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RELATED CORRESPONDENCE

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

February 7, 1985

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

Dr. Peter A. Morris
Administrative Judge
Atomic Safety and Licensing Board
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Washington, D.C. 20555

Dr. George A. Ferguson
Administrative Judge
School of Engineering
Howard University
2300 - 6th Street, N.W.
Washington, D.C. 20059

In the Matter of
LONG ISLAND LIGHTING COMPANY
(Shoreham Nuclear Power Station, Unit 1)
Docket No. 50-322-1 (OL)

Dear Administrative Judges:

Enclosed is a copy of the letter to the Long Island Lighting Company on Emergency Diesel Generator Loading referenced on page 8 of the February 5, 1985 Testimony of James Clifford, Joseph Buzy and Richard Eckenrode.

Sincerely,

Edwin J. Reis
Assistant Chief Hearing Counsel

Enclosure: As stated

cc: Service List

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Docket No. 50-322

FEB 5 1985

Mr. John D. Leonard
Vice President - Nuclear Operations
Long Island Lighting Co.
Shoreham Nuclear Power Station
North Country Road, P.O. Box 618
Wading River, NY 11792

Dear Mr. Leonard:

SUBJECT: EMERGENCY DIESEL GENERATOR LOADING -
SHOREHAM NUCLEAR POWER STATION

As part of its evaluation of the adequacy of the TDI Emergency Diesel Generators (EDGs) at Shoreham, the NRC staff reviewed the possibilities of operator error causing the EDGs to be loaded in excess of 3300KW, the "qualified load."

Based on our review to date, we believe that you have not performed an adequate operational evaluation or analysis of the effectiveness of the procedures to be relied upon, or of the instrumentation to be used, to limit operator error. In addition, the training program for this issue had not been developed, much less implemented at the time this review was done (mid-January, 1985). Based on the enclosed concerns, it does not appear that an adequate basis exists for concluding that procedures and training will prevent operators from unnecessarily loading the diesels above 3300KW, as stated in your letter, to H. R. Denton, dated November 19, 1984. In addition, we feel there are a number of procedure-related problems that may increase, rather than reduce, the likelihood of operator error.

Our specific concerns on the procedures, training, and instrumentation are enclosed. Acceptable resolution of these concerns is required before we can determine whether or not procedures and training are an adequate substitute for design changes or testing of the EDGs for this issue.

Although we received copies of several revised procedures on January 29, 1985, we could not perform a comprehensive review of them in time to file testimony with the ASLB on February 5. Accordingly, some of the enclosed concerns may have already been corrected. If you have any questions, please contact Mr. R. Caruso 301-492-8392.

Sincerely,

A. Schwencer

A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing

Enclosure: As stated

REQUEST FOR ADDITIONAL INFORMATION
SHOREHAM NUCLEAR POWER PLANT
EMERGENCY DIESEL GENERATOR LOADING

The NRC staff has conducted a review of the applicable Shoreham operating procedures, training program, and instrumentation that relate to operation of the TDI Emergency Diesel Generator (EDGs). The following procedures were evaluated by desk-top review:

Level Control SP29.023.01, Rev. 4
Loss of Offsite Power SP29.015.01
Loss of Coolant Accident Coincident with a
Loss of Offsite Power SP20.015.04, Rev. 0
Emergency Diesel Generators SP23.3Q7.01, Rev. 12
Main Control Room - Conduct of Personnel SP21.004.01, Rev. 7
Loss of Instrument Air SP29.016.01, Rev. 4
Emergency Shutdown SP29.010.01, Rev. 4

An onsite inspection of plant instrumentation and training programs relevant to EDG loading was conducted by representatives of the NRC on January 16 and 17, 1985. The NRC staff will evaluate the responses to the following requested information to determine if the licensee has performed an adequate evaluation or analysis of the acceptability of relevant training and procedures. In addition, the NRC will evaluate the licensee's response to determine the adequacy of the training, procedures and hardware for providing reasonable assurance that the procedures, training and instrumentation will not contribute to, and will serve to minimize, the likelihood of an operator error that would result in an overload of the EDGs.

