SHOREHAM NUCLEAR POWER STATION

EMERGENCY DIESEL GENERATOR LOADING

ANALYSIS PLAN

PREPARED FOR

LONG ISLAND LIGHTING COMPANY

FEBRUARY 28, 1985

GENERAL PHYSICS CORPORATION
COLUMBIA, MARYLAND

LONG ISLAND LIGHTING COMPANY

EDG Loading Analysis Plan
Executive Summary

The Long Island Lighting Company and General Physics Corporation will conduct an evaluation of applicable Shoreham operating procedures, training and instrumentation that relate to the management of emergency operation of the TDI Emergency Diesel Generators (EDGs) and the concept of the 3300 KW qualified load. The evaluation will ensure that there is reasonable assurance that (1) the procedures and training would not lead the operators to load the EDGs to over 3300 KW, (2) the procedures and training provide the necessary guidance to have the EDG load reduced to less than 3300 KW within 1 hour in the unlikely event loads exceed 3300 KW, and (3) the training program adequately addresses 3300 KW load limit associated with the EDGs.

A job/task analysis of two scenarios related to operation under EDG loading will be performed by human factors, operations and engineering personnel.

These scenarios will be:

- Loss of Offsite Power (LOOP)
- Loss of Offsite Power with Loss of Coolant Accident (LOOP-LOCA)

In order to evaluate emergency operations under these scenarios, the following Shoreham procedures will be used:

- Level Control SP29.023.01 Revision 5
- Loss of Offsite Power SP29.015.01 Revision 9
- Emergency Shutdown SP29.010.01 Revision 4
- Containment Control SP29.023.03 Revision 9

The approach for performing the evaluation involves four main steps:

1. Conduct System Function Review and Job/Task Analysis
2. Verify I&C Availability and Suitability
3. Validate EOPS and Control Room Functions Related to EDG Loading
4. Review EDG Training Plan Against Job Analysis Worksheets

The System Function Review and Job/Task Analysis Step will form the basis of data collected to support the evaluation of operating crew actions, procedures and training during the LOOP and LOOP-LOCA scenarios. Task Analysis worksheets will document tasks, decisions, and information and control requirements, independent of the existing control room instrumentation and controls. The job analysis worksheets will document the conditions, references, standards, and skills and knowledge requirements associated with each task statement. Data from Steps 1 through 4 will be compiled on worksheets and entered into a database management system for review and final documentation purposes.

The Verification Step will consist of first identifying the existing instrumentation and control (I&C) characteristics available in the Shoreham control room for each task. In addition a review of applicable system differences between the Shoreham control room and the Limerick Simulator will be conducted. Finally, the suitability of the existing I&C to meet the information and control requirements specified in Step 1 above will be assessed.

The Validation Step will involve walkthroughs in the Shoreham control room and real-time simulation in the Limerick simulator with operations personnel. The simulation will be videotaped for later data analysis. A timeline will be derived from the simulation runs and added to the task analysis worksheets. Particular emphasis will be placed on collecting data relevant to what the operators are doing to manage and track (log) loads on the EDGs.

The Review of the Training Lesson Plan against the job analysis worksheets will be conducted once the task data is collected and validated. The review will involve a comparison of skills and knowledge documented in the Job/Task Analysis with the lesson plan objectives and material covered in the lesson.

Recommendations from the four steps will be provided to LILCO in an analysis report by General Physics. The data forms will be approved by LILCO before use and the data collected during the evaluation will be turned over to LILCO at the end of the study.

LONG ISLAND LIGHTING COMPANY

SHOREHAM NUCLEAR POWER STATION
EMERGENCY DIESEL GENERATOR LOADING
ANALYSIS PLAN

1.0 System Functions Review and Task Analysis for EDG Loading

1.1 Purpose

The purpose of the System Function Review and Task Analysis is to conduct an evaluation of applicable Shoreham operating procedures, training and instrumentation that relate to the management of emergency operation of the TDI Emergency Diesel Generators (EDGs) and the concept of the 3300 Kw qualified load.

