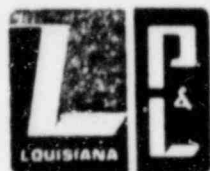


PROGRAM PLAN

INDEPENDENT DESIGN REVIEW OF WATERFORD SES UNIT NO. 3 EMERGENCY FEEDWATER SYSTEM



MIDDLE SOUTH
UTILITIES SYSTEM

LOUISIANA
POWER & LIGHT

142 DELARONDE STREET
NEW ORLEANS, LA. 70174
(504) 366-2345

AUGUST 1982



**TORREY
PINES
TECHNOLOGY**

A DIVISION OF GENERAL ATOMIC COMPANY

8210150353 821004
PDR ADOCK 05000382
A PDR

TABLE OF CONTENTS

| | PAGE |
|---|------|
| I. SUMMARY | 1 |
| II. TASK DESCRIPTIONS | 3 |
| Task A - Design Procedure Review | 3 |
| Task B - Design Procedure Implementation Review | 6 |
| Task C - Technical Review | 8 |
| Task D - Physical Verification Walkdown | 11 |
| | |
| A Task E - Processing of Potential Findings | 13 |
| | |
| Task F - Administrative & Reporting | 17 |

I. SUMMARY

This program plan has been developed for an independent design review of the emergency feedwater system for the Waterford Steam Electric Station Unit No. 3. This program will be performed by Torrey Pines Technology, a division of the General Atomic Company, for Louisiana Power & Light Company. The program is divided into six tasks as follows:

- Task A Design Procedure Review
- Task B Design Procedure Implementation Review
- Task C Technical Review
- Task D Physical Verification Walkdown
- Task E Processing of Potential Findings
- Task F Administrative and Reporting

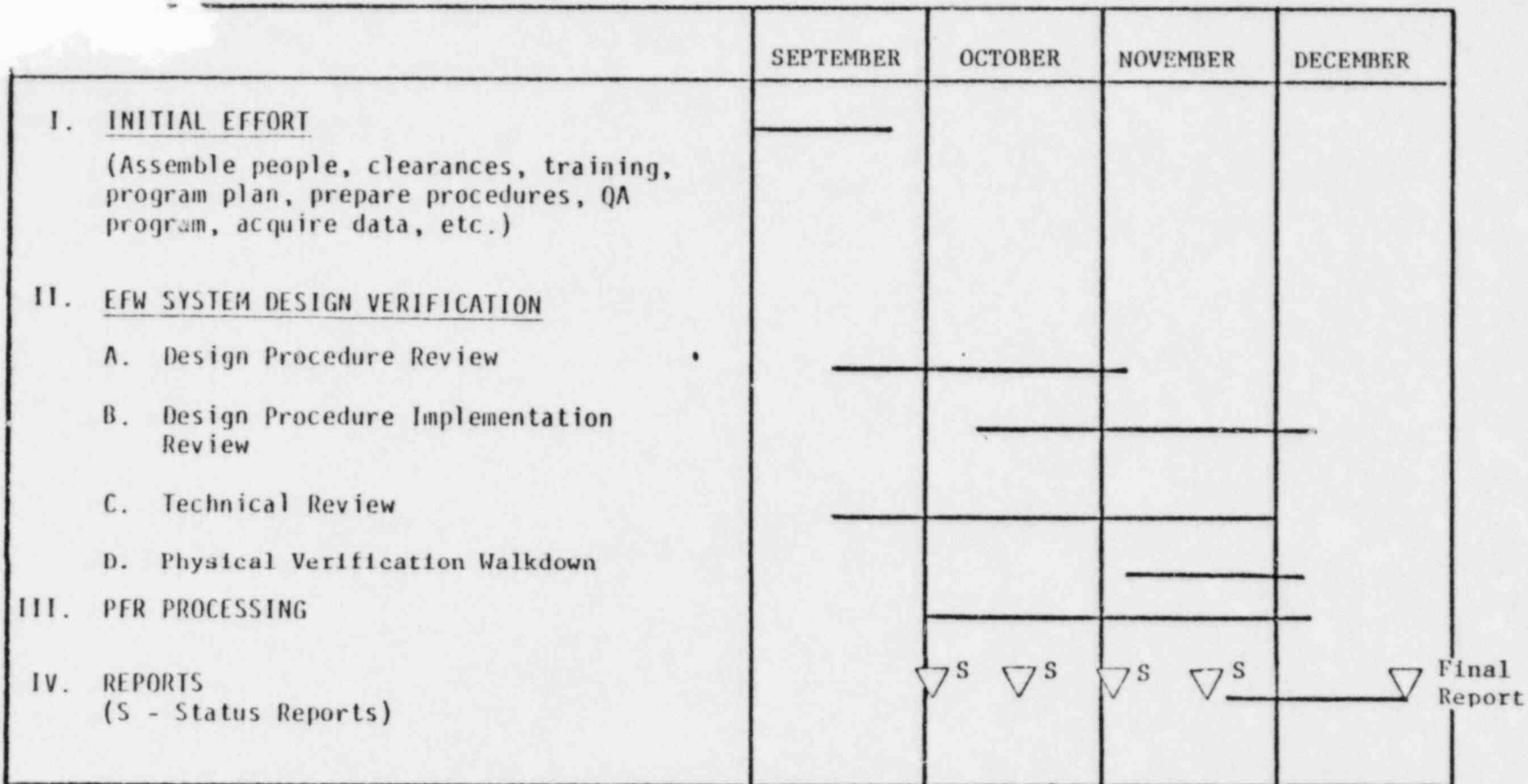
General Atomic Company, through its Torrey Pines Technology Division, is eminently qualified to perform this evaluation for Louisiana Power & Light Company. We operate under the first NRC-approved quality assurance program. We have available the significant expertise in both quality assurance and design required to review in detail the Waterford-3 emergency feedwater system, starting with a review of the design procedures and their implementation through a review of the technical design aspects of this system.