GENERAL

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 - SP29.023.01, Emergency Shutdown - SP29.010.01, Containment Control - SP29.023.03, Loss of Offsite Power - SP29.015.01, and Loss of Coolant Accident Coincident with a Loss of Offsite Power - SP29.015.04.

   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?

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?

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 3300KW.

   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 3300KW 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 3300KW 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 3300KW 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.

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.

5. The best reading accuracy that can be obtained on the installed EDG KW meter is 50KW assuming the operators are at normal reading distance. Thus, before <u>any</u> load less than 100KW is started, EDG loading, as

indicated on the meter, will need to be reduced to at least 3200KW, 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.

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

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 3300KW; 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.

Level Control - SP29.023.01

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.

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.

Loss of Coolant Accident Coincident with a Loss of Offsite Power - SP29.015.04

1. The purpose and operational effectiveness of having a separate procedure to deal with this specific combination of events is not clear. The actions taken in this procedure deal exclusively with verifying that all equipment that does not automatically connect to the diesel generators for a LOOP/LOCA is in fact not operating. Explain the analysis or evaluation performed to investigate and justify the impact on other competing operator responsibilities, and on the operators' ability to execute all necessary concurrent procedures.

2. Page 2, Step 4.1 -

   a. A number of the listed loads have no indication available in the control room, and the controls for these and a number of other listed loads are outside the control room. This adds significant concerns regarding completion of the step in a timely manner, accessibility of the necessary controls, adequacy of available lighting under the event conditions, and the impact of these actions on the watch engineers' attention to plant safety parameters. Describe any existing or planned provisions to address these concerns and the evaluation performed to determine whether or not the necessary actions can reasonably be accomplished.

   b. This step, and the procedure in general, does not address the action to be taken if the listed loads are not running, and the diesel generator loading is still in excess of 3300KW. Specific actions to deal with this condition are needed.

3. Page 2, Note before Step 4.1.1 -

   a. This note contains an action step. The note should be reworded to not require an action, or be incorporated into an action step.

   b. The need for checking the size of the load in this step is unclear, since the instruction is to stop the equipment regardless of its load. Explain what is intended by the action in the note, and why it is necessary.

4. Page 2, Substeps of Step 4.1 -

   a. The entire number should be shown for each substep to be consistent with the numbering scheme in other procedures.

   b. A place-keeping aid needs to be provided for each load to allow the operators to mark off each load as it is checked or de-energized.

5. Page 2, Step 4.1.1 - The terminology used in this step, "RBCLCW Pump," is inconsistent with the terminology used in SP29.015.01, "RBCLCW Circ. Pump." The two procedures need to be made consistent.

6. Page 4, Steps 4.2 and 4.3, and Caution - The sequence of these steps appears incorrect. The operators need to be warned, and need to determine that adequate load margin exists before instructing the watch engineer that loads may be added.

7. Page 4, Caution before Step 4.3 - This caution is formatted differently than the caution in SP29.015.01. In addition, there is insufficient contrast between the formatting of notes and cautions throughout the procedures. The cautions need to be reformatted, and a means needs to be used to highlight cautions to the operator which contrasts cautions form notes and from the steps.

8. The overall format of this procedure is inconsistent with the format of Level Control SP29.023.01. The procedures should have a consistent format, or the reason for the difference needs to be acceptably justified.

9. The format of conditional statements (e.g., IF ... THEN) are inconsistent between this procedure and Level Control SP29.023.01. The procedures should use a consistent format, or the reason for the difference needs to be acceptably justified.

Loss of Offsite Power - SP29.015.01

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.

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.

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 SP29.015.04. 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.

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

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.

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.

7. Page 3, Step 4.4.5 - This step addresses "RBCLCW Pumps," while Appendix 12.2 lists "RBCLCW Circ. Pumps." If these two listings are for the same equipment, they need to be labeled consistently.

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.

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.

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.

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, SP29.015.04, 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.