LILCO has performed a job analysis which identified major tasks associated with operation of the EDGs with the qualified load of 3300 KW under emergency operations. This job analysis will be used as input to the detailed evaluation of systems functions and operator tasks associated with the LOOP and LOOP-LOCA events. The stated purpose will be accomplished by performing an analysis of tasks contained in the Shoreham Emergency Operating Procedures (EOPs) listed below:

- Level Control SP 29.023.01 Revision 5
- Loss of Offsite Power SP 29.015.01 Revision 9
- Emergency Shutdown SP 29.010.01 Revision 4
- Containment Control SP 29.023.03 Revision 9

The steps that make up the System Functions Review and Task Analysis are shown in Figure 1 and are described below.

1.2 System Functions Descriptions

Plant systems and subsystems in the Shoreham control room that the operator must access during EDG emergency operations will be identified. Existing plant documentation (i.e., Shoreham FSAR) relating to plant systems will serve as a prime information source.

Descriptions of the functions for each of the systems identified above will be prepared. These system descriptions will include:

- The function(s) of the system
- Under what conditions the system is used
- A brief explanation of how the system operates

The description of systems functions in this manner will serve as a reference base for subsequent task analysis.

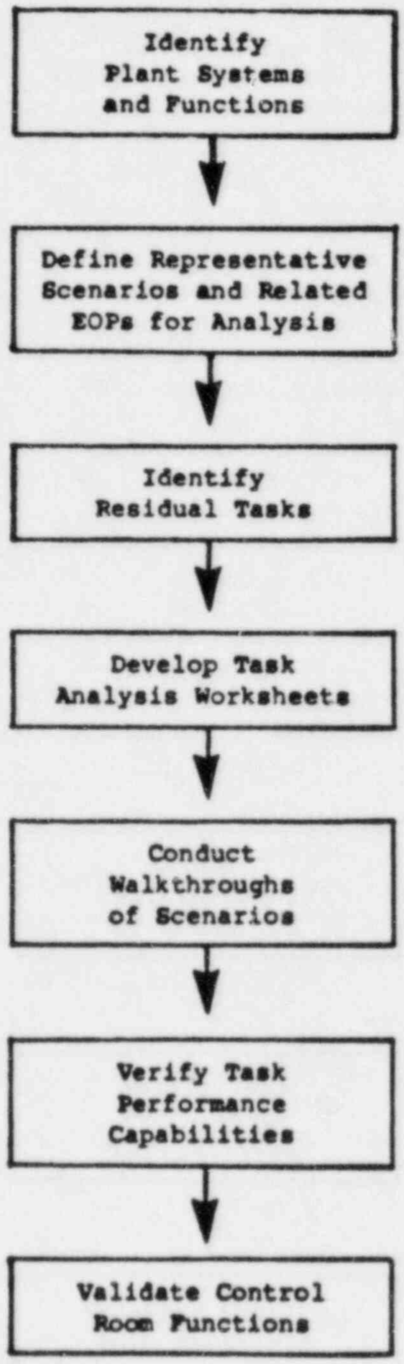

Figure 1. Systems Functions Review and Task Analysis Steps

1.3 Scenario Development

The Shoreham Emergency Operating procedures and the list of Shoreham systems will be used to define a set of simulator and walkthrough scenarios which adequately sample the Emergency Diesel Generator Loading emergency conditions and the plant systems and system functions used in those conditions. The Shoreham plant-specific EOPs that will be used includes:

- Loss of Offsite Power
- Emergency Shutdown
- Level Control
- Containment Control

The scenarious selected for task analysis are listed in Table 1. In addition, a brief narrative description of each scenario will be prepared that establishes the limits and conditions of the events to be analyzed. The descriptions will include:

- Initial plant conditions
- Sequence initiator
- Progression of action
- Final plant conditions
- Major systems involved

Scenarios developed will challenge, artificially if necessary, the diesel load limit in the context of removing load to either return to below the limit or to allow equipment start without exceeding the limit. To the extent this cannot be achieved in the simulator, it will be accomplished in control room walkthroughs.

1.4 Residual Task Identification

Residual operator tasks (unique tasks) from the plant-specific EOPs not covered in the simulator scenarios will be identified and analyzed separately in walkthroughs for associated information and control requirements. The analysis of residual tasks will be done to ensure that the operator interfaces had been examined even if those interfaces were not exercised in the simulator scenarios selected for validation. Verification of equipment availability and suitability will be performed for these residual tasks as well as for tasks embedded in the emergency scenarios.

