and are therefore identified as a source of makeup in the symptom oriented Level Control procedure. They are not identified as a primary means of level control. Following a LOOP/LOCA, with any of the ECCS pumps operating, e.g., the core spray and low pressure coolant injection pumps, the CRD pumps are not required for level control purposes. If these large ECCS pumps, which are included in the MESL, are not operating, and the CRD pumps are considered for level control, ample load capacity is available on the diesel

generator to ensure the 3300 KW qualified load is not exceeded. If the CRD pumps are operating and a LOCA signal automatically initiates the ECCS pumps, the CRD pumps will be automatically tripped. Finally, the use of the CRD pumps directed in the Loss of Offsite Power procedure occurs in a subsequent action step, and thus is not addressed simultaneously with the level control procedure action. The use of the CRD pumps in the subsequent action of the Loss of Offsite Power procedure is not essential to perform a safety function, and thus CRD pump operation is not essential. Thus, there is in fact no contradiction in the procedures. The operators are trained in the use of the CRD pumps under varying plant conditions.

LILCO has begun a detailed job task analysis as described in response to questions 1 and 3 above. This analysis and its resulting data base will assure that procedure conflicts do not exist, and that priorities are adequately recognizable.

7a. See Attachment 3 , LILCO Conducted Job Analysis and Attachment 4, Job Task Analysis Plan, to this letter.

7b. As described above, it is not clear that conflicts exist in the procedures. LILCO understands how conflicts could have appeared to exist in the originally reviewed Loss of Off-Site Power Procedure 29.015.01, given the reference in its subsequent actions to the Loss of Instrument Air Procedure, SP 29.016.01. Revision 9 of SP 29.015.01 assures that this apparent conflict no longer exists. In addition, the Job Task Analysis provides an appropriate method to identify and resolve any unforeseen conflicts should they exist.

7c. The procedure reviews and job analysis performed by LILCO, coupled with previous demonstrations of the operators' ability to properly operate equipment in accordance with emergency procedures, provided LILCO with the needed assurances that the operators could perform required actions without error. The job task analysis will provide objective criteria against which the performance of operating crews will be further evaluated during simulator scenarios and plant walkthroughs. This will demonstrate the ability to manage procedures and properly prioritize the operation of the equipment identified in the procedures. Any recommendations resulting from crew exercises will be addressed by LILCO, as appropriate, in the emergency procedures.

B. Level Control - SP 29.023.01

This procedure has been revised. The latest revision is provided in Attachment 6 to this response.

Question:

1. Page 2, Step 3.2 - This step lists the systems to be used to restore and maintain RPV water level. The second system listed (Step 3.2.2) is the CRD system which, if operated under LOOP/LOCA conditions and assuming automatic EDG loading as listed on FSAR Table 8.3.1-1, would cause the EDGs to be overloaded. The procedure needs to address reducing EDG loads to allow sufficient margin for running the CRD pumps before the CRD pumps are started. Any such modification needs to address the specific safety loads (or the criteria to be used in selecting the safety loads) to be stopped to allow the CRD pumps to be started. The parameters which must be monitored during the period of time and the conditions which require restart of these loads need to be identified to the operators.

Response:

1. By design, the control rod drive system is not required to restore vessel level. Level control is not the design function of the CRD pumps, although they can provide a small amount of makeup to the RPV through the control rod drive mechanisms. As a result of the BWR Owner's Group guidelines, however, the CRD system was introduced in the Level Control Procedure on a generic basis for all BWR's (i.e., BWRs 4 through 6) as a potential source of RPV level control. Though shown in the level control procedure, SNPS operators would not need to manually start the CRD system on the emergency busses to maintain RPV level in a large LOOP/LOCA event. The large low pressure core spray and residual heat removal system (LPCI mode) pumps would provide the mechanism to control RPV level. The CRD pumps could be used to control level during a small LOCA event, but they are not essential for this function. In such a situation, the RPV remains pressurized and the reactor core isolation cooling and high pressure coolant injection systems, are available for level control. If the CRD pumps are used in such a case, the low pressure ECCS pumps, e.g., core spray, are not operated and therefore do not represent load on the diesel generator.

   However, in the event that the SNPS operators consider the CRD system for level control, a caution statement has been added prior to Step 3.2.2 to remind the operators that starting a CRD pump could result in exceeding the 3300 KW qualified load, if the existing load on the associated emergency diesel generator is above 3050 KW. This caution statement will be written to conform to caution statement format in the symptom-oriented procedures and will read as follows:

   CAUTION

   If a CRD pump is started with its associated Emergency Diesel Generator load at 3050 KW, 3300 KW may be exceeded.