12. Page 3, Step 4.5 - The Level Control procedure calls for possible use of these pumps, while SP29.015.04 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.

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.

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

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.

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.

Emergency Diesel Generator Procedure - SP23.307.01

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.

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

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 3300KW. 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.

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.

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.

February 5, 1985

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
LONG ISLAND LIGHTING COMPANY	)	Docket No. 50-322-1 (OL)
	)	
(Shoreham Nuclear Power Station, Unit 1)	)	

NRC STAFF TESTIMONY OF JAMES W. CLIFFORD, JOSEPH J. BUZY, AND RICHARD J. ECKENRODE

NRC STAFF TESTIMONY OF JAMES W. CLIFFORD, JOSEPH J. BUZY,
AND RICHARD J. ECKENRODE

Q.1. What is your name and occupation?

A.1. (Clifford) My name is James W. Clifford. I am employed as an Operational Safety Engineer (Nuclear) in the Procedures and Systems Review Branch, Division of Human Factors Safety, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission.

Q.2. What are your qualifications and experience relevant to your testimony?

A.2. (Clifford) I have a Bachelor of Science degree in Systems Engineering. I have experience in the operation, maintenance, event analysis, and testing of naval nuclear propulsion plants and prototypes. During my employment with the U.S. NRC, I have been involved in numerous evaluations of licensee and applicant emergency operating procedures and procedure programs, including evaluations for licensing and for actual operating events. A further statement of my professional qualifications is attached to this testimony.

Q.3. What is your name and occupation?

A.3. (Eckenrode) My name is Richard J. Eckenrode. I am employed as a Human Factors Engineer in the Human Factors Engineering Branch, Division of Human Factors Safety, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission.

Q.4. What are your qualifications and experience relevant to your testimony?

A.4. (Eckenrode) I have a Bachelor of Science degree in Aeronautical Engineering. I have been active in the application of the Human Factors discipline to manned systems since 1960. During my employment by the U.S. NRC, I have participated in numerous evaluations of control room designs and design reviews for applicant and operating reactors. A further statement of my professional qualifications is attached to this testimony.

Q.5. What is your name and occupation?

A.5. (Buzy) My name is Joseph J. Buzy. I am employed as a Senior Reactor Engineer (Training and Assessment) in the Licensee Qualifications Branch, Division of Human Factors Safety, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission.

Q.6. What are your qualifications and experience relevant to your testimony?

A.7. (Buzy) I have a Bachelor of Science degree in Marine Engineering. I have over 28 years experience in the design, operation, maintenance,

event analysis, and training for military and commercial nuclear power plants, including 17 years as an Operator License Examiner for the U.S. NRC. My current responsibilities include evaluation of training and requalification programs for licensed operators and Shift Advisors. A further statement of my professional qualifications is attached to this testimony.

Q.7. What is the nature of your testimony?

A.7. (All) We are providing testimony to address the question of whether the procedures and training proposed by the licensee will provide additional assurance that the TDI emergency diesel generators (EDGs) will be operated within the specified loading capacity.

Q.8. What part do the procedures and training play in the TDI EDG design issue at Shoreham?

A.8. (All) In response to an NRC staff question, the licensee stated in November 1984, that they were relying on procedures and training (i.e., the operators) to keep from overloading the EDGs above a level identified as a "qualified load" during specified conditions. This qualified load we understood to be 3300KW. The specified conditions were a Loss of Offsite Power (LOOP) or a Loss of Offsite Power in

conjunction with a Loss of Coolant Accident (LOOP/LOCA). Without the assurance that operators would keep EDG loading less than 3300KW, the NRC staff could not certify the reliability of the EDGs.

In evaluating the EDGs, the design review resulted in a finding that the EDGs were capable of operating at 3500KW, as indicated in the portion of the testimony provided by the consultants to the NRC staff. Assuming the loads and associated loadings that are identified in the FSAR (Table 8.3.1-1) are accurate, and the reliability of the EDGs is acceptable to at least 3500KW, as determined by the NRC staff and its consultants, the operators are no longer required to keep EDG loading less than 3300KW, and the procedures and training are acceptable to be used, as at other plants, to provide additional assurance that the EDGs will be operated within the loading capacity of the machines.

