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August 6, 1985

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Re: Houston Lighting & Power Company, et al.  
 South Texas Project, Units 1 and 2  
 Docket Nos. 50-498 and 50-499

Dear Members of the Board:

Enclosed for the information of the Board is a Construction Project Evaluation Report on the South Texas Project prepared by the Institute of Nuclear Power Operations (INPO). The Report was received by HL&P on July 30, 1985 and was made available for review by the NRC Staff (Ref: ST-HL-AE-1320, August 1, 1985). A copy is being made available directly to the Board for its convenience and reference.

As noted by INPO, in describing the purpose and scope of the Report:

INPO's goal is to assist member utilities in achieving the highest standards of excellence in nuclear plant construction. The recommendations in each area are based on best practices, rather than minimum

acceptable standards or requirements. Accordingly, areas where improvements are recommended are not necessarily indicative of unsatisfactory performance.(p.1)

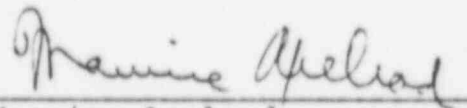
In carrying out its work under these guidelines, INPO identifies "good" or "beneficial practices" as well as opportunities for improvements, relating to both the quality and efficiency of performance. A very brief summary of these matters appears at page 2.

HL&P has addressed those findings which suggest areas for improvement and these are noted in the "response" section associated with each finding. INPO has found that HL&P's responses are considered satisfactory. (p.3) Additional measures designed to meet INPO's performance objectives are planned and, as requested by INPO, will be addressed by January 31, 1986. (p.3)

A review by HL&P pursuant to 10 C.F.R. Section 50.55(e) of the underlying INPO observations has identified one potentially reportable deficiency now under review in accordance with Project procedures. (Ref: ST-HL-AE-1267, June 5, 1985)

We hope this information is helpful to the Board.

Respectfully submitted,



Maurice Axelrad

cc: Service List



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July 25, 1985

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Mr. Don D. Jordan  
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Houston Lighting & Power Company  
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Houston, TX 77002

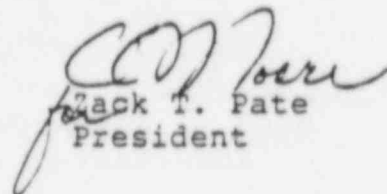
Dear Mr. Jordan:

Enclosed are two copies of INPO's 1985 Evaluation of the South Texas Project construction project. As requested/authorized by Mr. J. H. Goldberg's July 18, 1985 letter, seventy-five (75) copies will be sent to Mr. Robert L. Hawkins.

We further understand from Mr. Goldberg's letter that INPO is authorized to distribute the evaluation report in accordance with INPO's evaluation release policy. Mr. Hawkins will notify Mr. George Henson when this release is appropriate.

INPO does not intend to provide copies of evaluation reports to the NRC. However, we are continuing to encourage member utilities to provide construction project evaluation reports to the NRC. If you should decide to provide copies to the NRC, we request that you notify INPO.

Sincerely,

  
Jack T. Pate  
President

ZTP/nf  
Enclosures

cc/w: R. L. Hawkins  
cc/wo: J. H. Goldberg

RELATED CORRESPONDENCE

APRIL 1985  
CONSTRUCTION PROJECT EVALUATION  
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SOUTH TEXAS  
PROJECT

HOUSTON LIGHTING & POWER COMPANY

INPO

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EVALUATION  
of  
SOUTH TEXAS PROJECT  
Construction Project

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Houston Lighting & Power Company

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April 1985

## SUMMARY

### INTRODUCTION

The Institute of Nuclear Power Operations (INPO) conducted an evaluation of the Houston Lighting & Power Company's (HL&P) South Texas Project (STP) during the weeks of March 11, March 18, and April 1, 1985. The project is located approximately 12 miles southwest of Bay City, Texas. The project has two 1,250-Mwe Westinghouse pressurized water reactors.

### PURPOSE AND SCOPE

INPO conducted an evaluation at the site and at the principal design office, Bechtel Power Corporation in Houston, Texas to evaluate the control of design and construction processes and to identify areas needing improvement. Information was assembled from discussions, interviews, observations, and reviews of documentation.

The INPO evaluation team examined organization and administration, design control, construction control, project support, training, quality, and test control. The team observed actual work performance and test performance. A portion of the evaluation focused on a detailed vertical path examination through the design and construction of the project, combined with a horizontal examination at several points. The team at the design office reviewed the design control, and the team at the project site examined, in some detail, the installed equipment.

INPO's goal is to assist member utilities in achieving the highest standards of excellence in nuclear plant construction. The recommendations in each area are based on best practices, rather than minimum acceptable standards or requirements. Accordingly, areas where improvements are recommended are not necessarily indicative of unsatisfactory performance.

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## DETERMINATION

Within the scope of this evaluation, the team found, except as indicated by the findings, that the systems in place to control the quality of design and construction are being implemented effectively.

The following beneficial practices and accomplishments were noted:

The early staffing and involvement of station and start-up groups should enhance the program for turnover of systems.

The document control system is effective in ensuring construction personnel are utilizing the proper documents for performing work.

The weld filler material control program is being effectively controlled and enhances welder productivity.

The program for protection of installed instruments from the construction environment is effective and has been well implemented.

Improvements were recommended in a number of areas. The following are considered to be among the most important areas in need of improvement:

Strengthened adherence to some aspects of the project schedule.

Project construction, inspection, and testing procedures and personnel knowledge of requirements in the procedures.

Follow-up and correction of the root causes of recurring problems.

Emphasis on the shift from bulk to system completion to support turnover.

Findings and recommendations are listed under the Performance Objectives to which they pertain. Particularly noteworthy conditions that contribute to meeting Performance Objectives are identified as Good Practices. Other findings describe conditions that detract from meeting the Performance Objectives. It would not be productive to list as Good Practices those things that are commonly done properly in the industry since this would be of no benefit to Houston Lighting & Power or to INPO's other member utilities. As a result, most of the findings highlight conditions that need improvement.

The recommendations following each finding are intended to assist the utility in ongoing efforts to improve all aspects of its nuclear programs. In addressing these findings and recommendations, the utility should, in addition to correcting or improving specific conditions, pursue underlying causes and issues.

As part of each evaluation, the team follows up on responses to previous findings, in this case those from reports provided for both the Construction Project Evaluation conducted in September 1983, and the Testing Evaluation conducted in September 1984. Findings with response actions that are incomplete but progressing on a reasonable schedule have been carried forward in APPENDIX I to this report. In areas where additional improvements

were needed or where response actions have not been timely, a new finding that stands on its own merit has been written. Thus, this report stands alone, and reference to the previous evaluation reports should not be necessary. For this evaluation, there are 13 findings related to previous findings and one finding carried forward in APPENDIX I.

The findings listed herein were presented to HL&P management at an exit meeting on April 23, 1985. Findings, recommendations, and responses were reviewed with HL&P management on June 19, 1985. Responses are considered satisfactory.

To follow the timely completion of the improvements included in the responses, INPO requests a written status by January 31, 1986. Additionally, a final update will be requested six weeks prior to the next evaluation of the South Texas Project.

The evaluation staff appreciates the cooperation received from all levels of Houston Lighting & Power Company.

HOUSTON LIGHTING & POWER COMPANY

Response Summary

As a result of the INPO evaluation, four areas were identified to be among the most important in need of improvement. The project has undertaken actions that will result in improving these general areas of concern.