Question:

2. Page 3, Step 3.9 - Since this is the last step in the procedure, no following step exists in this procedure which would call for operating non-safety-related loads. The purpose of this step is unclear and should be deleted, moved, or its application explained.

Response:

2. Step 3.9, as it appeared in Revision 4, referenced the operator to Appendix 12.1 of the Loss of Offsite Power procedure. This step was intended to direct the operator to the KW load information for discretionary loads. Step 3.9 has been revised to direct the operator to Procedure 29.015.01, Loss of Offsite Power, if a LOOP exists. This returns the operator to the subsequent actions of the Loss of Offsite Power event procedure when it is appropriate to do so; that is, when offsite power has been lost. Though preliminary operator training had been implemented through required reading of Revision 4 of the Level Control procedure, the current revision of the Loss of Offsite Power Procedure, SP 29.015.01 Rev. 9, was distributed on a new required reading list. This list also highlighted the fact that LOOP/LOCA procedure SP 29.015.04 was deleted with pertinent information from this procedure being contained in the LOOP procedure. As such, operator training is current.

C. Loss of Coolant Accident Coincident With A Loss of Offsite Power SP 29.015.04

This procedure was developed from a combination of the Level Control and Loss of Off-Site Power emergency procedures. The information contained in SP 29.015.04 was subsequently determined to be redundant and unnecessary. Therefore, the procedure was deleted in its entirety. Notwithstanding the above, the specific Staff concerns regarding this procedure have been fully reviewed and considered by LILCO for their generic applicability. The identified Staff concerns as they affect SP29.015.04 can be addressed in two (2) basic categories. The first category includes those concerns which are addressed completely by the deletion of the procedure. The second category includes those concerns which are addressed by the revision of SP 29.015.01, Loss of Off-Site Power and by further evaluation as part of the independent job task analysis previously discussed.

Items 1, 3, 4a, 5, 6, 7, 8 and 9 identified on pages four (4) and five (5) of the Staff RAI are addressed by the deletion of SP 29.015.04. Items 2a, 2b, and 4b on page four (4) of the RAI are addressed by the revision of SP 29.015.01 and evaluation based upon the independent job task analysis. In addition, although items 5 through 9 are addressed by the deletion of SP 29.015.04, they will also be evaluated by the independent job task analysis. In reviewing and revising procedures, consistency in terminology and format will be carefully considered.

D. Loss of Offsite Power - Sp 29.015.01

This procedure has been revised. The latest revision is provided in Attachment 6 to this response.

Question:

1. Pages 1 and 2, Note before Step 4.1 - This note is split between two pages, which may cause a portion of the note to be missed or misinterpreted. The note, and notes and cautions in general, needs to be wholly contained on one page, and be on the same page as the step to which they apply.

   This note contains an action and is independent of other adjacent steps. The note needs to be rewritten as a note without requiring an action, or else the action portion needs to be rewritten as an action step.

Response:

1. The procedure has been revised. The note was unnecessary and therefore has been deleted. Additionally, the four (4) procedures identified in response to item 1a on page 2 of the Staff RAI will be reviewed to ensure that this concern for formatting is addressed in each procedure.

Question:

2. Page 2, Step 4.1 - This step calls for observation of parameters, but does not provide instructions to correct any abnormal conditions that are found. This step needs to address correction of any abnormal voltage or frequency observed.

Response:

2. The procedure has been revised to provide direction to the operator to ensure that each emergency diesel generator is maintaining its associated bus at or close to 4160 volts and 60 Hz. Thus, this step now directs correction of abnormal conditions.

Question:

3. Page 2, Caution before Step 4.2 -

   a. This caution is formatted differently than the caution in Loss of Coolant Accident Coincident with a Loss of Offsite Power SP 29.015.04. A consistent format for cautions needs to be used in all emergency procedures.

b. The caution contains an action step that calls for removal of other equipment from service prior to adding non-safety loads. With the current projected loading of all three diesel generators, safety loads will need to be removed before any load can be manually added. The procedure needs to provide acceptable guidance on how the operators are to determine which safety loads are to be removed before non-safety loads are added. Provide the analyses or evaluation performed to determine which safety loads can be removed under what conditions to allow which expected non-safety loads to be added. In addition, the portion of this caution requiring action to be taken needs to be rewritten as an action step.

Response:

3a. Cautions contained in SP 29.010.01, Emergency Shutdown, and SP 29.015.01, Loss of Off-Site Power, will be revised to be consistent with the format and content utilized for cautions in the symptom-oriented emergency procedures. The remaining event-oriented emergency procedures will be reviewed for format consistency during the emergency operating procedure upgrade effort required by supplement 1 of NUREG 0737.