Q.9. Is there reasonable assurance that the EDGs will be operated within their load capacity?

A.9. (All) Based on the information we have reviewed to date, we have not found reasonable assurance that the EDGs will be operated within their load capacity.

Q.10. Describe the review performed to date.

A.10. (All) In early December 1984, we were asked by our Division of Licensing to evaluate the procedures related to EDG operation. We evaluated the following letters to determine the role the licensee intended for the procedures and training.

a. J. D. Leonard to H. R. Denton, dated July 3, 1984
b. J. D. Leonard to H. R. Denton, dated August 22, 1984
c. J. D. Leonard to H. R. Denton, dated September 11, 1984
d. J. D. Leonard to H. R. Denton, dated November 19, 1984 (SNRC-1104)
e. J. D. Leonard to H. R. Denton, dated November 29, 1984

We received the following procedures during the first week of January 1985:

a.	Level Control	SP29.023.01, Rev. 4, dated 12/20/84
b.	Loss of Offsite Power	SP29.015.01, Rev. 7, dated 12/20/84
c.	Loss of Coolant Accident Coincident with a Loss of Offsite Power	SP29.015.04, Rev. 0, dated 12/20/84

d. Emergency Diesel Generators — SP23.307.01, Rev. 12, dated 12/14/84

e. Main Control Room - Conduct of Personnel — SP21.004.01, Rev. 7, dated 9/27/84

We conducted a review of these procedures for useability and technical accuracy. We had numerous comments on the procedures.

In addition to these procedures, we visited the site January 16-17 to evaluate the location and adequacy of the instrumentation and controls to be used during the execution of the procedures, to obtain information on the training program necessary to complete our evaluation, and to obtain additional procedures that would be used during the assumed LOOP or LOOP/LOCA conditions. The following additional procedures were obtained:

f. Emergency Shutdown — SP29.010.01, Rev. 4, dated 8/16/84

g. Loss of Instrument Air — SP29.016.01, Rev. 4, dated 10/7/83

Q.11. Describe how the information evaluated has led to your current position.

A.11. (Buzy) The most significant finding was that at the time of our site visit, the training department had not yet started to develop a

training program to address the integration of the numerous issues that would have to be addressed to operate the plant with the limitation on EDG loading. We therefore had no basis for evaluating the adequacy of the training, or the basis for the training program.

(Clifford) There were a number of concerns regarding the procedures. In several instances, the procedures would have either directed the operators to take actions that would have overloaded the EDGs, or required the operator to decide between various options, without either specifying the options themselves or providing the criteria for choosing between the options.

(Clifford) The number of procedures that were required to be used by the operators simultaneously raised a concern regarding the manageability of the procedures, and the large number of interrelated actions during their execution.

(Eckenrode and Clifford) There was also a concern that the actions that would have to take place outside the control room to determine if a number of non-safety loads were operating may add an unacceptable level of confusion and delay while the operators were trying to mitigate a LOOP/LOCA event. In addition, no means had been provided to keep track of the loads that were being manipulated.

We are requiring that the specific concerns identified during our review be acceptably addressed by the licensee before we complete our evaluation. These specific concerns are addressed in a Request for Additional Information transmitted from A. L. Schwencer to J. D. Leonard dated February 5, 1985.