1.5 Task Analysis Worksheet Development

Task Analysis Worksheets (see Figures 2 and 3) will be developed that indicate the operational steps required in each scenario along with the appropriate information and control requirements, means of operation, and I&C present on the control boards. The operator tasks will be analyzed using plant-specific EOPs as a starting point. The Task Analysis Worksheets will be prepared in the following manner:

1. Discrete steps in the Shoreham EOPs will be identified in order of performance. These steps will be recorded in the "Procedure Number" column of the Task Analysis Worksheet, and branching points noted depending on the plant transient being analyzed in the "Scenario Response" column. Note that there may have been more tasks subsequently identified in Step 2 below than there will be procedural steps.

Figure 2.

TASK ANALYSIS WORKSHEET

SCENARIO ______________________ PAGE ___ of ___

Shoreham Procedure Number	Time	Task/Subtask	Seen. Resp.	Crew Memb	Loc.	Decision and/or Action Requirements	Information & Control Requirements	I&C Identification			Verification		Comments/ Candidate HED's
								Means	Panel	No.	Avail.	Suit.	

G85-0122

1. **SCENARIO** - operating scenario name and identifier (ID).

2. **PROCEDURE NO. (SHOREHAM)** - procedure step number for SHOREHAM EOPs (Emergency Operating Procedures).

3. **REAL TIME** - from simulation for each task (start/stop time).

4. **TASK/SUBTASK** - a description of the crew member task/subtask in the operating sequence.

5. **SCEN. RESP.** - a notation designating decision points or branching information needed for correct task execution for the operating scenario (as defined in the operating scenario description).

6. **CREW MEMBER** - the crew member who performs the task.

7. **LOC** - the location where the task is performed.

8. **DECISION AND/OR ACTION REQUIREMENTS** - any contingent decision and/or action requirements that are linked to task performance.

9. **INFORMATION AND CONTROL REQ.** - the information and control requirements for successful task performance (derived independently of the actual I&C in the control room). Noted in this column are (1) the system involved (2) the parameter, component in procedure needed and (3) the relevant characteristics of the parameter or component required for the operator to execute the task (e.g., parameter range, accuracy, scale, units or control states).

10. **MEANS** - the actual means (e.g. switch, meter, etc) used by operators to perform the task in the control room.

11. **I&C IDENT. (PANEL/NO.)** - the actual instrumentation and controls (I&C) identified from walkthroughs that the operators used to perform the task. The I&C is uniquely identified using a PANEL number and Equipment Number (NO.).

12. **VERIFICATION (AVAIL./SUIT.)** - columns that indicate the availability and suitability of the Instrumentation and controls (I&C) needed for task performance. These columns would contain a "yes" or "no" answer which is arrived at through a Verification Process Flowchart. Entries that are a "no" are detailed further on an HED Suitability Assessment Form.

13. **COMMENTS** - any comments related to scenario execution, task performance, or the accompanying task requirement columns (the balance of the task analysis worksheet)

Figure 3. Task Analysis Worksheet Fields (Columns) Definitions

TABLE 1
SHOREHAM OPERATING SCENARIOS FOR TASK ANALYSIS

SCENARIO 1. Loss of Offsite Power

SCENARIO 2. Loss of Offsite Power with Loss of Coolant Accident

2. A brief description of the operator's tasks (in order of procedural steps) will be recorded in the "Tasks/Subtasks" column of the Task Analysis Form. Note that there may be more tasks described than are explicitly called out in the procedural step. Tasks, both explicit and implicit, will be documented by SRO subject matter experts and General Physics human factors specialists using plant-specific EOPs and Shoreham FSAR.

3. The operator decisions and/or actions that are linked to task performance will be noted in the "Decision and/or Contingent Action Requirements" column. System functional response is described when appropriate in this column. This set of data also includes branching points in the EOPs that determine the outcome of the operating sequence.

4. Input and Output requirements for successful task performance are noted in the "Information and Control Requirements" column in Figure 2. These are typically parameters, components or procedural information that are necessary for operators to adequately assess plant conditions or system status (e.g., reactor vessel water level, dry well temperature, etc.).

   Relevant characteristics for parameter readings or control selection will be noted by the Subject Matter Expert (SME) in the "Information and Control Requirements Column" in Figure 2.