3b. The procedure has been revised. This general caution statement was deleted. A specific caution statement has been added prior to each subsequent action step which directs operation of equipment prior to restoration of offsite power. The use and content of these caution statements will be further evaluated by the job task analysis currently being performed. The caution statements will be clearly worded as cautions.

The projected load referred to in this question is the conservatively calculated MESL which is based on design response to a LOOP/LOCA. Following a LOOP only, diesel generator loads will be substantially below the MESL. Following a LOOP/LOCA, the actual loads on the diesel generators will also be well below the conservatively calculated MESL. In addition the immediate actions of the event-oriented emergency procedures and the actions to clear any entry conditions of the symptom-oriented emergency procedures, are given priority and generally precede the subsequent actions of the Loss of Offsite Power Procedure. These actions will result in further reduction of actual diesel generator loading from the conservatively calculated MESL. Notwithstanding, the procedure has been written, with caution statements as described above, to alert the operators to the 3300 KW qualified load.

Question:

4. Page 2, Step 4.2 - As currently worded, this step requires no definitive action. The step should be reworded in the imperative mode.

Response:

4. This step (4.2) was rewritten as an action step and renumbered as Step 4.3 in the revised procedure. In addition, the new Step 4.3 will be further revised to read as follows:

> 4.3. If 3300 KW is or will be exceeded on any emergency diesel generator by the addition of other loads, reduce the load to less than 3300 KW by removal of loads in the order of priority shown in Table 1.

Question:

5. Page 2, Step 4.4 -

   a. For a LOOP/LOCA, with the listed loads running in addition to the automatic loads (assume none are de-energized), provide the actual (or if not available, the calculated) loading on all three diesel generators.

   b. This step addresses action for three diesel generators running. What is the expected action if only two, or one, diesel generator is running? The procedure needs to be modified to address the appropriate conditions.

   c. The operators are instructed to check Appendix 12.1 for load levels of individual components: (1) For Step 4.4, why are the load levels not provided in the procedure itself since specific components are designated for operation? This would reduce the procedure transitions, and reduce the complexity of actions and likelihood for error. (2) The power supply and load level for the following loads are not listed in Appendix 12.1 - Main Turbine Emergency Bearing Oil Pump, RFPT Standby Lube Oil Pump, RFPT Emergency Oil Pump, Reactor Recirculation MG-Set Lube Oil Pump, Reactor Recirculation MG Set Emergency Lube Oil Pumps. If Step 4.2 is followed, these loads will never be started. The power source for these loads need to be specified, EDG loading (if appropriate, since these appear to be DC power loads) for these loads need to be listed, and/or the step needs to be modified to have these loads running when necessary, (3) Step 4.4.2 addresses "Bearing Lift Pumps," while Appendix 12.2 lists "Main Turbine Bearing Lift Pumps." If these two listings are in fact the same, they should be labeled consistently with each other and with the control room label designation.

   d. This step includes label alpha-numerics. If this information is important, Appendix 12.1 needs to be modified to include these designations.

e. The phrase "as a minimum" implies that any other equipment in the plant that may be operating is a satisfactory situation. Reword to clarify.

Response:

5a. In the revision to this procedure, the loads previously listed in step 4.4 have been separated into new steps 4.7 and 4.8 for clarity. Though inappropriate, the addition of the load in Steps 4.7 and 4.8 of Revision 9 to SP 29.015.01, to the MESL for each emergency diesel generator following a LOOP/LOCA, yields calculated loads as follows:

	EDG 101	EDG 102	EDG 103
Calculated MESL	3253.3 KW	3208.7 KW	3225.5 KW
Step 4.7	8 KW	8 KW	32 KW
Step 4.8	9.2 KW	9.2 KW	60.4 KW
	3270.5 KW	3225.9 KW	3317.9 KW

Several comments are appropriate to this response. The AC powered loads identified in Steps 4.7 and 4.8 of SP29.015.01, Revision 9, are locked out automatically following a LOOP/LOCA as a result of the LOCA signal. As long as the LOCA signal is present, these loads cannot be energized without overriding the LOCA signal in the emergency switchgear rooms. The AC powered loads identified in Step 4.7 have alternate DC powered loads. Neither the loads identified in Step 4.7 nor those identified in Step 4.8 are required to perform a safety function. The load summation provided above in response to this question begins from the conservatively calculated MESL for LOOP/LOCA and thus are conservatively high. In addition, steps 4.7 and 4.8 are subsequent actions performed after loads would have been reduced by immediate actions as previously discussed and the caution statement preceeding Step 4.5. For all these reasons, given the assumptions stated in the question, the total loads presented are not representative of actual plant conditions. The actual loads would be substantially lower.