PROFESSIONAL QUALIFICATIONS

JAMES WILLIAM CLIFFORD

My name is James William Clifford. I am employed as an Operational Safety Engineer in the Procedures and Systems Review Branch, Division of Human Factors Safety, Office of Nuclear Reactor Regulation, U. S. Nuclear Regulatory Commission, Washington, D. C. I have held this position since October 1980. I have also been assigned as Acting Section Leader, Section A (Procedures) of the Procedures and Systems Review Branch for the period of March 28, 1983 to September 11, 1983. The Procedures and Systems Review Branch reviews and evaluates licensee programs for the technical, human factors, and operational aspects of nuclear power plant operating and maintenance procedures. I was involved in the pre-licensing audit of emergency operating procedures at five (5) applicants' sites, and have review the emergency operating procedure development programs for eight (8) applicants and operating reactors. These reviews included the evaluation of technical guidelines, operational concerns, and the human factors guidelines to be used in the development and implementation of the emergency operating procedures. I was involved as one of the principal staff reviewers for the human factors aspects of emergency operating procedure generic technical guidelines for B&W and Combustion Engineering Owners Group guidelines, and, through the reviews of procedures for three (3) BWR applicants, assisted in the evaluation of the adequacy of the BWR Owners Group guidelines. I was the principal reviewer for the operational and human factors concerns for the Pressurized Thermal Shock generic issue, including audits of emergency operating procedures for six plants.

From July 1978 to October 1980, I was a naval officer qualified to the equivalent of a shift supervisor at the naval nuclear power prototype at Windsor, CT, where my responsibilities included supervision of plant operations, training of new personnel, and ensuring the continued expertise of experienced personnel. From March 1976 to July 1978 I was a naval officer assigned to a nuclear powered ship, where my responsibilities included safe operation of the ship's nuclear power plant.

I earned a BS degree in Systems Engineering from the U. S. Naval Academy in 1974. During my naval service and my employment with the NRC, I have attended several courses, varying from one week to six months in duration, on plant engineering, human factors, and plant operations. I am previously qualified as Chief Engineer Officer for Naval Nuclear Propulsion Plants.

RICHARD J. ECKENRODE
PROFESSIONAL QUALIFICATIONS
HUMAN FACTORS ENGINEERING BRANCH
DIVISION OF HUMAN FACTORS SAFETY

Since December 1980 when I was hired by the U.S. NRC, I have been assigned to the Human Factors Engineering Branch, Division of Human Factors Safety, Office of Nuclear Reactor Regulation. My initial responsibilities included: (1) participation in the development of NUREG-0700, "Guidelines for Control Room Design Reviews," and (2) participation in the onsite control room design reviews required for operating licenses. Subsequently, I have participated in over 20 control room design reviews, 12 of which I directed. I was a member of the NRC Task Forces which reviewed the steam generator tube rupture event at R. E. Ginna Nuclear Power Plant and the ATWS event at Salem Generating Station.

I have been active in the application of the human factors discipline to manned systems since 1960 and have directed or participated in more than 30 major human factors projects. I am a member of the Human Factors Society.

I hold a Bachelor of Science degree in Aeronautical Engineering from St. Louis University and have completed five NRC sponsored courses in Nuclear Reactor Concepts, Radiation/Contamination Protection, Pressurized Water Reactor Fundamentals, BWR Technology, and PWR Simulation.

From 1963 until joining the U.S. NRC in 1980, I was a Principal Associate with Dunlap and Associates, Inc., of Norwalk, Connecticut. Dunlap and Associates, Inc. is a research and consulting firm in the areas of systems and operations analyses and the behavioral sciences including human factors.

Some of my major projects included:

- Development of human factors guidelines for designing CRT color display formats for a large electrical power distribution control room. Subsequently designed a major portion of the displays.

- Development of a task analysis methodology for determining training requirements and training device requirements and characteristics, as applied to Infantry and Cavalry Fighting Vehicles.

- Conducted human factors and systems analyses resulting in man/machine interface design recommendations, procedures development and training requirements recommendations for the following systems and programs:

    - Optical lens manufacturing facility
    - Hemotology laboratory
    - Navy AEGIS combat system program
    - Trident submarine missile system
    - Remotely piloted aircraft
    - UTTAS and research helicopters
    - Antisubmarine Warfare attack team trainer
    - Landing helicopter assault ship

- Chemical/biological warfare protective clothing
- Manned orbital laboratory
- Apollo/Saturn prelaunch checkout system

From 1960 to 1963 I was with the Life Sciences Department of McDonnell Aircraft Corporation. During that time I participated in the human factors analysis and design work on projects Mercury and Gemini and on mechanical ground support equipment for the F4 Tactical Fighter aircraft. I also participated in the Mercury astronaut acceleration training program and gathered human performance data to assist in verifying mission reliability estimates.