5. Once the Tasks, Decision Requirements, and Information and Control requirements are specified, the specific instrumentation and controls (I&C) for EDG loading with the qualified load limit of 3300kW that the operator required per procedural step will be documented. The I&C needed to either (1) initiate, maintain or remove a system from service, (2) confirm that an appropriate system response has or has not occurred, i.e., feedback, or (3) make a decision regarding plant or system status will be listed. The "Means" column refers to how the information and control requirements are presented on the control boards (e.g., switch, meter, etc.). The "I&C Identification" column provides the specific panel number and identification number of the control or instrument.

   For each I&C (equipment) identified in this column, the equipment characteristics (parameter, range, units, scale, and/or control states) are noted on the form in Figure 4. A description of the equipment characteristics noted in Figure 4 is contained in Figure 5. These characteristics are used in the Verification of I&C Availability and Suitability Step as discussed in Section 2 below.

It is important to note that Steps 1 through 4 are completed on the Task Analysis Worksheet using independent sources of data other than the actual I&C present in the control room. Step 5 essentially completes the first step in the verification process to identify whether or not the necessary I&C for task performance is available in the control room.

The remaining columns of the Task Analysis Worksheet will be utilized during the Verification of Task Performance Capabilities, which is described in Section 2. These columns are briefly described below:

6. Verification column (used during the Verification step)
"Availability" of the I&C identified in Step Five (5.) for successful operator task performance is noted by a check in this column; "Suitability" of the I&C to meet the information and control requirements of operator task is noted by a check in this column.

7. Comments/Candidate HEDs
Comments or candidate Human Engineering Discrepancies (HEDs) can be noted in this column during any step of the Task Analysis or V&V phases. Data for HEDs will be entered on an HED form and into the computerized database.

The Task Analysis Worksheet thus serves as the complete record of operator tasks, decisions, information and control requirements, and I&C availability and suitability verification during the selected emergency operating sequences. This record is developed through the series of steps described above.

1.6 Task Analysis Database

The task analysis data will be entered into a computerized database. The forms that are used in collecting the data are:

- Task Analysis Worksheet
- I&C Equipment Characteristics

These forms collectively makeup the complete database fields that are defined for the Task Analysis, Verification and Validation phases. The Task Analysis Worksheet is the master record of task data and the verification phase decisions made about the task data and associated I&C Equipment Characteristics.

In the computerized database, each data field (column) is represented only once with data being keyed to one or more fields of the Task Analysis Worksheet. The other two forms are linked by either the Task Analysis Worksheet (TAW) Scenario and Task I.D. (see Equipment Suitability HED Form) or by the I&C Equipment Identification columns (see I&C Equipment Characteristics form). The engineer can enter the database by referencing either the Scenario-Task ID or the I&C Identification (Panel No.) keys. In this way, the database allows flexibility to search both operator task data and equipment data.

1.7 Control Room Inventory

The function intended for a control room inventory is to determine whether the instrumentation and controls needed to support the operation of the EDGs below 3300 kw under emergency conditions actually exist. This function will be accomplished as part of the task analysis effort and the related verification and validation efforts. The determination of I&C availability is described in Section 2.3, I&C Availability. Equipment characteristics associated with the I&C (Equipment) identified in the task analysis worksheet will be noted using the form in Figure 4.

EQUIPMENT CHARACTERISTICS

Panel ID: ______ (1)

Reviewer: ______ (2)

Date: ______ (2)

I & C Description and Parameter	I & C Number	Inst. Type: SW/Meter/ Recorder/Controller	Range	Units	Divisions: Major/Minor Scale: Log/Linear	Control: SW Positions Lights: Color/Meaning
(3)	(4)	(5)	(6)	(7)	(8)	(9)

Figure 4. I&C Equipment Characteristics

1. PANEL I.D. - the specific panel identification code. It can be a letter code or number code.

2. REVIEWER & DATE - the name of the person filling out the equipment characteristics form and the date it was performed.

3. I&C DESCRIPTION - this is the noun name description of the instrument or control as it appears on the panel. The Parameter measured should be included as the last part of the I&C Description where applicable.