We, as a company, have not had significant involvement with Louisiana Power & Light Company in the immediate past. The individuals assigned to this program are free from conflict of interest.

This independent review is schedule to be completed in December 1982. The overall schedule is shown in Fig. 1.



Fig. 1 Proposed Schedule for LP&L Independent Design Review



II. TASK DESCRIPTIONS

The purpose of this program is to conduct an independent review of the Waterford 3 emergency feedwater (EFW) system from NRC approved design basis to final design documents. The program will not review the design process performed by equipment fabricators other than Combustion Engineering Inc. (CE) and Dravo.

The program is structured to verify that the design process converted the design basis specified in the FSAR into design documents. The detailed description of the tasks included in this program are in the following subsections.

TASK A - DESIGN PROCEDURE REVIEW

Objective

To verify compliance of design procedures and controls with the NRC-approved QA section of the PSAR or to 10CFR-Part 50, Appendix B. The procedures and controls used by LP&L, Ebasco, and CE will be reviewed. The procedures and controls of Dravo and Bergen/Patterson, two major piping and supports subcontractors to Ebasco, will also be reviewed.

Subtasks

- A1 Prepare a procedure and checklist to accomplish the evaluation described herein.
- A2 Provide a detailed description of the complete structure of the design control procedures applicable to the EFW system design work performed by LP&L, Ebasco, Dravo, Bergen/Patterson, and CE. This description will include a comprehensive list of all relevant procedures.

A

In carrying out this work item, it will be assumed that the major EFW design work was performed by LP&L, Ebasco, Dravo, Bergen/Patterson or CE. If this is not the case and other organizations also performed significant overall design work, then those organizations will be identified and their design control procedures will be identified and described.

A3 Determine that the CE procedures used for Waterford-3 are essentially the same as the procedures used for either the San Onofre or Palo Verde plants.

1. If it is determined that the same procedures were used, then no further review of the CE procedures will be performed.
2. If the titles and revisions of any of the CE procedures are different from those used either on San Onofre or Palo Verde, then the principal aspects, in terms of the "who," "what," "when," and "how," and the controls described in each will be compared to identify differences, if any, in the approaches taken on the Waterford-3 project versus the San Onofre or Palo Verde projects.
 - a) If the principal aspects of the controls are basically the same, then no further review of the CE procedures will be performed and the results of the previous TPT reviews will be used as the basis for this review.
 - b) If the principal aspects of the controls described in the CE procedures for LP&L appear to contain basic differences from that described in either the comparable San Onofre or Palo Verde procedures, then the affected CE procedures will be reviewed in detail for compliance with PSAR commitments and NRC requirements.