- a. The planning and development of the various project schedules continues to receive increased attention. With the transition to the system turnover mode, detailed planning and scheduling will become an important ingredient in the successful completion of the project.
- b. Project documents will be reviewed to ensure consistency and clarity exist in the delineation of requirements. The Training Department will assist supervisors, as necessary, to ensure personnel are knowledgeable of requirements set forth in project documents.
- c. The project established a procedural method to identify, report, and investigate significant situations, problems or concerns to management. This procedure applies to all work activities on the project, including occurrences at the Houston Branch Office and activities at the South Texas Project job site. It also applies to any occurrences at the facilities of major suppliers of materials, equipment, and services that impact or delay the planned furnishing of those materials, equipment, or services to the project. The closure of these significant situations, problems, or concerns will be through an investigation report that includes immediate action taken to resolve the problem as well as the identification of long-term corrective action to preclude recurrence.
- d. Emphasis is being placed on the transition from bulk installation of commodities to completion of components and systems in support of system turnover. This transition includes not only organizational changes, but educating and training personnel to utilize the planning and scheduling tools to perform their work.

ORGANIZATION AND ADMINISTRATION

MANAGEMENT INVOLVEMENT AND COMMITMENT TO QUALITY

**PERFORMANCE OBJECTIVE:** Senior and middle managers in the owner's corporate office, designer's office, and at the construction site who are assigned functional responsibility for matters relating to the nuclear project should exhibit, through personal interest, awareness, and knowledge, a direct involvement in controlling the quality of the project.

**Finding (OA.2-1)** Increased attention is needed by utility site management in monitoring actions to resolve problems affecting the project. Specific actions include the identification of generic problems, analysis to determine underlying causes, and the closeout of corrective actions.

**Recommendation** Strengthen the management monitoring of contractor performance in the identification and resolution of generic and recurring problems. Ensure root causes to problems are identified and feedback mechanisms are developed to assess the effectiveness of corrective actions.

**Response** The management control and monitoring of contractor performance has been increased by the following actions. Site engineering participation has increased in field engineering activities to ensure timely resolution to identified engineering problems. An increased number of field walkdowns have been established to identify interference problems and to provide for better pre-job planning by the utility, construction manager, and constructor. Job site personnel have been reorganized to more effectively utilize job site non-manual personnel. This will provide for a more timely identification of underlying causes of generic problems and will also enable the project to close out corrective actions in a timely manner. The monitoring of the effectiveness of corrective actions are ongoing to ensure resolution to previously identified problems.

Project management presently utilizes Procedure PMP-09 (Project Management Procedure-09) to identify significant problems at the South Texas Project.

The procedure requirements are as follows:

- a. significant problems be identified to upper management
- b. investigation of the problem
- c. log and track the problem

- d. management evaluation with respect to reportability per PLP-02 (Project Licensing Procedure)
- e. description of immediate corrective action and underlying causes
- f. determining long-term corrective actions to preclude recurrence

An additional requirement was established by the HL&P Group Vice President, Nuclear on May 21, 1985, titled "The South Texas Project Weekly Critical Items Report." The STP Weekly Critical Items Report will be submitted to the Group Vice President, Nuclear each week on Monday morning.

This information will provide upper management current information on significant problems and will identify methods of problem resolution and corrective action required to preclude recurrence.

The report format will identify the following:

- a. problem definition
- b. required plan of action
- c. identification of a senior person responsible to oversee its solution
- d. schedule for carrying out corrective action

The report will identify how many weeks each item has been carried as a critical item.

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DESIGN CONTROL

DESIGN INTERFACES

**PERFORMANCE OBJECTIVE:** The design organization's external and internal interfaces should be identified and coordinated to ensure completion of a design that satisfies all input requirements.

**Finding (DC.2-1)**

The control of some equipment mounting design details needs to be improved. Some panels have been installed with welding or bolting details different from those that were used for seismic qualification, and some as-qualified mounting details are not currently available.

**Recommendation**

Review the program that controls the dissemination of equipment mounting information among various design organizations. Ensure the program provides for thorough interface reviews. Where problems are identified, review affected design work and correct any discrepancies.

**Response**

The program that controls the dissemination of equipment mounting information among various design organizations has been reviewed. The Equipment Qualification Group reviews actual mounting details, issued by the Civil/Structural Discipline that deviate from vendor qualified design. A final comparison between the actual equipment mounting design drawing as amended by Field Change Requests (FCR), Field Change Notices (FCN), Design Change Notices (DCN), and Non-Conformance Reports (NCR) and the mounting as given in the seismic qualification documents is made during completion of the seismic qualification checklist for the equipment, and any deviations found are reconciled. Completion of the checklist is a scheduled project activity to be completed by December 1985.

Review of the program has shown that the Equipment Qualification Group had not reviewed all actual issued civil mounting details against the vendor equipment qualification reports. In order to enhance the intergroup review cycle, the mounting-check portion of the seismic qualification checklist will be accelerated for equipment where the mounting design drawings have already been issued in order to detect at an earlier stage any discrepancies between the design mounting and the qualification mounting. This check will be completed by September 1985.

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## DESIGN PROCESS

**PERFORMANCE OBJECTIVE:** The design process should be planned, scheduled, and controlled to ensure incorporation of design requirements.

**Finding (DC.3-1)** Notification of known design changes is not always provided to construction in time to prevent rework. Engineering holds are sometimes not placed on portions of the design being changed.

**Recommendation** Reinforce adherence to the Engineering Holds Program. Emphasize the requirements for coordination of changes with all affected disciplines, and inform construction as soon as possible of pending changes. Initiate a feedback mechanism with construction to ensure the program is functioning as intended.

**Response** A bulletin will be issued by July 1985 to all engineering personnel emphasizing the importance of the holds program and stressing the criticality of communicating pending changes to construction at the earliest possible time to avoid rework.

A team of site engineers will be established to study the frequency and severity of occasions where construction has not been notified promptly of changes. A report of their evaluation, including any recommendations for improvement, is scheduled for July 1985. -Any recommendations will be implemented as soon as possible. A follow-on check will be made by December 1985 to determine if the actions produced satisfactory results.

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**Finding (DC.3-2)** More attention is needed in the preparation, review, and approval of some engineering documents. A number of errors were noted in engineering calculations, specifications, drawings, and a Design Change Authorization Request (DCAR).

**Recommendation** Emphasize the requirements for accuracy in the preparation, review, and approval of calculations, specifications, drawings, and DCARs. Evaluate the controls governing these documents, and implement appropriate improvements, including training of personnel.

**Response** In order to increase the attention paid to the preparation, review, and approval of engineering documents, enhancements to the processes of checking and calculation finalization are being implemented as described below.

With respect to the checking process, a number of senior, experienced physical design checkers in each discipline have been identified and, as of May 1985, have undergone a training session. The responsibilities of the checker relative to attention to detail, maintenance of engineering quality, clarification of notes and details, model/drawing overlays, and importance of tolerances relative to constructibility and interferences were stressed. The importance of the checker in the reduction of FCRs was emphasized. As part of this responsibility, the senior checker has a role in counseling originators and other checkers. Overall guidance for the FCR reduction/counseling program is provided by the assistant project engineer for quality. The program requires a monthly review of discipline FCRs, determination of which engineers/designers are associated with a high number of FCRs related to missing/inadequate engineering or design interferences, and documented counseling of such individuals with training and coaching as to how to reduce FCRs.