5b. The original Step 4.4 contained wording reflecting three (3) diesel generator operation to be consistent with the equipment to be verified in the following substeps. In fact, the step was generic and equipment would be verified operating based on the number of diesel generators operating. In the revised procedures, Steps 4.7 and 4.8 have been written to be independent of the number of diesel generators in operation by removing reference to the number of diesel generators.

5c. The revised procedure deletes the original Appendix 12.1 and provides a new table of prioritized non-essential loads as previously discussed. Furthermore, the subsequent actions have been enhanced by caution statements indicating the maximum diesel generator load levels that should exist prior to the designated operations. The revised procedure has been reviewed to ensure that system nomenclature is consistent throughout. System designation numbers consistent with control room labeling have been incorporated in the procedure.

5d. Table 1 of the revised procedure includes the alpha-numeric designations. Major equipment included in the subsequent actions of SP 29.015.01, ie. the control rod drive pumps, RBCLCW pumps and reactor protection system are routinely in use. Therefore, alpha-numeric system designation is not required.

5e. The phrase "as a minimum" has been deleted in the revised procedure.

Question:

6. Page 2, Step 4.4.4 - This step contains a confusing combination of the logic terms "and" and "or". As written the D Service Water Pump could be the only pump running and the logic step would technically be satisfied. In addition, Step 4.4 calls for the listed equipment "as a minimum". If this is true, having all four service water pumps running would be an acceptable condition and the logic terms are unnecessary. State what is intended, and clarify the existing wording.

Response:

6. Three service water pumps start automatically, one on each 4 KV emergency bus. Since the pumps start automatically they are now listed under automatic action in the revised procedure. Step 4.4.4 of Revision 7 was deleted.

Question:

7. Page 3, Step 4.4.5 - This step addresses "RBCLCW" Pumps", while Appendix 12.1 lists "RBCLCW Circ. Pumps". If these two listings are for the same equipment, they need to be labeled consistently.

Response:

7. The revised procedure corrects the concern and refers to the pumps in a consistent manner.

Question:

8. Page 3, Step 4.4.5 and 4.4.6 - These steps do not list the alpha-numeric control room label designation as is used in Steps 4.4.1 through 4.4.4. The procedure needs to consistently address all equipment.

Response:

8. The equipment referred to in Step 4.4.6 has been included in the automatic actions section of the revised procedure. The equipment identified in Step 4.4.5 is routinely in use and alpha-numeric designation is not required as discussed in response to item 5d above.

Question:

9. Page 3, Note after Step 4.4.5 -

   a. This note requires an action based on a condition, and needs to be incorporated into an action step.
   b. The note needs to be clarified to state which pumps are being referenced.

   c. Notes need to be placed before the step to which they apply.

Response:

9 (a-c). The note after Step 4.5 of Revision 7 has been deleted. Step 4.5 of Revision 9 to SP 29.015.01 will be revised to read as follows:

4.5 Ensure one RBCLCW pump is operating in each loop.

In addition, Step 4.11.8 of Revision 9 will be deleted. As now worded, Step 4.5 results in one RBCLCW pump operating in each loop. Thus Step 4.11.8 is unnecessary to direct the third pump to be secured.

Question:

10. Page 3, Step 4.4.6 - To reduce the possibility of confusion, or of not considering a particular load, when calculating total diesel generator load, this step needs to list the specific equipment in each train.

Response:

10. This step has been deleted and does not appear in the revised procedure. RBSVS is initiated automatically on loss of offsite power and thus, appears under Automatic Actions.

Question:

11. Page 3, Notes after Step 4.4.7 -

a. Notes need to be placed before the step to which they apply.

b. The first note requires an action and needs to be incorporated into the procedure as an action step.

c. The first note, in conjunction with Step 4.4.6, is inconsistent with Step 4.4, which states that the listed equipment "as a minimum" be operating, which would allow operation of two filter trains and four RBSVS/CRAC chilled water systems. Provide the allowable and intended (if different from allowable) equipment conditions, and clarify the step (with the first note a step, if still required).

d. The second note is inconsistent with the instruction provided in Step 4.2, SP 29.015.04, which requires Watch Engineer direction before energizing any additional emergency powered equipment. The reason for imbedding the addition of equipment loads to the diesel generators is not clear and it is not clear what the relationship of this note is to adjacent notes or action steps. Therefore, (1) provide definitive direction regarding adding additional emergency powered equipment, including appropriate personnel for authorizing the addition; (2) place the action in a location in the procedure appropriate for the action; and (3) provide criteria in the procedure for deciding what is needed and what is not needed.

Response:

11a,b. The above referenced notes were unnecessary and have been deleted. Additional notes in the revised procedure are placed before the step to which they apply.

11c. The equipment identified in item c is now included in the automatic actions section of the procedure. Therefore, the note and phrase "as a minimum" have been deleted from the revised procedure.