- A4 Obtain (or use on-site) copies of CE, LP&L, Dravo, Bergen/Patterson, and Ebasco procedures identified in A2.
- A5 The initial collection of procedures from CE, LP&L, Dravo, Bergen/Patterson, and Ebasco will include only currently applicable revisions.
- A5 Review all current procedures affecting the EFW system design work for conformance to the commitments in the latest PSAR.
- A6 Review selected design control procedure revisions applicable in time periods other than those covered in A5 for compliance to the applicable PSAR commitments, per A5 above.
- A7 Summarize the design procedure review, including any Potential Findings. This information will be included in the reports of Task F.

Milestones

| | | Dates |
|----|--|----------|
| A1 | Procedure and Checklist | 9/24/82 |
| A2 | Complete Procedure Structure | 10/8/82 |
| A3 | Review CE Procedures | 10/8/82 |
| A | A4 Access LP&L, Dravo, Bergen/Patterson, and Ebasco Procedures | 10/29/82 |
| A | A5 Review LP&L, Dravo, Bergen/Patterson, and Ebasco Procedures | 10/29/82 |
| A6 | Review Selected Procedures from Previous Time Periods | 11/5/82 |
| A7 | Summarize Results | 11/12/82 |

TASK B - DESIGN PROCEDURE IMPLEMENTATION REVIEW

Objective

To verify, through a sample of EFW system design documents, compliance with the design procedures and controls identified in Task A.

Subtasks

- B1 Prepare procedure and checklist to accomplish the evaluation described herein.
- B2 Select the design documents to be reviewed for compliance with the procedures. The selection of documents for review will be based on the following criteria:
1. All documents reviewed in Task C will be included.
 2. Additional design documents for the EFW system shall be selected for other Quality Class I or II items from the Equipment Classification List in the FSAR.
 3. The selection shall include work by LP&L, if any, Ebasco, Dravo, Bergen/Patterson and CE.
 4. The selection shall include design documents such as calculations, drawings, specifications, memos, change notices, computer code verification reports.
 5. The selection shall include work which spans the calendar period of the design effort, and which covers all phases of the design process.
- B3 Locate pertinent design documents.

- A | B4 Evaluate implementation of design procedures identified in Task by
| reviewing LP&L, Ebasco, Dravo, Bergen/Patterson, and CE design
| documents for compliance with those procedures.
- B5 Summarize the review work for inclusion in the reports of Task F.

Milestones

| | Dates |
|----------------------------------|----------|
| B1 Procedure and Checklist | 10/1/82 |
| B2 Selection of Design Documents | 10/1/82 |
| B3 Location of Design Documents | 12/8/82 |
| B4 Review Design Documents | 12/8/82 |
| B5 Summarize Results | 12/17/82 |

TASK C - TECHNICAL REVIEW

Objectives

The objective of this task is to review the structural, mechanical and electrical design of a selected portion of the emergency feedwater system to assure that the system design is adequate to perform its intended function. The emergency FW pump room cooler (AH-Air Handler) which impacts the EFW system, will also be reviewed. This will include review to assure that the design is in compliance with NRC approved design bases and methodologies as given in the FSAR.

Subtasks

- C1 Prepare specific procedures and evaluation criteria for the design review using ANSI N.45.2.11, Section 6.3.1 criteria for guidance.

The procedures will selectively address the following as they apply to each subtask:

- o Adequacy of design specification.
 - o Applied loads.
 - o Mathematical model used for analysis.
 - o Input to analysis.
 - o Validation of computer code used.
 - o Output of analysis.
 - o Calculations showing compliance with approved standards.
- C2 Prepare a design chain for major structures and components to identify major design organizations and interfaces.
- C3 Select the system features to be reviewed based on the following criteria:

- o The system features shall include safety-related mechanical components, controls, electrical, and piping.
 - o Features which have design interfaces between the various major design organizations shall be included.
 - o Features selected shall be representative of safety-related portions of the system.
- B | o The design of the emergency feedwater pump room cooler (AH-Air
| Cooler) for one room containing motor driven EFW equipment shall
| be reviewed.
- o A range of design methods shall be covered.
- A | o Condition Identification Work Authorizations (CIWA's) which have
| engineering design implications for the EFW system will be
| included.
- A | C4 Obtain current design documentation from LP&L, Dravo, Bergen/
| Patterson, Ebasco and CE and perform review.