With respect to finalization of calculations, an activity to verify and document that the calculation is consistent with the recent design status and documents (including FCRs and Supplier Deviation Disposition Requests) is being developed and is scheduled for implementation during the first half of 1986. As part of the finalization process, any inconsistencies in the calculation will either be re-analyzed or an assessment made and documented that the inconsistency between the calculation and the design document is not significant. If the calculation cannot be finalized at that time, an open item list of exceptions will be developed for future disposition. The required elements of the finalization approach have been determined for each type of engineering calculation. These elements consist of updating to latest document revision, walkdown verification, or measured as-built, depending upon the type and safety classification of the commodity and the type of calculation.

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**Finding (DC.3-3)**

Some cables presently installed and others that have been designed need additional analysis. Cable sizes were used for 480 volt motor control centers, 250 volt and 125 volt DC systems, and 120 volt AC systems that are smaller than those suggested by the Architect Engineer's (A/E) Design Guide.

**Recommendation**

Review installed and designed cable sizes for 480 volt motor control centers, 250 volt and 125 volt DC systems, and 120 volt AC systems for their adequacy. Provide technical justification for cable sizes that are smaller than those suggested by the A/E's Design Guide.



Response

The design guide for sizing cables for available fault current areas establishes two alternatives. The first alternative is a minimum-size cable to be self-protected for the available fault current for any length of cable no matter how short the cable may be. The second alternative is to size cables to be protected at the load for the available fault current at the load utilizing the actual routed cable length and no minimum cable size.

Because of the relatively short length of cable required to provide adequate impedance for short circuit protection, documented verification of the alternative criterion has not been required. This criterion is being revised to require verification that cables are sized to be self-protected at the load as indicated in Table II of calculation 5E019EC5044. Verification will be done in conjunction with the ampacity and voltage drop verification program. No physical changes are expected however.

Disposition of the above item will be completed by July 1985.

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DESIGN OUTPUT

**PERFORMANCE OBJECTIVE:** Project design documents should specify complete, accurate, and clear requirements for a constructible, testable, operable, and maintainable design.

Finding (DC.5-1)

Some specification and drawing requirements are different, and definitive installation and inspection criteria are not always provided. As a result, coordination or interpretation is often required by construction personnel.

Recommendation

Review installation specifications and drawing installation notes to ensure they are consistent and complete for both installation and inspection applications. Revise the documents as necessary.

Response

A joint Bechtel/Ebasco task force is reviewing project installation specifications, procedures, and inspection criteria. As problem areas are identified, changes to documents are being issued to clarify criteria. This will be completed by September 1985 for the piping, pipe support, and electrical installation specifications and procedures.

In order to improve coordination and reduce the amount of interpretation required by construction personnel, site engineering participation will be increased in field engineering

activities, and signatory authority will be extended to appropriate field engineering personnel. The overall effect will be to increase the availability of qualified personnel who can provide clarification and interpretation to installation and inspection personnel. This augmented staff will ensure that appropriate changes to drawings and installation specifications are identified and implemented when definitive installation or inspection criteria are in question.

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**Finding (DC.5-2)**

Installation to current drawings is resulting in numerous interferences between HVAC duct installations and other commodities. As a result, FCRs have to be generated to resolve design problems, and construction activities are delayed.

**Recommendation**

For Unit 1, conduct joint walkdowns with the constructor to determine that remaining designs are constructible and to reserve duct right-of-way. For Unit 2, implement a program for reviewing designs to identify and resolve interferences prior to drawing release.

**Response**

As recommended by INPO, Unit 1 walkdowns are being conducted by Bechtel and by the HVAC fabricator to determine that remaining designs are constructible and to reserve duct right-of-way. Unit 2 walkdowns have not been completed, but are in process on an "as needed" basis.

Duct routing is shown on the model to reserve right-of-way for HVAC. Unit 2 designs are reviewed to ensure that any problem conditions identified and resolved in Unit 1 are also corrected for Unit 2.

The walkdown programs will be continued, and changes will continue to be made to Unit 2 designs reflecting problems discovered and resolved on Unit 1.

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**Finding (DC.5-3)**

Engineering documents do not specify criteria to prevent contact during a seismic event. Several examples of direct contact were noted in existing installations.

**Recommendation**            Develop clearance requirements between various commodities, and incorporate them into appropriate documents. Train field engineers and craft foremen to use these criteria during installation. Inspect existing installations to identify and correct existing problems.

**Response**                    In order to address this issue, acceptance guidelines will be provided to Construction during the bulk installation phase and walkdowns will be performed.

The acceptance criteria for separation and contact between the various commodities have been developed based on the displacement response and seismic contact sensitivity of the commodities and their supports. The criteria and instructions for implementation will be issued by July 1985. Cases where contact and/or less than minimum separations are identified will not be a cause for rejection or issuance of a non-conformance report. When appropriate, cases will be recorded and submitted by field engineering for evaluation and disposition by project engineering.

In conjunction with the Area Turnover Schedule, which is currently planned to begin in early 1986, engineering will perform systems interaction evaluation walkdowns. The scope of these walkdowns will be extended to include the recording and reporting of cases where contact and/or potentially close separations between commodities are identified. Walkdown programs to evaluate separation and contact conditions will be included as part of this commitment.

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#### DESIGN CHANGES

**PERFORMANCE OBJECTIVE:** Changes to approved project designs should be controlled to ensure the design criteria are not violated.

**Finding (DC.6-1)**            Design document revisions need to be more effectively coordinated with construction. Some approved FCRs and DCNs are modified when incorporated into later revisions of the drawing. The modification is not described or highlighted to identify the portions of the FCR or DCN that have been altered. As a result, some already constructed installations may not conform to the most recent design revision.

**Recommendation**            Clearly identify modifications to approved FCRs and DCNs when incorporating in affected documents. Ensure impact of

the modification is assessed by the construction organization. Review previously modified FCRs and DCNs to identify any construction rework.

**Response**

Engineering Department Procedure 4.62 will be revised by July 1985 to emphasize the requirement that FCRs cannot be modified except for editorial/administrative changes.

Additional training will be given to the appropriate engineering personnel to emphasize the importance of clearly identifying in the revision wording on design documents those modifications which have been made to DCNs. This training will be complete by July 1985.

Previous FCRs and DCNs that have been modified will be reviewed for design changes affecting construction. Affected modifications will be resolved with construction to readily identify portions of the FCRs and DCNs that have been altered. The review is anticipated to be complete by August 1985. The status of resolutions with construction will be provided in the six-month status report.

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CONSTRUCTION CONTROL

FACILITIES AND EQUIPMENT

**PERFORMANCE OBJECTIVE:** Construction facilities and equipment should be planned for, acquired, installed, and maintained consistent with project needs to support quality construction.

Finding (CC.2-1)	Some construction facilities and equipment are not consistent with project needs. Problems were observed in temperature, humidity, and cleanliness control in a temporary building housing the reactor vessel head and in the availability of welding machines.
Recommendation	Review project needs for support facilities and construction equipment, and correct deficiencies identified.
Response	Project needs for support facilities and construction equipment are constantly being reviewed for adequacy. The specific deficiencies noted in the finding have been corrected. The temporary building housing the reactor vessel head was cleaned and the roof was repaired to prevent rain water from leaking into the area. The availability of welding grids was assessed in March of that year, and it was determined that additional grids were required. A purchase order has been placed for 75 additional grids. Also, the utilization of grids was reviewed, and it was determined that ganging them would provide better usage. Welding grids have been "ganged" into racks located strategically throughout the work areas, thereby making them more accessible for use.