4. I&C NUMBER - this is the alpha-numeric identification code given to an instrument or control.

5. INSTRUMENT TYPE - this is either a switch, meter, recorder, controller, potentiometer, pushbuttons, indicator lights, etc.

6. RANGE - this is the meter range from minimum to maximum on the scale.

7. UNITS - the standard of measurement such as GPM, APMS, INCHES, RPM, etc.

8. DIVISIONS/SCALE - the divisions are listed as major and minor graduations. The scale is either log or linear.

9. CONTROL/LIGHTS - for a control, list the switch positions (i.e.: open-normal-close). For lights, list the color and its meaning when illuminated.

Figure 5. Description of Equipment Characteristics Form

1.8 Videotape Data Analysis Methodology

Videotapes of the operating scenarios will be taken in the Limerick Simulator.

In analyzing the videotapes of the scenarios, the primary concern will be the recording of instruments and controls used in each task.

Each time a discrete action is performed, (e.g., observing a meter, positioning a control, informing other operators of plant status), the analyst will fill in the Task Analysis Worksheet as described in the Systems Function Review and Task Analysis Procedure. The fields completed in the videotape analysis will be:

- Time
- Task performed
- Control room crew member
- His location
- Means used to perform the action (e.g., meter, discrete control, verbal, continuously variable control)
- I&C Identification numbers of components used (includes Panel No. and Comp. No.)

The list of components used will be detailed further on an Equipment Characteristics form (see Figure 4). This form includes I&C characteristics associated with the I&C identified on the Task Analysis Worksheet as follows:

- Display characteristics
  - Range
  - Units
  - Scale type
  - Accuracy

- Control characteristics
  - States
  - Direct/Indirect

Once the task analysis data reduction is complete, any new tasks identified will be subjected to analysis for independent information and control requirements by a subject matter expert (SME). This SME will not have seen the actual I&C used by the operating crew.

The completed Task Analysis Forms will be then ready to be used in the Verification of Availability and Suitability Phase of the evaluation study.

2.0 Verification of Task Performance Capabilities

2.1 Purpose

The purpose of the Verification of Task Performance Capabilities is to systematically verify that the information and control requirements that are identified in the task analysis are:

- Present in the main control room and/or available to the operators.
- Effectively designed to support correct procedure performance

2.2 Methodology

The Verification of Task Performance Capabilities will utilize a two-phase approach to achieve the purpose stated above. In the first phase, the presence or absence of the instrumentation and controls that will be noted in the task analysis will be confirmed. This will be done by comparing the requirements in the "Information and Control Requirements" column of the Task Analysis Form to the actual I&C manipulated ("I&C Identification" column) by the operator during the validation scenarios (see Figure 6).

2.3 I&C Availability

The presence or absence of required instrumentation and controls to manage EDG loading with the qualified 3300 KW load limit will be noted in the "Availability" column of the Task Analysis Form. If discovered that required instrumentation and controls are not available to the operator, any such occurrence will be identified as an HED and documented accordingly on an HED form.

The result of the verification of I&C availability will be a main control room inventory (in the Task Analysis Form column labelled "I&C Requirements") of instrumentation and controls needed to support operation under EDG emergency conditions.

2.4 I&C Suitability

The second phase will determine the human engineering suitability of the required instrumentation and controls to manage EDG loading with the qualified 3300 KW load limit by comparing the instrumentation against the criteria shown in Figure 6. For example, if a meter utilized in a particular procedure step exists in the main control room, that particular meter will be examined to determine whether or not it has the appropriate range and scaling to support the operator in the corresponding procedural step. If the meter characteristics are not appropriate, it will be noted by placing a check in the "Not Fully Useable" column of the Equipment Suitability Form (see Figure 7). This type of occurrence will be defined as an HED and documented accordingly on an HED form. If the equipment characteristics are appropriate then it will be noted by placing a check in the Suitability column on the Task Analysis Worksheet (Figure 2).

3.0 Validation of EOPs and Control Room Functions

3.1 Purpose

The purpose of the Validation of EOP and Control Room Functions step in the study will be to determine whether the functions allocated to the control room operating crew could be accomplished effectively within (1) the structure of the Shoreham specific EOPs and (2) the design of the main control room as it exists.