11d. SP29.015.04 has been deleted. Watch engineer direction and approval is only required for removal of low pressure ECCS pumps as delineated in the core spray and residual heat removal system procedures.

Question:

12. Page 3, Step 4.5 - The Level Control procedure calls for possible use of these pumps, while SP 29.015.04 calls for

these pumps to be off, and now they are being turned back on again. The conditions under which the CRD pumps are to be operated, including priorities over other safety equipment, need to be determined, and the actions in these three procedures that govern use of the CRD pumps need to be coordinated to meet the priorities. Provide the evaluation or analysis performed to establish acceptable priorities and conditions for CRD pump operation, including priorities for diesel generator loading. Modify the appropriate procedural steps in the appropriate procedures to address the priorities and conditions.

Response:

12. The Loss of Coolant Accident Coincident with a Loss of Off-site Power procedure (SP 29.015.04) has been deleted. Prioritization and caution statements have been included in the revised Loss of Off-Site Power Procedure SP 29.015.01.

Additionally, as previously described, caution statements contained within SP 29.015.01 will be revised to be consistent in format with the symptom-oriented emergency procedures. The priorities and conditions for CRD pump operation are described in Responses A.7 and B.1 above.

Question:

13. Page 3, Step 4.6 -

a. This step states that RPS MG sets are to be restarted "when practical". The need for adequate load margin on the diesel generators is a consideration that needs to be explicitly factored into this step.

b. This step abbreviates "RPS" while Appendix 12.1 does not. Nomenclature needs to be made consistent.

Response:

13a. Step 4.6 has been revised and is renumbered as Step 4.4 in the revised procedure. A caution has been added prior to Step 4.4. The caution indicates that if the load on the emergency diesel generator is above 3250 KW then re-energizing a reactor protection bus system may result in exceeding a total load of 3300KW. This caution statement will be revised to read as follows:

CAUTION

If the Reactor Protection System is energized with it's associated Emergency Diesel Generator load at 3250 KW, 3300 KW may be exceeded.

13b. The nomenclature has been made consistent in the revised procedure. RPS is now written as Reactor Protection System in both the text of the procedure and Table 1.

Question

14. Page 4, Step 4.10.7 - This step omits the word "spent" as used in Appendix 12.1. Be consistent.

Response:

14. Appendix 12.1 was replaced with a new table (Table 1). Table 1 no longer contains the spent fuel pool cooling pumps. In addition, Step 4.11.7 (formerly Step 4.10.7) will be deleted from Revision 9 of the procedure. The spent fuel pool cooling water pumps will not be used until the first refueling outage.

Question:

15. Pages 6 and 7 (Appendix 12.1) - The equipment listing for "TSC Air Cooled Condenser" is split between two pages. Listings should be completed on a page, and not split in this manner.

Response:

15. Appendix 12.1 has been deleted and the new Table 1 does not include the above referenced equipment. The new Table 1 was reviewed to ensure that equipment listings were not split between pages.

Question:

16. Appendix 12.1 - The format of the tabulated values makes it very difficult to associate the specific numeric loading values with their respective loads. The table needs to be acceptably reformatted to make the values easily relatable to the proper equipment.

Response:

16. Appendix 12.1 has been deleted and a new Table 1 has been provided in the revised procedure. This table will be reviewed as part of the independent job task analysis to ensure that the above referenced concern is addressed. The table has been reformatted and is more easily read than the former Appendix 12.1.

Additional Comments

As a result of discussions with the Staff, the following additional modifications will be made to the Loss of Offsite Power Procedure, SP29.015.01.

a) Step 6.2 in the discussion section of Revision 9 will be deleted. A more complete discussion of the MESL will be included in the requalification training program.

b) The parenthetical information contained in Steps 4.6 and 4.8 of Revision 9 will be deleted.

E. Emergency Diesel Generator - SP 23.307.01

A copy of this procedure is enclosed in Attachment 6 to this response.

Question:

1. Page 11, Step 8.1.4.5, and Page 13, Step 8. 1.5.4 - These steps provide two different instructions on when to close the EDG breaker during paralleling operations, and are inconsistent in providing instructions regarding checking that load is picked up by the EDG. Explain the reason or justification for the difference in closing position used in the two steps, or make the steps consistent, and provide justification for the method used. Modify the step(s) to provide consistent instructions on what to observe when the breaker is shut.

Response:

1. The procedure Step 8.1.4.5 will be revised to be consistent with Step 8.1.5.4 as to use of the synchroscope and instruction on observations after breakers are closed.