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Finding (CC.2-2)	<p>The main fabrication shop is not effectively utilized and supported by the project. Areas that need attention include the following:</p> <ol style="list-style-type: none"><li>a. lack of fabrication shop schedule</li><li>b. shortage of required material</li><li>c. timeliness in preparation of process data checklists</li><li>d. support of main fabrication shop by other project disciplines</li></ol>
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e. fabrication quality control program

Recommendation

Evaluate the effectiveness of the main fabrication shop in the areas noted and initiate appropriate corrective action.

Response

Since the finding was issued, the Welding QC Department and Authorized Nuclear Inspector have assigned resident personnel in the fab shop. This has enhanced the performance of the shop in the processing of data checklists.

There are two types of material flow through the main fabrication shop. One type is the bulk quantity fabrications, which are on a standard schedule. The second type is work requested by work order from the units. The second type is required by erection crews and takes priority. These are individually scheduled and prioritized as required. Since most of the second type are emergencies, they are more difficult to schedule. The study being made on utilization of the main fab shop will help in schedule development. This study was completed in May 1985.

The material problem stated in the finding has been principally narrowed to aluminum bronze, sheet metal, and some class I small bore pipe and fittings.

Ebasco Quality Control is presently addressing measures to simplify and consolidate fabrication shop inspection activities. These measures will include revisions to existing procedures and/or development of specific tailored procedures, and address fab shop inspection activities that will, where allowed, reduce the frequencies of inspection characteristics. Once implemented, this will provide for the release of fabricated items in a more expedient manner, while retaining required levels of quality. This program will be in place by August 1985.

The other project disciplines will support the main fabrication shop when the shop inspection program is modified as stated.

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### MATERIAL CONTROL

**PERFORMANCE OBJECTIVE:** Material and equipment should be inspected, controlled, and maintained to ensure the final as-built condition meets design and operational requirements.

**Finding (CC.3-1)** Some equipment and material are not sufficiently protected from the construction environment and degradation. This problem was noted throughout the plant site.

**Recommendation** Increase awareness of project personnel to the requirements for material and equipment protection. Monitor the effectiveness of these efforts by increasing surveillance efforts in this area.

**Response** In March 1985, the Permanent Plant Maintenance (PPM) Program was restructured to give added upper management support by establishing a full-time dedicated PPM superintendent supported by a full-time dedicated department. Also, programmatic and procedural changes have been implemented whereby equipment is being monitored so that required protection and maintenance are being performed. Training classes and desk-top instruction have been given to supervisors and craftsmen in order to better control the in-place protection housekeeping and PPM requirements. At present, there is an extensive effort to get proper protection on every piece of site equipment. This approach is working and will continue as an ongoing program.

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**Finding (CC.3-2)** Some improvements are needed in the management of materials to support construction. The following problems were noted:

- a. Some materials needed for construction are not readily available.
- b. Some requisitions are being received by the warehouse for materials already issued to the field.
- c. Some work is being initiated to fabricate items already installed in the plant.

**Recommendation** Review the materials management program to ensure it supports the project schedule. Promote more effective use of the Field Material Control System (FMCS) in conjunction with an improved method for accountability by the constructor of materials issued to the field. Integrate field, fabrication shop,

and vendor component fabrication activities to prevent duplication of work.

Response

- a. The FMCS is a computerized material tracking system that statuses material availability and storage location within the designated storage control. Occasionally, over ordering of materials from the warehouse occurs. The unused materials accumulate in the field and are unavailable to other field personnel. Requests for Stored Items (RSI) for selected materials are being screened for requests of abnormally high quantities. There is an ongoing effort to identify and return unused materials to the warehouse that can be entered into the FMCS material tracking system.
- b. On April 22, 1985, a directive was issued stating that duplicate RSIs will not be accepted unless they are signed by the appropriate Ebasco Unit Manager and they state that the request is to replace lost material. This direction will serve two purposes. First, it will identify the magnitude of actual lost items and the responsible supervisors, thus allowing appropriate corrective measures. Secondly, it will promote a more diligent effort in controlling field-received items and the research of previous issues prior to second request. Utilization of the Material Labor Control System (MLCS)/FMCS program will be continually enhanced by a recurring user training program. The current session of this training started April 18, 1985 and is scheduled to complete by September 1985. Additionally, management will continue to emphasize to all unit managers, superintendents, and discipline lead engineers the importance of properly researching MLCS or FMCS prior to requesting tag items and the importance of proper material control after receipt of material. This is considered an ongoing training effort to minimize the duplication.
- c. The fabrication shop has been requested to fabricate small bore spools that have already been fabricated in the field. Investigation reveals that while the current system of logging small bore fabrication requests should be effective in preventing unintentional submittal of duplicate requests, it does not always prevent field forces from fabricating an item that is also being requested from the fabrication shop. This unintentional duplication can be controlled by utilization of the MLCS program to identify status of small bore spools. In the



significant areas of pipe and pipe supports, the responsibility of the pipe and pipe support fab shop is assigned to the unit 1 superintendent for control and scheduling of work. Codes will be identified in the existing program to show if a fabrication request has been made, field installation is in progress, and shop fabrication status. Minor enhancements will be required, as well the development of status codes. Following program development, the users will be trained via Desk Top Instruction as to the program capability and requirements. It is expected that these corrective actions will be complete by July 1985.

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#### CONTROL OF CONSTRUCTION PROCESSES

**PERFORMANCE OBJECTIVE:** The construction organization should monitor and control all construction processes to ensure that the project is completed to design requirements and that a high level of quality is achieved.

**Finding (CC.4-1)**

Improvements are needed in the project documents that govern installation, inspection, and testing activities. The following types of problems were noted:

- a. Specific instructions necessary for installation, inspection, and testing are sometimes not available at the work point.
- b. Extensive research is sometimes needed to identify the applicable criteria for the work being performed and inspected.
- c. In some cases, inconsistencies exist between the procedure and specification requirements for the work being performed and inspected.

**Recommendation**

Consider implementing the following actions to correct the problems noted:

- a. Improve availability of installation, inspection, and test procedures in the field. Evaluate the use of a traveler system to make installation and acceptance criteria available to field personnel.

- b. Consolidate installation and acceptance criteria for a given activity into a single source document. This document should, whenever possible, contain actual criteria rather than references to other procedures.
- c. Review installation, inspection, and test procedures to identify and resolve inconsistencies in requirements.

**Response**

Ebasco Quality is presently developing a system for expanding the usage of the traveler system to other disciplines that will readily provide the documents and criteria necessary to accomplish inspection activities at the work point in a timely manner.

A preliminary feasibility study for the integration of construction/quality inspection procedures has been undertaken. As a result of this study, a trial procedure shall be generated by July 1985 incorporating construction quality inspection requirements. This procedure shall then be evaluated by management personnel and additional action taken as necessary.

Procedure and specification inconsistencies have been previously identified by South Texas Electric Generating Station site personnel. A task force has been established and this task force is presently identifying such inconsistencies.

The actions stated for resolution of this item will be complete by August 1985.

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**Finding (CC.4-2)**

The pipe support installation procedure and specification do not contain sufficient and complete guidance for construction and inspection personnel. As a result, FCRs, specification change notices, requests for engineering assistance, and specification general revisions are required to provide clarification. It also appears that more restrictive revisions have not been evaluated for the impact on previous installations.

**Recommendation**

Upgrade pipe support installation and inspection guidance by the following:

- a. Perform a collective review (utility, A/E, constructor) of the pipe support installation and fabrication specification to ensure the criteria provide information needed to properly construct and inspect piping installations.