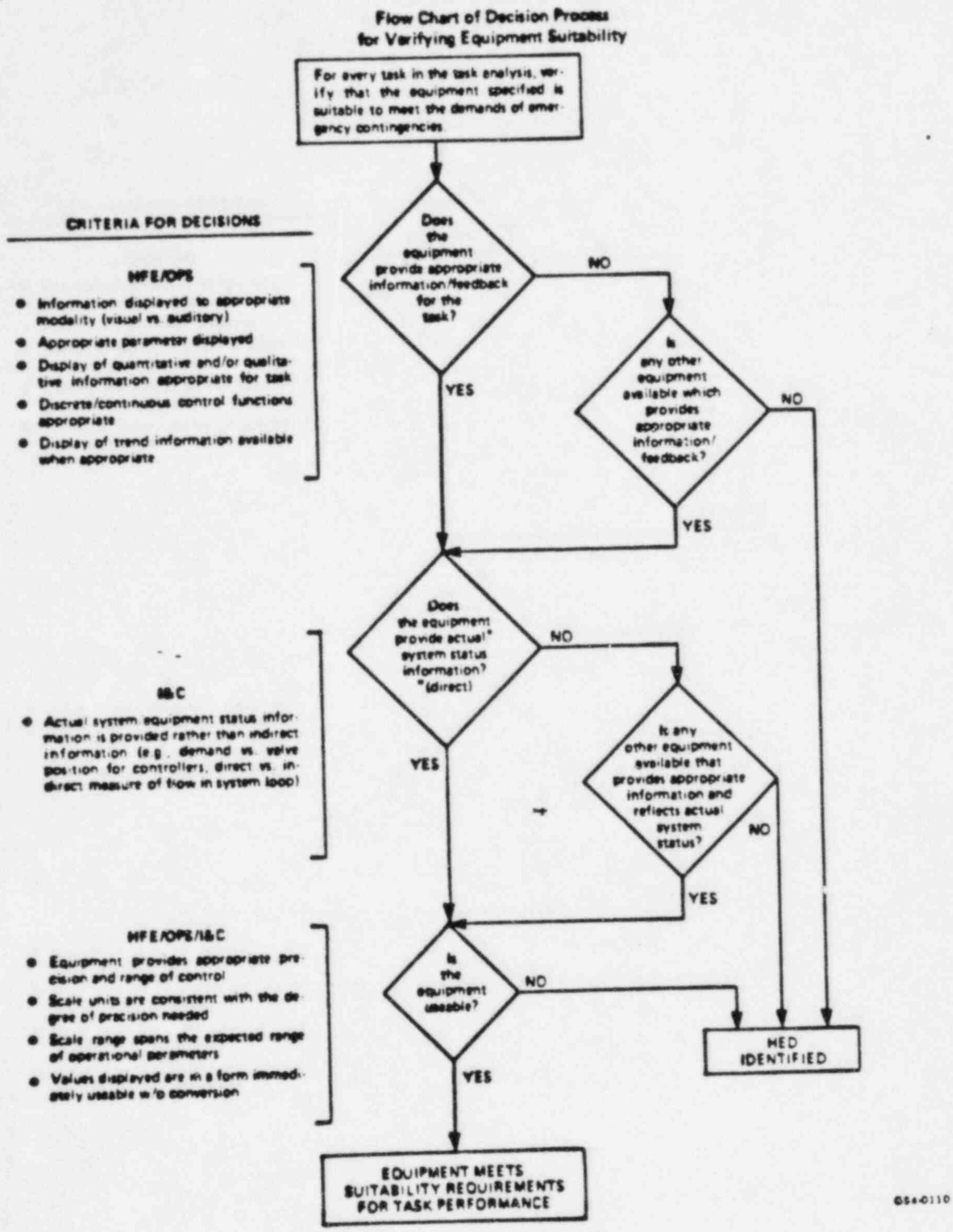

Figure 6. Flow Chart of Decision Process for Verifying Equipment Suitability

EQUIPMENT SUITABILITY HEDs

Completed by:____________

Date:____________

TAW REF.		I&C Equipment Ident.	Info. not Appropriate	Direct Sys. Status Not Provided	Not Fully Useable	Comments
Scen.	Task I.D.					