The review will be conducted in five major disciplines.

a. Structural Review

The structural review will address the structural adequacy of the piping, pipe supports and pump support. One pump support and one representative pipe hanger will be reviewed in detail to determine their adequacy to properly restrain the equipment for all appropriate FSAR criteria. In addition, a sample area of the system piping will be selected and evaluated for adequate damage protection against the effects of high energy line breaks and/or foreign missiles within the proximity.

B |

b. Instrumentation and Controls Review

Instrumentation and controls, including control logic diagrams, will be reviewed to confirm that the EFW system can be configured to operate properly in both normal and accident modes of operation.

c. Mechanical Review

The design of the EFW system will be reviewed to confirm operational capability to function appropriately under both normal and accident conditions. The review will consider both the mechanical and hydraulic characteristics/capabilities to provide assurance of the system adequacy. In addition, the steam supply path to the turbine driven pump will be reviewed for potential condensate buildup or water slugging which would adversely affect the turbine drive operability.

A |

d. Electrical Review

The electrical design of the EFW system will be reviewed to confirm that the supply of electrical power, under both normal and accident conditions, will permit proper operation of the system.

e. Fluid System Review

The EFW fluid system review will address the adequacy of the overall system to meet the basic functional requirements for the system. Capacities, temperatures and pressures will be reviewed. Review of the air cooler system will determine heat removal requirements and verify that the design air is adequate for safety-related operations.

B |

C5 Identify need for independent analysis with different analytical models and computer codes than those used by LP&L, if any, and by Dravo, Bergen/Patterson Ebasco, or CE. Independent analysis shall be done if one of the following situations arises:

- o The analytical output cannot be adequately judged based on ANSI N.45.2.11, Section 6.3.1.
- o The method of analysis does not appear reasonable.
- o The impact of Potential Finding cannot be ascertained.

C6 Summarize the technical review work for inclusion in the reports of Task F.

Milestones

| | Dates |
|---|----------|
| C1 Review Procedures and Criteria | 9/13/82 |
| C2 Prepare Design Chain | 9/13/82 |
| C3 Feature Selections | On-Going |
| C4 Design Review | 11/15/82 |
| C5 Identify Need for Independent Analysis | 11/8/82 |
| C6 Summarize Results | 12/3/82 |

TASK D - PHYSICAL VERIFICATION WALKDOWN

Objective

The objectives of this task are to determine that (1) the physical installation of the EFW system conforms to the requirements of design drawings and specifications, and (2) to identify heat-load contributors in the portion of the HVAC system selected in Task C.

Subtasks

- A
- D1 Prepare procedures for each unique type of walkdown or inspection. Collectively these procedures will address the following as they apply to each feature:
- o Installation of components in accordance with design documents.
 - o Installation of the EFW in accordance with P&I diagrams.
 - o Installation of piping in accordance with drawings and isometrics.
 - o Agreement between component functional rating, as given on nameplates, with design requirements, as given in corresponding specification.
 - o Inspection of selected features for compliance with design details.
 - o Equipment part numbers/tag numbers agree with drawings.
- D2 Choose items for physical verification from those features selected for design review under Task 3. These will include major components, piping, and pipe supports. Item selection may consider design margin as determined from the design review, to the extent allowed by the schedule.

- D3 Obtain an inventory of the heat load sources affecting the selected portion of the HVAC system by performing a walkdown of the area containing the selected portion.
- D4 Perform walkdown to verify the adequacy of the installation. The walkdown will visually verify that the selected components, and piping have been installed in proper relative positions. The piping isometric walkdown will dimensionally verify routing and support locations as well as general support arrangement. Selected components and supports will also be inspected to dimensionally verify such details as material sizes, weld types, fasteners, and attachments to the structure.
- A D5 Summarize results of the work in Task D for inclusion in final report.

Milestones

| | Dates |
|---|----------|
| D1 Prepare walkdown procedures | 10/22/82 |
| D2 Choose items for physical verification | 10/22/82 |
| D3 Complete heat load source inventory | 10/25/82 |
| D4 Complete walkdowns | 11/19/82 |
| D5 Summarize Results | 12/3/82 |

TASK E - PROCESSING OF POTENTIAL FINDINGS

Objective

To review and document all Potential Findings identified during the review; to provide for evaluation and classification of the significance of Potential Findings; and to transmit Findings to LP&L, Ebasco, and CE.