Question:

2. Sections 8.1.4 and 8.1.5 need to be modified to appropriately inform the operators of the EDG qualified load limit.

Response:

2. Section 6.2 of the procedure establishes the Operating Limits for the Emergency Diesel Generators. Step 6.2.1 establishes the 3300 KW limit. It is not necessary to repeat this limit in Sections 8.1.4 and 8.1.5.

Question:

3. Page 13, Step 8.1.5.3 and 8.1.5.4 - These steps instruct the operators to parallel the EDGs and pick up load on the EDGs. During an emergency condition (e.g., a LOOP/LOCA) with speed droop set at zero, the EDGs may pick up loads significantly above 3300 KW. Describe the likelihood and consequences of this action given the current procedures, and modify the procedure, if necessary, to ensure a controlled load transfer during this paralleling operation.

Response:

3. Paragraphs 8.1.5.3 and 8.1.5.4 refer to the operation of the EDGs in parallel with the NSST or RSST. This operation

would not be performed during a LOOP. If a LOCA were to occur while the EDG was paralleled to the NSST or RSST, the parallel operation would continue, and EDG load would remain as demanded by the governor.

In the event of a LOOP (and any combination of the above circumstances) the EDG would pick up load and the isochronous governor would maintain the EDG at 60 Hz, since the speed control governor is not in the circuit in this condition, no matter what the previous course of events may have been (e.g., even if the EDG had been paralleled and speed control was in operation).

The maximum design load for any EDG is less than 3300 KW at 60 Hz, and this qualified load could only be exceeded if loads were manually added to the EDGs.

The procedures which contain steps requiring equipment to be manually connected to the EDGs, contain a caution statement. This statement warns the operator that starting certain equipment with a diesel above a specified load level could result in loading that diesel above the 3300 KW qualified load.

Question:

4. Appendix 12.4, Operational Surveillance Log Sheets, has readings that are to be taken every half hour while the EDGs are in service. The log sheets need to be modified to include the operational ranges for the various readings contained in Steps 8.1.2.7 and 8.1.3.4 of the procedure.

Response:

4. The Operational Surveillance Log Sheets, Appendix 12.4 of the procedure, will be revised to incorporate the operational ranges for the parameters listed in Steps 8.1.2.7 and 8.1.3.4.

Question:

5. The EDG procedure needs to be modified to provide consistent instructions for use of the installed synchronizing lamps, which are to be used in the case of synchroscope malfunction.

Response:

5. The procedure will be revised to address the use of these installed synchronizing lamps.

F. CONTAINMENT CONTROL PROCEDURE SP 29.023.03

As a result of the February 27 - March 1, 1985 Staff meeting the following changes will be made to the containment control procedure:

1. The caution statement on page 2 associated with Steps 3.1.5 and 3.1.6 will be moved to page 3 so that it appears on the same page with its action statements. In general, cautions and notes will appear on the same page as the action statements with which they are associated.

2. Steps 3.3.1 and 3.3.3 will be revised and combined as a new Step 3.3.1. The revised Step 3.3.1 will read as follows:

   3.3.1. Sample and analyze primary containment atmosphere to ensure environmental release limits are met. To obtain the sample operate the post-LOCA Hydrogen Recombination System or the Post Accident Sampling System.

3. The caution statements for operation of the Post LOCA Hydrogen Recombiner and MSIV Leakage Control Subsystem will be revised to read as follows:

   CAUTION

   If a Post LOCA Hydrogen Recombiner is started with its associated Emergency Diesel Generator load at 3150 KW, 3300 KW may be exceeded.

   CAUTION

   If the MSIV Leakage Control Subsystem is started with its associated EDG load at 3250 KW, 3300 KW may be exceeded.

4. Step 3.3.5 will be revised to reverse the order of the BEFORE and INITIATE statements.

5. The job task analysis will determine whether or not a caution statement for starting an RHR pump associated with the 3300 KW load limit is required at page 4 and page 7 to caution the operator as to acceptable diesel generator load before starting an RHR pump for containment spray.

6. The caution statement associated with starting an RHR pump on page 2 will be revised to read as follows:

   CAUTION

   If an RHR pump is started with its associated EDG load at 2250 KW, 3300 KW may be exceeded.

ATTACHMENT 3

LILCO Job Analysis

ELEMENT #	ELEMENTS	CONDITIONS	STANDARDS	PROBLEM ASSESSMENT	PROBLEM RESOLUTION
01.	Ensure RPV level is being restored or maintained.		RPV level must be above TAF.		
02.	Ensure actions are being taken to restore non-running EDGs.	If all EDGs did not start.	Remaining EDGs must not exceed 3300KW each.	What if one EDG do not start.	Use remaining EDGs to maintain Rx level and containment integrity.
03.	Determine which equipment loads could be on the overloaded EDG.	Load on EDG exceeds 3300KW			
04.	Determine which loads affected EDG can be safely reduced and priority while maintaining adequate core cooling and control of primary containment temperature pressure.				
05.	Direct CRO to secure the unnecessary loads.			EDG load must be less than 3300KW	
06.	Classify the event and initiate emergency plan.				