Figure 7. Equipment Suitability HED Form

3.2 Methodology for Validation

This section provides an overview of the steps involved in the simulator validation of EOPs and Control Room Functions. First, scenarios will be developed that challenge critical safety functions that must be restored using the procedures. Second, expected operator actions will be delineated for each scenario so that a hypothetical template is available for comparison to what actually happens during the simulator run. Next, the scenario will be simulated and the operating crew will use the EOPs to restore the plant to a safe condition. The operators are then debriefed to provide an important source of information for evaluating the procedure set. Following the debriefing, operators will walk through the scenario in slower than real time to evaluate the operational aspects of the control room design. The videotapes and generated documentation are then reviewed for dynamic performance problems and procedural error. Procedural errors will be written up on Human Engineering Discrepancy forms for LILCO resolution and dynamic control room hardware discrepancies will be written up as HEDs. The following sections provide further details of this process.

3.3 Methodology for Simulator Validation

A scenario is a collection of selected pre-planned events used as a framework for validation. A scenario includes the initial plant conditions, action sequences and expected outcome for a hypothetical plant emergency. To the extent possible, each scenario will be planned to include a unique set of paths through the EOPs in order to exercise as much of the procedures as possible. While some of the objectives of procedure verification/validation can be evaluated without reference to events, the useability of EOPs can be fully evaluated in the context of successfully controlling emergency events. Thus, scenarios will be constructed to challenge the procedures based on selected events.

A systematic procedure for choosing events with which to construct a scenario provides greater assurance that a representative sampling of events will be chosen. One way to sample events is to select ones that challenge the procedures to maintain critical safety functions of the plant. The development of scenarios is a multistep process and is described in the following paragraphs.

The first step in the development of scenarios will be to define which critical safety functions are to be challenged. Once the critical safety functions have been identified, the validation team will define the boundary conditions within which the scenario would be exercised; specifically, the validation team will define the initial conditions and final conditions of the scenario. Initial conditions are defined as those conditions existing (i.e., plant status) immediately prior to the event intended to challenge critical safety functions. Final conditions will be defined as those conditions representing a safe and stable plant. Restoration of the simulator to a state consistent with these final conditions will be the ultimate criterion for validation.

The next step will involve analyzing the Shoreham EOPS to identify those elements representing the desired final conditions. The EOPs will be further analyzed to define the hypothetical event path of the scenario in progressing from the initial to final conditions. Finally, the progression of action and scenario initiator(s) will be defined. The progression of action is a chronological description of the events highlighted on the EOPs as well as anticipated operator actions. The scenario initiator(s) is that event which degrades plant status to a level requiring entry to the EOPs.

Following development of scenarios by the validation team, scenarios will be reviewed by Limerick simulator instructors to ensure that simulator performance required by the scenarios is consistent with simulator capabilities (i.e., to ensure that simulator modeling is adequate to successfully exercise the scenario). Where inconsistencies are noted, the scenario progression of action will be modified as necessary, as will be the sequence initiator(s) and timing of malfunctions. It should be noted that these modifications will not redefine the scenarios; they only modify the specific simulator functions used to successfully implement the scenarios.

3.4 Delineation of Expected Operator Actions

The scenarios developed by the validation team will be of sufficient complexity to require the use of multiple procedures to restore the plant to a safe and stable condition. The scenarios will to the extent possible include both loading and unloading sequences for the EDGs.

The format presented in Figure 2 will be used by the validation team, both in defining the expected operator actions and evaluating the scenario. This format will identify:

- A procedure set for the scenario and specific steps from each procedure
- Operator actions which follow an expected path through the scenario
- Description of specific points at which differences between the control room and simulator may impact operator performance
- Description of discrepancies between actual performance and expected performance
- Categorization of discrepancies (training, procedures, instrumentation)

Following the completion of simulator exercises, actual operator actions will be compared with the EOP elements to identify any discrete EOP elements or groups of elements that had not been exercised by the scenarios. As appropriate, these residual tasks will be identified and the procedure steps will be evaluated. The residual tasks (i.e., those EOP elements not amenable to simulation) will be evaluated in the walkthroughs at Shoreham with the operators.

3.5 Evaluation of Simulator/Control Room Differences

A comparison will be made between the Limerick simulator and the Shoreham main control room, to determine significant differences that could affect the scenarios as they relate to the EDG 3300kW qualified load limit. Differences in panel design will be noted, where appropriate, and operator actions will be delineated so that attention can be given to the differences during the simulator runs and subsequent analysis. Operators will be familiarized with these differences prior to performing each scenario.