Description

Tasks A, B, C, or D may identify potential differences between the EFW system design and the design requirements. These differences will be documented in Potential Finding Reports. Following the filing of a PFR it is reviewed by the appropriate task leader. The purpose of this review is to determine if the PFR is valid, that is, if it is accurate, well defined and traceable to a specific requirement.

The original design organization constitutes the next level of review. The PFR is sent to the appropriate organization for the same type of accuracy and definition review as was conducted by the task leader. At the same time a copy of the PFR is sent to the LP&L representative.

When the PFR is returned from the original design organization, it is sent back to the initiator and the task leader. Based on the information supplied by this organization, the initiator may modify the PFR or just comment on the organization's response. The task leader can only add his comments. Following this review, the PFR is sent to the Findings Review Committee.

An impact assessment for the Potential Finding is prepared to define the potential for impact on the safety of the plant. The impact assessment and the PFR are then submitted to the Findings Review Committee for evaluation.

This committee is comprised of five senior technical people at GA who have extensive experience and broad knowledge of the design and construction of nuclear power plants. It is the purpose of this committee to evaluate each PFR and classify it according to an established criteria.

A Potential Finding is classified as invalid if after the above-described review, the initiator, the task leader, and the original design organization agree that the Potential Finding is inaccurate. In addition, Potential Findings can be classified as invalid if two of the above-identified three reviewers conclude that the Potential Finding is invalid and the Findings Review Committee also decide it lacks validity.

The review procedure will contain criteria for classifying a valid Potential Finding as either a Finding or an Observation. Basically, if a Potential Finding is a deviation that could result in a substantial safety hazard, or if there is an indication of a repetitive or generic deviation that could create a substantial safety hazard, the Potential Finding is classified as a Finding. Potential Findings that are valid, but that do not satisfy the above criteria for a Finding, are classified as Observations.

The classification of the Potential Finding is reviewed by the Project Manager to determine if the correct procedures have been followed. Subsequently, the Observations and Findings are sent to the LP&L representative for resolution. In the case of Findings, a Corrective Action Plan is prepared by LP&L and returned for review. This review is to determine if the Corrective Action Plan satisfies the concern expressed in the Finding. Each Corrective Action Plan is reviewed by the initiator of the Finding, the task leader, the Findings Review Committee and the GA project manager.

In each step of this review process the comments and information that are added become a permanent part of the PFR. All PFRs will be included in the final program report that is transmitted to LP&L and to the NRC.

Subtasks

- E1 Establish a Findings Review Committee. This committee will be composed of senior technical people with broad experience in engineering management.

- E2 The Committee will identify specific criteria for determining the degree of impact that Potential Findings have on the design adequacy of the Waterford-3 EFW system.