ELEMENT #	ELEMENTS	CONDITIONS	STANDARDS	PROBLEM ASSESSMENT	PROBLEM RESOLUTION
07.	Direct the restoration of manually connectable loads.	Adequate core cooling & control of primary containment temp. and pressure exists.			
08.	Verify plant status is consistent with Tech Specs.				

ELEMENT #	ELEMENTS	CONDITIONS	STANDARDS	PROBLEM ASSESSMENT	PROBLEM RESOLUTION
1.	Verify reactor scram has occurred.				
2.	Verify NSSS isolation has occurred.				
3.	Verify EDGs have started & have energized emergency buses.		Load must not exceed 3300KW	What if EDGs did not start? What if load exceeds 3300KW?	Manually start EDG. Reduce EDG loads based on function & priority of equipment
4.	Verify one service water pumps starts on each 4KV emerg. bus.			What if one service water pump does not start on each bus?	Manually start service water pump.
*5.	Verify RBSVS initiates				
6.	Verify RBSVS/CRAC Chillers Start.				

LOOP LOCA

ELEMENT #	ELEMENTS	CONDITIONS	STANDARDS	PROBLEM ASSESSMENT	PROBLEM RESOLUTION
7.	Place the mode switch in shutdown.				
8.	Verify a rapid flux decrease.				
9.	Verify all control rods inserted.				
10.	Monitor Reactor Vessel Level.				
11.	Verify group isolations consistent w/entry conditions.	Reactor Vessel Level cannot be maintained due (due to LOCA)			
12.	Verify ECCS automatic initiation.	LOCA is not small break.			
13.	Verify EDG load is within limits.		EDG load must not exceed 3300KW.	What if load exceed 3300KW?	Reduce load based on equip. function and priority as directed by SS.

LOOP LOCA

ELEMENT #	ELEMENTS	CONDITIONS	STANDARDS	PROBLEM ASSESSMENT	PROBLEM RESOLUTION
14.	Restore & maintain RPV level using CS, and/or LPCI (RHR) systems.		RPV level with limits. Min. systems used to restore level.	What if CRD pump does not trip due to LOCA signal?	Trip the CRD pump.
15.	Operate all available drywell cooling.	Drywell temp. > 145°F Off-site power restored.	RHR pumps must not be diverted from LPCI mode if inadequate core cooling exists.		
16.	Verify Reactor Recirculation pumps and drywell fans are shutdown.	Drywell temp. approaches 296°F. Off-site power lost.			
17.	Initiate drywell sprays.	" "	EDG load must not exceed 3300KW.	What if EDG exceeds 3300KW	Reduce load based on function and priority of equipment as directed by SS.
18.	Depressurize the RPV.	Drywell temp. cannot be maint. below 296°F and RPV level can be maintained. LOCA is small o°o RPV has not depressurized.	EDG load must not exceed 3300KW.	What if EDG load exceeds 3300KW from ECCS pump flow to increasing while depressurizing RPV	Reduce load based on function and priority of equipment as directed by SS.

ELEMENT #	ELEMENTS	CONDITIONS	STANDARDS	PROBLEM ASSESSMENT	PROBLEM RESOLUTION
19.	Operate available suppression pool cooling.	Suppression pool temp. > 90°F.	RHR pumps must not be diverted from LPCI mode if inadequate core cooling exists. EDG load must be below 2250KW before starting RHR pump.		
20.	Operate the Post-LOCA Hydrogen Recombination system.	Drywell pressure ≥ 1.69 psig Hydrogen found in drywell sample.	EDG load must be below 3150 KW before starting Post-LOCA Hydrogen Recombiner.		
21.	Operate the MSIV leakage control system.	If fuel damage is indicated & MSIV's are leakage Main steam line pressure < 35 psig	EDG load must be below 3250 KW before starting MSIV leakage control system.	What if the EDG load for train selected is > 3250KW? What if both EDGs are loaded > 3250 KW?	Select other train from other EDG to start. Shift or secure loads to make room on the EDG as directed by SS.
22.	Direct Rad-Chem to sample primary containment atmosphere.				
23.	Vent the primary containment.	Drywell temp is below 212°F and environmental release limit is met.			