- b. Revise the installation procedures to reflect requirements of all governing documents including the specification. Avoid referencing other documents that require construction personnel research and interpretation. Provide appropriate training for construction personnel.
- c. Review past specification revisions to ensure that construction interpretation and application are consistent with the design requirements.
- d. Implement a concurrence review (utility, A/E, constructor) program for future specification changes to ensure the appropriate justification and impact on completed construction have been established.

Response

Pipe support installation and inspection guidance will be upgraded by the following:

- a. A collective utility, constructor, and A/E review of pipe support installation and fabrication specifications will be performed to ensure completeness for proper installation and inspection. This review will be complete by September 1985.
  - b. Installation procedures will be revised to reflect governing document requirements. Where practical, other document references will be avoided that would require research and/or interpretation by construction personnel. These revisions will be complete by October 1985.
  - c. Previous revisions to specifications will be reviewed by October 1985 to ensure the interpretations and applications by construction are consistent with the design requirements.
  - d. Future changes to specifications involving previously installed work will be handled through the Design Change Approval Request (DCAR) process, ensuring the appropriate justification and impact on completed construction have been considered.
-

Finding (CC.4-3)	Some electrical construction work is not being performed in accordance with project procedures and good industry practices. Specific problems were noted in the areas of cable installations, high voltage terminations, and moving and installing equipment.
Recommendation	Improve the control of electrical construction activities in the following areas: <ul style="list-style-type: none"><li>a. Place increased emphasis on adherence to procedures. Ensure users of these documents are knowledgeable of requirements.</li><li>b. Reinforce current requirements for the care and protection of equipment during moving and installation.</li></ul>
Response	<p>Knowledge of procedures and adherence to acceptable construction practices are being addressed through an ongoing extensive craft and supervisory training program. This program has been in effect since May 1985.</p> <p>Formal classroom training is conducted in cable pulling, cable termination tools, cable termination, cable separation, and care and protection of equipment.</p>

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### QUALITY WORKMANSHIP

**PERFORMANCE OBJECTIVE:** The project should focus its efforts on achieving quality through the work force, with verification by the inspection force.

Finding (CC.5-1)	Improvement is needed in the identification of non-conforming conditions by some craftsmen, craft supervisors, and quality control (QC) inspectors. Non-conforming conditions are not always noted or understood by the construction personnel.
Recommendation	Emphasize the need for increased attention to and knowledge of installation criteria by craftsmen, craft supervisors, and QC inspectors. Ensure non-conformances are documented.
Response	<p>A program has been initiated by construction to ensure that craftsmen and craft supervisors are being made aware of non-conformances and non-conforming conditions.</p> <p>Prior to final inspection of work, the crews are contacting field engineering as needed to clarify areas that may be in question,</p>

as to whether or not the items can be final inspected and accepted.

Supervisors and craftsmen are being instructed on an ongoing basis as to what constitutes a deficient or non-conforming condition. This is now more easily accomplished due to the increase in engineering/technical personnel. These programs started in April 1985 with the addition of more engineering personnel in the field.

Ebasco has implemented training to construction and quality personnel in the form of a video presentation targeted at standardizing criteria for initiation of NCRs. The first class was held on April 2, 1985 and will be ongoing.

Additionally, Ebasco Quality Control will conduct a formal training program for inspection personnel. This program will include instruction on inspection criteria and the identification, documentation, and processing of NCRs. In addition it will cover other aspects of inspection such as tools, measuring and test equipment (M&TE), inspection records, and resolution of specification/inspection record discontinuities

Training will be administered to all Quality Control inspection personnel. This training should preclude misunderstandings regarding the identification and documentation of non-conforming conditions. These additional training courses will start no later August 1985.

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### TEST EQUIPMENT CONTROL

**PERFORMANCE OBJECTIVE:** Measuring and test equipment should be controlled to support construction testing effectively.

**Finding (CC.7-1)**

The measuring and test equipment program needs upgrading. Problems were identified in the following areas:

- a. Vendor manuals used by personnel in the metrology laboratory are not controlled.
- b. Some torque wrenches have been used in the unallowable lower 20 percent of their range, improperly stored, and damaged.
- c. Satellite M&TE storage and issue stations are not under the control of the metrology laboratory supervisor.

- d. The metrology laboratory has experienced difficulty in maintaining humidity control.

**Recommendation**

Upgrade the M&TE program by implementing measures such as the following:

- a. Include metrology laboratory vendor manuals in the vendor manual control program.
- b. Upgrade the storage and use of torque wrenches to meet vendor's recommendations. Evaluate the results of torquing that was done in the lower 20 percent of the wrench's range.
- c. Ensure satellite M&TE storage and issue stations are in compliance with project procedure requirements.
- d. Upgrade metrology laboratory humidity control capability.

**Response**

- a. All metrology laboratory vendor manuals will be in the document control system by July 1985.
- b. The results of torquing in the lower 20 percent range of torque wrenches will be evaluated, and appropriate corrective action will be taken.

Training of the users will be conducted to ensure the proper use and storage of torque wrenches. In addition, the metrology laboratory will affix a label to torque wrenches to specify to the user the ranges or portion of the range that cannot be used.

- c. Present procedures state that the metrology laboratory supervisor controls the satellite storage areas for M&TE. The intent was for the satellite storage requirements to be specified by the metrology laboratory supervisor and the user group to be responsible to meet all required storage requirements. The procedures will be revised to clarify this point. Designated satellite storage areas will be established by the user groups for storage of M&TE when it is not in use.

These actions will be completed by August 1985.

- d. Efforts are underway to modify the present environmental control system for the metrology laboratory to correct this situation. Whenever the

environmental requirements cannot be met, the calibration activities are suspended until the environment is brought back into specifications.

This action will be completed by August 1985.

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PROJECT SUPPORT

INDUSTRIAL SAFETY

**PERFORMANCE OBJECTIVE:** The construction site industrial safety program should achieve a high degree of personnel safety.

Finding (PS.1-1)

Additional efforts are needed in the maintenance of industrial safety, housekeeping, and hazardous waste material control conditions. Added emphasis is needed by site personnel in following established site procedures, project rules, and regulations in these areas.

Recommendation

Place increased management emphasis on safety, housekeeping, and hazardous waste material control conditions. Consideration should be given to the following:

- a. Industrial Safety
  1. Strengthen the implementation of the site safety awareness program.
  2. Stress the importance and responsibility of each individual to practice safety and to adhere to established procedures.
  3. Evaluate the use of eye protection by all personnel in the construction areas of the plant.
- b. Housekeeping
  1. Strengthen the implementation of the existing housekeeping program.
  2. Enforce accountability in areas where specific housekeeping responsibilities have been designated.
- c. Hazardous Waste
  1. Upgrade facilities for storage of waste products.
  2. Ensure storage areas are effectively monitored and maintained.



3. Ensure personnel are trained and understand requirements for the handling, storage, and maintenance of materials for which they are responsible.

Response

Commencing in August 1985, a safety award program will be initiated on this project. Recognition and achievement awards will be given to various groups on the job site for their safety performance. This program will help to motivate project employees to identify and correct safety deficiencies in their areas. In addition, the new foreman's orientation was revised in March 1985 to include a section on the responsibility of supervisors and foremen to work together to correct field hazards. Each week, the Safety Department evaluates first aid records from field activities. Particular attention is given eye-related injuries. Problem areas are identified and remedial action is taken to key in on problem areas on the job site.

Added to the new foreman's orientation training session is a section concerning the importance of keeping areas clear of materials and debris. In May 1985, the Safety Department started writing articles for the site newspaper. The first one concerned project housekeeping. Housekeeping activities will be stressed as an ongoing program in the Project Gangbox Safety topics.