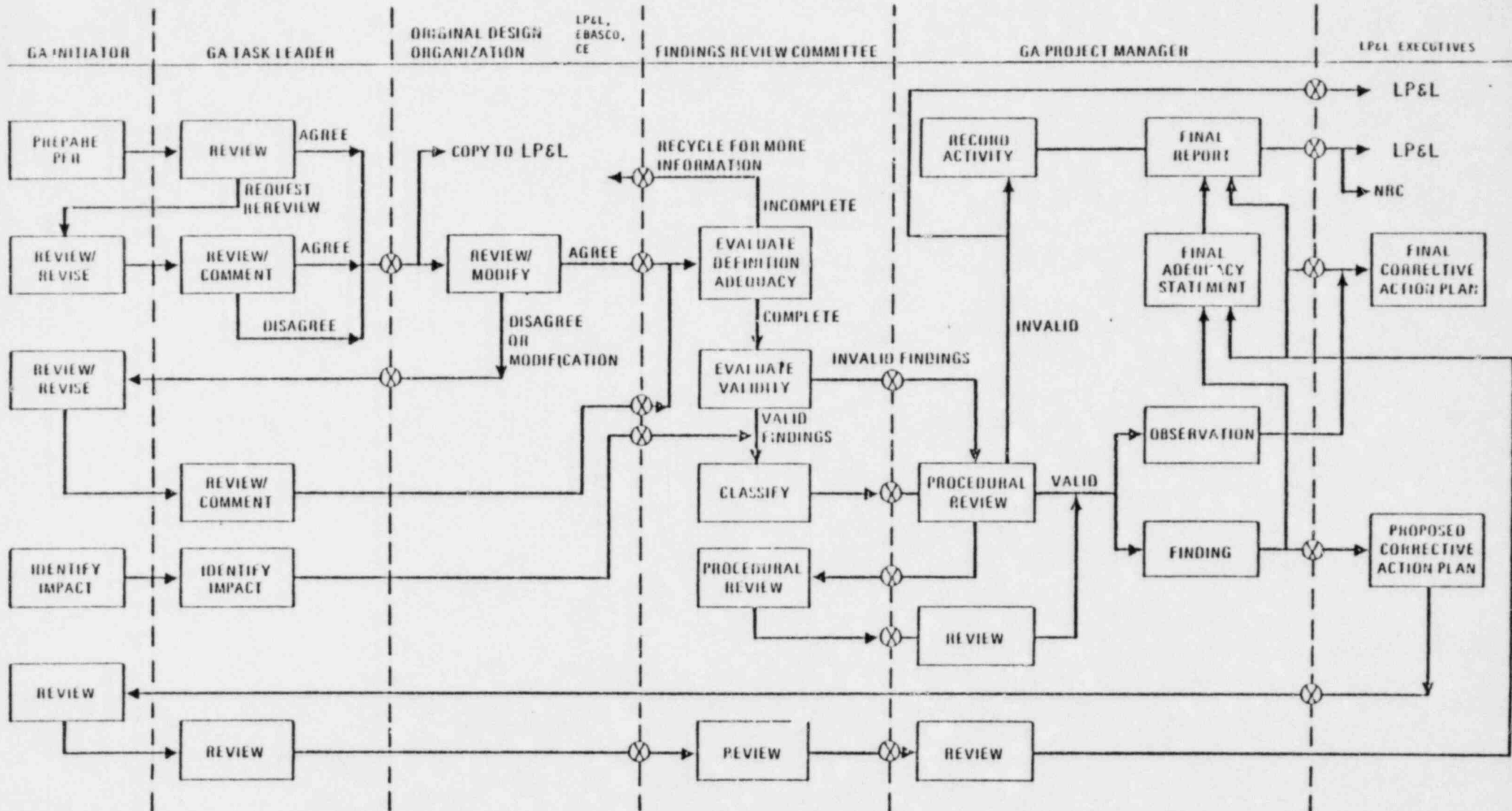
- E3 Establish a detailed procedure to process Potential Findings. This procedure will assure that LP&L and Ebasco, or CE have verified the definition and accuracy of the Potential Finding. The basic process is shown in Fig. 2.

Milestones

| | Dates |
|---------------------------------|---------|
| E1 Establish Committee | 9/17/82 |
| E2 Define Criteria | 10/1/82 |
| E3 Establish Specific Procedure | 10/1/82 |



Fig. 2 PROCEDURE FOR PROCESSING FINDINGS



17

TASK F - ADMINISTRATIVE AND REPORTING

Objective

Provide administrative and management support for the project. Prepare biweekly status reports, and a final evaluation report on Findings and conclusions with respect to adequacy of the design of the Waterford-3 Emergency Feedwater System.

Subtasks

- F1 Provide management of the design review program and accumulate cost and schedule data.
- F2 Prepare biweekly status reports on progress of the review effort.
- F3 Compile all Potential Findings, results of the Findings Review Committee, Observations and Findings. Assess the adequacy of the EFW system design.
- B F4 Prepare a final report compiling all Potential Findings, Observations, and Findings, including their description, comments, assessment of impact, the results of the Findings Review Committee, the results of the review of LP&L Corrective Action Plans, and the final assessment of the adequacy of the design of the Waterford-3 EFW system.

F5 Issue Final Report

Milestones

| | Dates |
|--|------------|
| F1 Management/Cost | Continuous |
| F2 Complete biweekly status reports | Bi-weekly |
| F3 Complete compilation of Information | 12/3/82 |
| F4 Complete final report draft | 12/15/82 |
| F5 Issue final report | 12/22/82 |



TORREY
PINES
TECHNOLOGY

A Division of General Atomic Company
P.O. Box 81608 · San Diego, CA 92138