ELEMENT #	ELEMENTS	CONDITIONS	STANDARDS	PROBLEM ASSESSMENT	PROBLEM RESOLUTION
24.	Initiate suppression pool sprays.		Suppression pool sprays must be initiated before suppression chamber pressure reaches the pool spray limit. RHR pumps must not be diverted from LPCI mode if inadequate core cooling exists.		
25.	Verify Reactor Recirculation Pumps & drywell fans are shutdown.	Suppression chamber pressure is above limit.			
26.	Initiate Drywell Spray.	Suppression chamber pressure is above limit.	EDG load must not exceed 3300KW.	What if EDG load exceeds 3300KW?	Reduce load based on function and priority of equip. as directed by SS.
27.	Depressurize the RPV.	Suppression chamber pressure cannot be maintained below limit. RPV level can be maintained.	EDG load must not exceed 3300KW.	What if EDG load exceeds 3300KW from ECCS pump flow increasing while depressurizing RPV.	Reduce load based on function and priority of equip. as directed by SS.

ELEMENT #	ELEMENTS	CONDITIONS	STANDARDS	PROBLEM ASSESSMENT	PROBLEM RESOLUTION
28.	Terminate injection into the RPV from sources external to the primary containment.	Suppression pool level > +6" A equate core cooling is assured.			
29.	Direct Rad-Chem to sample suppression pool water.	High Drywell pressure signal clear.			
30.	Lower suppression pool level.	Water is within discharge limits.			
31.	Notify System operator that a loss of offsite power has occurred. (Loop) & request status of black start gas turbines.				
32.	Ensure each EDG is maintaining its associated bus at, or close to 4160 V and 60 Hz.		Each EDG cannot exceed 3300KW.	What if EDG loads exceed 3300KW?	Reduce loads based on function and priority of equipment as directed by SS.

ELEMENT #	ELEMENTS	CONDITIONS	STANDARDS	PROBLEM ASSESSMENT	PROBLEM RESOLUTION
33.	Notify the Watch Eng. to classify the event and initiate the emergency plan.	LOOP in progress for greater than 15 minutes.			
34.	Reduce loads on the EDG.	EDG 3300KW load limit is or will be exceeded.	EDG load must not exceed 3300KW.	What if EDG loads exceed 3300KW?	Reduce loads based on function and priority of equipment as directed by SS.
35.	Direct PEO to Re-energize Reactor Protection System buses A & B from either their normal or alternative supply.		EDG must not exceed 3250 KW before RPS is is energized.	What if load of incorrect EDG exceeds 3300KW?	Determine PEO started wrong RPS MG set and direct PEO to secure the MG set.
36.	Start one RBCLCW pump in each loop.	Adequate core cooling is assurred. Primary containment press. & temp. are under control One pump not running in each loop.	EDG must not exceed 3200KW prior to starting assoc: RBCLCW pump.		
37.	Start one CRD pump.		EDG must not exceed 3050KW prior to starting pump.		

LOOP LOCA

ELEMENT #	ELEMENTS	CONDITIONS	STANDARDS	PROBLEM ASSESSMENT	PROBLEM RESOLUTION
38.	Direct PEO to reenergize the following MCCS: - MCC111B - MCC112B - MCC113A	DC not running. LOCA signal is not cleared.	- MCC111B-3250KW - MCC112B-3250KW - MCC113A-3150KW	What if load of incorrect EDG exceeds 3300KW?	Determine PEO energized wrong MCC and direct PEO to deenergize the MCC.
39.	Verify the following pumps have started: o Main turbine turning gear oil pump o Feedpump turbine turning gear oil pump (A & B)		EDGs must not exceed 3300KW each.	What if EDG exceeds 3300KW?	Reduce loads based on function and priority of equipment as directed by SS.
40.	Verify plant status is consistent w/tech specs.				
41.	Transfer the emerg. buses to their normal supplies and place EDG in standby.	Normal and/or station power is restored.	EDG's not to exceed 3300KW.	What if EDG exceeds 3300KW?	Reduce loads based on function and priority of equipment as directed by SS.

LOOP/LOCA (PEO)

ELEMENT #	ELEMENTS	CONDITIONS	STANDARDS	PROBLEM ASSESSMENT	PROBLEM RESOLUTION
1.	Restart RPS MG sets (trains A & B)			What if wrong RPS MG set is started causes EDG load exceed 3300KW	Secure MG set as directed by CRD.
2.	Reset EPA breakers (A&B RPS and Alternate supply)				
3.	Override the LOCA signal for: - MCC111B - MCC112B - MCC113A				
4.	Reset shunt trip for MCC supply breakers.	Individual feeder breakers open on all MCCs.		What if LOCA signal is over-ridden for wrong MCC causing EDG load to exceed 3300KW?	Open supply breaker as directed by CRO.

ATTACHMENT 4

Shoreham Nuclear Power Station

Diesel Generator Loading Analysis Plan

Prepared by General Physics Corporation