Construction Site Procedure-12 covers general instructions for housekeeping during construction. Under this procedure, engineering establishes requirements based on zone designations. After implementation of zone designation, Quality Control inspects these zones at regular intervals. The unit superintendent will be held accountable for housekeeping responsibilities. For violations of this procedure, Deficiency Notices are written by Quality Control to Construction, and the violation is corrected in a timely manner.

A Hazardous Material Response Program will be implemented in July 1985. Supervisory personnel are now being sent to formalized training seminars on hazardous material response. This activity will be a comprehensive program on control and cleanup of hazardous chemicals.

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## PROJECT PLANNING

**PERFORMANCE OBJECTIVE:** Project plans should ensure completion of the project to the highest industry standards by identifying, interrelating, sequencing, and implementing the tasks of the project organizations.

**Finding (PS.2-1)** Improvement is needed in the planning and sequencing of some construction activities to allow orderly installation of HVAC ductwork. Specific concerns noted were in the following areas:

- a. fabrication and installation of special duct pieces in accordance with the priority program
- b. constructibility walkdown

**Recommendation** Expedite delivery of the remaining pieces of ductwork from the fabricator in the order in which they are required by the prioritization program.

Perform walkdowns by representatives of the A/E, fabricator, and constructor to identify and reserve the necessary space requirements for duct installation.

**Response** A program was initiated on April 15, 1985 to have Intermech fabricate missing pieces and rework or repair pieces in seven days or less when identified by the installer as urgent. This program is now in effect, and the shorter turn-a-round time is being realized.

Walkdowns for remaining HVAC commodities are now being conducted by Intermech engineers and the integrated ECI/BEC HVAC engineers and supervisors organization.

In the last part of February, Intermech was given a schedule of erection priorities. Since that time, they have furnished the bulk of Unit 1 HVAC duct. As of May 1985, unit 1 is no longer experiencing a ductwork shortage.

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**Finding (PS.2-2)** Some project elements are not fully supporting the rolling 4 x 10 shift schedule in accordance with the development and operational plan. Areas for improvement included the following:

- a. material availability
- b. field engineering

- c. coordination between shifts
- d. weekend administration support

**Recommendation**

Evaluate the design activity schedule, field engineering support capabilities, material availability, and the coordination of work between shifts to determine that these activities support construction schedules in accordance with the Development and Operational Plan. Initiate appropriate corrective actions.

**Response**

The project organization has been evaluated on effectiveness, manpower utilization, shift coordination, shift resource utilization, and weekend coverage. The existing organization is being modified as appropriate to improve support and coordination of the 4x10 shift schedules. These modifications will be complete by July 1985. Specifically, additional coordination positions have been established and manned, and shifts are being staggered within the non-manual force to reinforce coordination between turns and day to night shifts. Revised shift work hours now provide for one-hour overlap between day and night shifts. Engineering and Material Control organizations have assigned more senior personnel to all shifts with emphasis on increasing the backlog of work in support of the 4x10 shift schedule.

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**PROJECT CONTROL**

**PERFORMANCE OBJECTIVE:** Project scheduling and the planning and coordination of work should ensure that the objectives of the project plan are met effectively and efficiently.

**Finding (PS.3-1)**

Some aspects of the project schedule need more attention. Bulk quantities are not always being attained, and some component turnovers for testing are behind schedule. Problems noted in the implementation of the schedule are as follows:

- a. System Completion Status fragnets are sometimes not being issued six months prior to system turnover, as required by the site scheduling program.
- b. Engineering support, material availability, and shift coordination are sometimes not supporting crafts in meeting bulk commodity schedules.

- c. The increased scope of work resulting from new commodity quantities are not being evaluated to assess impact on resources and schedule.
- d. The impact of delayed inspection and rework have not been fully evaluated.

Recommendation

Improve the implementation of the project schedule in the following areas.

- a. Implement the project schedule program in identifying system completion status six months prior to scheduled turnover.
- b. Evaluate the support and coordination required to maintain the shift schedule and take the necessary corrective actions.
- c. When work scope changes are issued, reevaluate the allocation of resources and the impact on the project schedule.
- d. Strive to complete partially installed work in a timely manner to minimize the possibility of inspection and rework delaying system turnover schedules.

Response

- a. The project scheduling program is being monitored to ensure that system completion schedules are issued a minimum of six months prior to system release.
- b. Job site personnel have recently been reorganized to more effectively utilize job site non-manuals. The primary objectives include increasing field engineering support (most noticeably by extending signatory authority to engineers in the units) and improving the supervisory-to-craft ratio to increase direct craft supervision. In addition, a shift coordination group has been established to ensure that the proper shift interfaces take place to optimize the effectiveness of the 4-10's operation.
- c. The manpower plan is based on commodity installation by system to support the start-up schedule. The constructor manages staffing to an approved total project level and allocates manpower as required to support the project plan. Significant quantity changes and the associated manpower changes are factored into the plan through the Potential Change Notice process.

- d. Reporting procedures are currently being revised to exclude progress credit for commodities that have not been transmitted to QC within four weeks of being reported construction complete. In addition, both in-process and final inspection rejects are continually analyzed and reviewed with construction to reduce the reject rate. A portion of the to-go man-hours were scheduled during the three months prior to system release to address completion-type activities (including rework) for which no quantities would be reported.
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Finding (PS.3-2)

Rework resulting from design revisions to some pipe supports is not identified until the walkdown prior to system turnover. Although the Administrative Site Procedure (ASP-10) was revised during the evaluation to include pipe and small bore pipe supports, it does not account for past revisions or large bore pipe supports. As a result, some rework may not be included in the turnover schedule or provided appropriate management visibility.

Recommendation

Revise ASP-10 to include all pipe supports. Develop and implement a program to determine the actual status of all pipe supports. Revise the status for those installations that have outstanding revisions. Ensure the program addresses field-generated documents such as non-conformance reports and field change requests that change installation status.

Response

ASP-10 was revised in March (ICP No. 3, Rev. No. 1, Para. 2.01.04) to include provisions for large bore supports. A code field in MLCS is to be filled by Houston Engineering every time a support is revised after it is statused as installed. This data triggers site engineering to review the revised drawing and analyze the impact on the installed support. Implementation of this procedure to date has been unsatisfactory. Site engineering is reviewing the problems and will take corrective action. Proper implementation of this procedure will address future design revisions.

There is no plan to formally review all previously issued pipe support design revisions. The Configuration Control Program, as outlined in ASP-10, is in reality a documented check of work that is already being done by the field engineers as part of their daily activities. Discrepancies in configuration will also be found during the numerous walkdowns that take place prior to system release. As a final check, QC ensures that all commodities are installed per the final design configuration prior to transferring the paperwork for the system to start-up.

Field-generated revisions are tracked by other means. NCRs are self-closing documents. Visibility of outstanding NCRs is available by system through MLCS, as well as on the system completion schedules. Configuration control for field change requests is addressed in WPP/QCI 20.0 (Para. 5.1.1.1). The initiator of the FCR is to determine if the change affects any item that has already been accepted by QC. If so, he contacts the appropriate resident engineer who completes the "review for impact on installed commodities" form in accordance with ASP-10.

All design revisions made after system design freeze (six months prior to release for test) are scheduled and tracked by the project punchlist program. For design changes made prior to design freeze, a portion of the to-go man-hours have been resource loaded between the 90 day walkdown and the system release to accommodate any additional rework identified during the walkdowns. These man-hours are provided for by the rework allowance built into unit rates. Additionally, all drawing revisions are reviewed, estimated, and catalogued in the field to provide the dynamic base required for rework due to design revisions. These measures provide allowances in the schedule and provide the required visibility to management.