3.6 Performance of Simulator Runs

The operating crew chosen for the simulator runs will be familiarized with the latest procedures through training. The crew will not briefed on the actual scenarios to be run. The operators will be, however, briefed on the purpose of the validation.

Each scenario will be simulated separately (in real-time) with a debriefing session and walkthrough after the run. During the run, validation team members will be observers; at a minimum, two training/operations personnel and one human factors specialist will participate. Some notes will be recorded on Task Analysis forms, but excessive note-taking will be avoided so that the observers are free to observe. The tape record of the scenario will permit the observers to analyze occurrences later. In addition to the videotape of the scenarios, computer printouts from the simulator of switch, parameter, and annunciator status will assist in the analysis of the tapes if the observers are uncertain of an action because of camera placement.

During the simulator runs, if the crew takes an expected alternate path that will be as correct as the expected path, they will be allowed to continue uninterrupted. If the operating crew momentarily takes an unexpected alternate path that will be an incorrect path, but will be able to get back on the correct path using the procedure within a reasonable amount of time, the simulation will continue undisturbed. If, however, the crew takes an unexpected alternate path that is incorrect and shows no sign of recovering, the simulation will be stopped. If an obvious, remediable error is involved, e.g., a page of the procedure was missing, the problem will be corrected and the run started again where it went astray.

3.7 Debriefing of Operators

The operator debriefing session will be conducted immediately after each scenario run on the simulator. The comments of the operators who participated in the exercise will provide one of the most important sources of information for evaluating the procedure set. Operator actions which did not lend themselves to direct observation, such as symptom diagnosis or conversion of displayed values will be described by the operators during the debriefing. The operators' comments will also contribute to greater accuracy in analyzing deviations from expected operator actions which occurred during the scenario.

3.8 Scenario Walkthroughs

The purpose of the walkthrough will be to evaluate the operational aspects of control room design in terms of control/display relationships, display grouping, control feedback, visual and communication links, manning levels, traffic patterns, and the field operator functions. These walkthroughs will be performed at Shoreham.

After the operator debriefing is completed, the operators will be requested to perform a walkthrough of the scenario in slower than real time. During the walkthroughs, the operators will note any errors, such as improper step sequencing or branching, that occurred on the Task Analysis Forms. These errors will be traced back to the EOPs for investigation to ascertain whether the error occurred because of a procedural problem.

If a procedural problem is discovered, it will be documented and later written up on an HED form. The HED forms will be submitted to LILCO Operations who will review them and take the appropriate action.

The operators who perform the scenarios will review the Task Analysis Worksheets along with a human factors specialist. The operators will be asked to note any errors or problems that were encountered in the walkthroughs and to expound upon the source of the errors or problems. Any dynamic performance problems uncovered during this phase will be documented as HEDs.

Once the events have been analyzed to extract the information noted above, Link Analyses, will be prepared to document movements of the operators in the Shoreham control room during the scenarios.

4.0 Review of EDG Training Plan with Job Analysis Worksheets

General Physics and LILCO will review the EDG Training Plan and compare it to the job analysis data collected in Step 1 above.

The comparison will focus on the skills and knowledge needed to manage EDG loading during the LOOP and LOOP-LOCA scenarios. These skills and knowledge requirements identified in the job analysis portion of Step 1 (see Figure 8) will form the basis for the review of the lesson plan objectives and the material content covered in the lesson.

Recommendations for improving the lesson plan will be provided in a summary form to LILCO. These recommendations will also address the correspondence of the lesson plan content to the EDG procedures and their use in the Shoreham control room.

SKILLS AND KNOWLEDGE WORKSHEET

JOB CATEGORY:
PLANT ID:
OPERATING SEQUENCE:
JPM ID:
PAGE NO:
DATE:

TASK CODE	EXPECTED SOURCE OF S&K QUALIFICATION	SKILLS AND KNOWLEDGE STATEMENTS	COMMENTS

Figure 8. Skills and Knowledge Worksheet

ATTACHMENT 5

TDI - Emergency Diesel Generator

3300 KW Load Lesson Plan