JOSEPH J. BUZY

Professional qualifications

Current Position: Systems Engineer (Training & Assessment)
Personnel Qualifications Branch
Division of Human Factors Safety
U.S. Nuclear Regulatory Commission

Education: B.S. Marine Engineering - 1954
U.S. Merchant Marine Academy
Kings Point, N.Y.

Experience:

- Military Service - 1954 - 1956 Served as Damage Control Officer and later Engineering Officer on U.S.S. Hollis APD-86.

- Nuclear - 1956 - 1960: Employed by Bettis Laboratories under contract to the Naval Reactors Program as an operating engineer for the Large Ship Prototype, AIW. I was trained and qualified as Chief Operator on the submarine prototype SIW and assisted in training Navy personnel for SIW and later AIW. I later qualified as Chief Operator on AIW and was assigned as test coordinator during the AIW power escalation program. I was later transferred to Newport News Shipyard as a Bettis Laboratory representative during the construction and start-up testing of the U.S.S. Enterprise. I assisted in initial start-up of two reactor plants on the Enterprise.

1960 - 1963: Employed by the Martin-Marietta Corporation as an operations test engineer for the PM-1 plant. The plant was built for the AEC and Airforce in Baltimore, Maryland, and transported to Sundance, Wyoming. At the site I qualified as Shift Supervisor and was in charge of a combined military crew during the start-up and demonstration phases of the PM-1 plant. I trained and qualified a majority of the military crew who later operated the PM-1 plant.

1963 - 1978: Employed by the AEC as Nuclear Engineer in the Operator Licensing Branch. I was trained and qualified as an operator licensing examiner and responsible for developing and administering written and operating examinations under 10 CFR Part 55 for all types of reactor licensed under 10 CFR 55 and 115. I occasionally directed AEC consultants in development and administration of examinations. In 1970, I was appointed as Section Leader for Power and Research Reactors (P&RR). I trained and supervised several OLB examiners in addition to a group of six to eight consultant examiners. The P&RR section administered examinations at all research and test reactors, Babcock and Wilcox, Combustion Engineering, General Atomics (HTGRs at Peach Bottom and Fort St. Vrain) and the sodium cooled reactors, Fermi I and SEFOR.

Examinations also included use of simulators. The P&RR section occasionally provided personnel to conduct examinations at the Westinghouse and General Electric plants. The P&RR section also reviewed Section 13.2, Training, in the FSAR and developed safety evaluation reports in this area.

1978 - 1979: I was assigned to Region II, Atlanta, Georgia and participated in a Pilot Test Program for regionalization of OLB functions. I was responsible for all licensed operator and senior operator renewals as well as changes to requalification programs in Region II. I developed and conducted examinations on all types of reactors, including the use of simulators, in the Region. Shortly after the Three Mile Island, Unit 2, accident, I was detailed as part of the NRC team at TMI for several weeks. Due to large demands on the OLB staff at Headquarters, the Pilot Test Program was suspended in the fall of 1979 and I returned to Headquarters as the PWR (Westinghouse) Section Leader. I was employed in this capacity until February of 1982.

1982 - Present: I am currently assigned as a Systems Engineer (Training and Assessment). This position requires: review of licensee's applications in Chapter 13.2 of the FSAR and preparation of Safety Evaluation Reports, review of changes to the licensee's requalification programs, response to Regional reports to provide resolution on the interpretation of training requirements. I have been recently assigned as a reviewer of Shift Advisor training programs. I have also participated in review of the ATWS event at Salem and the review of PTS training at H.B. Robinson and Calvert Cliffs. In addition, I have participated in the review of training programs at TMI.

Publications: I have contributed to several NUREGs published by the NRC.