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Finding (PS.3-3)

Many instrumentation systems cannot be completed because piping root valves have not been installed. This is resulting in an accumulating backlog of quality control inspections. Quality control procedures do not allow inspection of instrumentation and control (I&C) installations until instrumentation systems have been completed and as-built information is incorporated into approved drawings.

Recommendation

Develop a schedule for installing piping root valves that supports the timely completion of instrumentation systems.

Response

A schedule has been developed for the installation of root valves. All root valves are as of May 15, 1985, now being installed in conjunction with the I&C systems completion schedule.

Ebasco's Quality Control Program does provide for in-process inspections (i.e., welding, material identification, cleanliness, etc.) during the installation process to an as-built drawing, which aids in eliminating potential inspection backlogs. However, in accordance with current quality program and site

requirements, final inspection of installations must be performed to an approved design drawing, which is dependent upon construction and engineering efforts.

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**Finding (PS.3-4)**

**Improvement is needed in the administration of the engineering punchlist (EPL).** The following problems were noted:

- a. Engineering punchlist meetings are not attended by individuals with authority to establish recovery plans or commit resources.
- b. The EPL is incomplete for some systems.
- c. Some forecast dates are changed with no reason given.

**Recommendation**

Reemphasize the purpose and importance of the EPL with all discipline responsible engineers, group leaders, and group supervisors. Place special emphasis on the importance of ensuring the EPL accurately reflects the remaining engineering work and the need to complete this work on schedule. The above could be accomplished through training sessions conducted by system completion assistant project engineers.

Increase management participation in punchlist status meetings to the extent necessary to ensure the meeting objectives are met.

**Response**

Engineering Group supervisors (EGS) are required to attend the EPL meetings on a monthly basis. Project engineering is also in attendance at the monthly meeting. Both EGSs and project engineers exert authority to establish recovery plans and commit resources. In addition, the attendance for the weekly meetings has been modified such that the proper level of persons attend who establish recovery plans or commit resources for critical systems having engineering activities that impact construction.

Training will be given to engineering personnel to emphasize the importance of ensuring the EPL accurately reflects the remaining engineering work and the importance of meeting forecast dates. This training will be complete by July 1985.

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**Finding (PS.3-5)**                      **Emphasis is needed on the development of instrument setpoints.** The existing schedule is not being met or revised to reflect when setpoints will be issued. Coordination of the engineering setpoint schedule between I&C and mechanical disciplines needs strengthening.

**Recommendation**                      Improve the planning and coordination of instrument setpoint document efforts. Revise and update the setpoint list completion schedule in a timely manner to reflect completion dates as required by startup. Evaluate the resources to support the required completion dates. Ensure mechanical and I&C discipline efforts are coordinated to avoid schedule delays.

**Response**                                      The setpoint schedule has been reviewed and revised to show a recovery program. Additional manpower has been assigned to support the recovery program. In order to ensure the implementation of the recovery program, a senior project level setpoint coordinator has been assigned to direct and maintain the setpoint program. The coordinator, by means of weekly setpoint coordination meetings, will ensure the timely execution of the setpoint program. Weekly coordination meetings between controls and mechanical will deal with both technical and priority problems arising in the setpoint program.

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**Finding (PS.3-6)**                      **The status of exception items remaining on a system is not always correct.** The lists do not reflect all completion items or the current status of all items.

**Recommendation**                      Evaluate and implement methods and responsibilities to ensure exception items remaining on a system are more accurate. Provide follow-up to ensure these lists are accurate and items are completed as scheduled.

**Response**                                      The first tool modified was the Master Completion List (MCL). Currently existing computers are used to provide the exception items remaining on the system, and the remaining open items are handwritten. This action was implemented in April 1985 and will continue until all punchlists are developed in accordance with the Start-up Schedule. This new punchlist will provide the following:

- a.    issuance of main punchlist one time
- b.    elimination of MCL input sheets to generate initial punchlist, allowing the coordinator more time to work his system



Activities in progress to improve the completion effort are as follows:

- a. Additional personnel will be added to groups (HL&P Construction, HL&P Engineering, EBASCO, Bechtel, Westinghouse, HL&P Startup) by August 1985.
  - b. An improved level of management in system meetings to ensure schedule compliance and provide workaround as guidance has been implemented.
  - c. Actions are being taken to better define the status of systems and to develop punchlists.
- 

**Good Practice (PS.3-7)**

A program has been established to manload and track quality control inspection man-hours and activities in support of the overall project schedule. As a result, management is able to forecast quality inspection requirements and readily identify progress and problem areas. This program has been specifically designed to accomplish the following:

- a. Provide project management the status of quality control inspection activities as related to the following:
    1. the work construction has claimed as completed
    2. the work construction has turned over to QC for final inspection
    3. the work quality control has inspected
    4. the work quality control has completed
  - b. Forecast quality control manpower requirements based on the following:
    1. the existing construction schedule
    2. unit rates from inspection man-hours expended at other nuclear projects for specific activities
-

## DOCUMENTATION MANAGEMENT

**PERFORMANCE OBJECTIVE:** The management of project documentation should support the effective control and coordination of project activities and provide a strong foundation for the documentation/information requirements of the plant's operational phase.

**Finding (PS.6-1)**

The quality documentation for the installation and testing of some safety-related piping does not reflect appropriate attention to detail. Errors were found in some weld and material inspection reports, hydro-test walkdown checklists, and as-built drawings for the piping.

**Recommendation:**

Initiate action to improve the review of documentation packages prior to placing them in the record retention facility. Make the following improvements:

- a. Start documentation reviews earlier to reduce the impact of subsequent activities.
- b. Ensure documentation is completed and reviewed by cognizant technical groups before being placed in the record retention facility.

Investigate the omission of field repaired vendor welds from existing drawings. Take corrective action as determined appropriate.

Implement existing procedural requirements for the annotation of Code Data Reports when the work is accepted.

**Response**

Completed documentation packages will be investigated and appropriate actions taken to rectify discrepancies identified, including those in the finding. Additionally, Code Data Reports will be annotated as work progresses, and the backlog of annotating Code Data Reports shall be worked off.

Ebasco's Quality Program provides for documentation review by Quality Control supervision as inspection records are completed in the field. Quality training sessions will be conducted to emphasize attention to detail in inspection documentation reviews. These sessions shall be mandatory for all inspection disciplines.

Additionally, the recently established Site Integrated Records Group performs a content review prior to transmitting quality records to STP-RMS.

The investigative actions and training addressed in this response will be completed by August 1985.

The results of this effort will be provided in the six-month status report.

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TRAINING

GENERAL TRAINING AND QUALIFICATION

**PERFORMANCE OBJECTIVE:** The training program should ensure that all employees receive indoctrination and training required to perform effectively and that employees are qualified as appropriate to their assigned responsibilities.

Finding (TN.3-1)

Some project personnel (electricians, welders, testers, inspectors) are not sufficiently knowledgeable of project requirements contained in procedures. The project relies to a significant degree on the reading of procedures or informal training, but measures have not been implemented to ensure these practices are effective or that all appropriate personnel are trained.

Recommendation

Upgrade the methods used to evaluate training effectiveness to include observation of follow-up performance. Provide guidance to supervisors responsible for determining the type of training (reading, informal, or classroom) to be used. Strengthen the tracking and monitoring of training schedules to ensure personnel receive required training.

Response

The methods used to evaluate training effectiveness have been upgraded to include observation of follow-up performance as follows:

- a. Observations and evaluations of on-the-job performance will be increased by immediate supervisors and the Training Department as requested.
- b. Written surveys will be administered to course graduates and their supervisors at specified intervals to determine if learning objectives have been met and/or retained.

Guidance will be provided to supervisors responsible for determining the type of training (reading, informal, or classroom) to be used as follows:

The Training Department will assist the supervisor in analyzing performance problems, as requested, and in determining if the performance problem can be most appropriately corrected through training, or if the problem is non-training related. If it is determined that the performance problem can be corrected through training, then the Training Department will recommend methods for training to the supervisor and will assist in developing and conducting appropriate remedial training programs.

Actions taken to strengthen the tracking and monitoring of training schedules to ensure personnel receive required training are as follows:

- a. Training attendance rosters will be modified to include identification of participant's immediate supervisor.
  - b. Upon completion of the training, copies of attendance rosters, as appropriate, will be forwarded to the applicable supervisors.
  - c. Upon request of the supervisor, the Training Department will provide a computer printout, by course, listing all employees who have completed.
-

## QUALITY

### QUALITY INSPECTIONS

**PERFORMANCE OBJECTIVE:** Quality inspections should be performed in a manner that ensures optimum monitoring of project activities.

**Finding (QP.3-1)**

The performance of some QC inspectors needs improvement. Inspections do not always ensure verification of project requirements. Some deficient conditions noted by inspectors are not being documented to allow correction and root cause analysis. Some inspectors are not sufficiently familiar with the acceptance criteria for items they inspect, or they perform inspections to criteria beyond that required by procedures.

**Recommendation**

Implement controls to ensure that QC inspectors perform their inspections in accordance with existing requirements. Strengthen the monitoring of QC inspector performance through increased involvement of first-line supervisors in the field. Increase inspector training in acceptance criteria.

**Response**

Increased monitoring of QC inspector performance by supervisors has been implemented to ensure inspections are performed in accordance with requirements. QC supervisor/inspector interface meetings will be conducted during each turn to discuss pertinent issues. Topics of these meetings and attendance sheets will be placed on file.

Additionally, the enhanced training program to be implemented will increase inspector knowledge and understanding regarding the applicability of inspection criteria and the requirements for documenting non-conforming conditions.

Implementation of QC supervisory meetings and the enhanced training program will commence by September 1985.

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### CORRECTIVE ACTIONS

**PERFORMANCE OBJECTIVE:** Conditions requiring corrections or improvements should be resolved in an effective and timely manner.

**Finding (QP.5-1)**

Improvement is needed in the implementation of some aspects of the Corrective Action Program. Some corrective actions and adverse trend investigations have not been effective in preventing recurrence.

**Recommendations:**

Implement measures for the prompt and effective resolution of quality problems. Ensure that corrective action addresses the identification of the basic cause and actions to prevent recurrence. Follow up on the adequacy and effectiveness of implementation of corrective action. Strengthen the involvement of the first-line supervisors and middle-level managers in the resolution of quality problems.

**Response**

STP feels that the overall corrective action and trending programs are effective. However, in some instances recurrence of certain deficiencies has not been prevented. The key to improvement is in the better utilization of the existing systems, which includes the following:

- a. reviews by the Quality Assurance organizations of all three companies during issuance of deficiency documents for significant or recurring problems warranting special attention
- b. a special review of NCRs immediately following issuance by Bechtel Quality Assurance for significant, recurring, or potentially generic implications of single non-conformances
- c. a problem reporting system to project management for identifying problems of all types (including quality) with significant or potential significant impact on the successful completion of the project
- d. a trend analysis system that includes normalization of data against general construction volume (man-hours, quantities installed, etc.) that factor out increased levels of deficiencies that are due simply to more effort expended in an area
- e. a trend committee consisting of senior personnel from all organizations that provides for steering guidance for trend analysis, suggesting modifications to data collection and analysis, immediate action assignments on recognition of potential trends, and additional analysis of the root cause of trends identified
- f. a Quality Licensing Awareness Program that provides for the continuing centralized review of selected key documents by a multi-disciplinary board consisting of senior, experienced personnel--This review is for completeness, consistency, trends, and generic problems.

Further improvement can be obtained by increasing the level of understanding of all levels of supervision and management on the project of the existence of these corrective action tools. An indoctrination session will be prepared and administered that takes the corrective action system features, explains their purposes and functions, and stresses the line managers' responsibility in identifying the cause of deficiencies and eliminating the causative factors.

This indoctrination program will be developed and fully implemented by August 1985.

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## TEST CONTROL

### ORGANIZATION AND STAFFING FOR TESTING

**PERFORMANCE OBJECTIVE:** Organizational relationships should be defined and the organizations staffed to ensure effective implementation of the test program.

Good Practice (TC.2-1) The utility's Start-up Department has implemented an effective method of evaluating experience and educational backgrounds of test personnel. The method utilizes a detailed resume placed in a standard format that lists durations of prior work experience, education, and training. Comprehensive guidance is provided that prescribes what amount of prior training and work experience can be applied toward qualification. This method also utilizes a detailed list that establishes educational "equivalents" when substituting past work experience for education. These methods provide consistent and documented logic when evaluating the educational background and work experience of test personnel against applicable qualification requirements.

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## TEST PLANNING

**PERFORMANCE OBJECTIVE:** Testing activities should be controlled effectively through the use of detailed plans and schedules.

Good Practice (TC.3-1) The preparations by Start-up before turnover of installed instrumentation are very thorough and establish good packages in preparation for calibrations. An instrument checklist was developed that is very detailed and identifies all necessary facets of the installation that are required for turnover of the instrument prior to test. Sign-off of verification at the time of walkdown is required by the start-up engineer. The Discipline Test Schedule identifies all tests that must be performed for the specific instrument being tested. The Instrument Information Sheet identifies specific data associated with the instrument. These measures identify hardware and software problems early and help maintain the testing schedule.

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### TESTING PERFORMANCE AND DOCUMENTATION

**PERFORMANCE OBJECTIVE:** Performance and documentation of the test program should ensure that test objectives are achieved and that test results are reviewed and documented properly.

**Finding (TC.4-1)**

The preparation and conduct of some hydrostatic testing needs improvement. Hydrostatic testing is not always performed by personnel familiar with the testing process. The identification and use of some testing equipment are not specified in applicable test procedures.

**Recommendation**

Provide training for personnel performing hydrostatic testing, and follow up to ensure its effectiveness. Upgrade hydrotest procedures to ensure that the identification and use of equipment are specified.

**Response**

The project has developed a site procedure that more clearly delineates test objectives, responsibilities, and acceptance criteria. Responsible personnel, including test engineers and craftsmen, will be trained to the general requirements of the procedure and specific requirements for each test. Hydro test procedures will be reviewed to ensure that the proper use of test equipment is specified.

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CONSTRUCTION EXPERIENCE

OPERATING AND CONSTRUCTION EXPERIENCE

**PERFORMANCE OBJECTIVES:** Industrywide and in-house design and construction experience, as well as operating experience, should be evaluated for applicability, and appropriate actions implemented in a timely manner. Information on in-house design and construction experience should be shared with the industry.

Finding (OE.2-1)	Significant project events of generic interest need to be reported to the industry via NUCLEAR NETWORK. The in-house experience review process does not require such reporting.
Recommendation	Implement a process for timely identification and reporting of significant project events via NUCLEAR NETWORK.
Response	HL&P will develop an interdepartmental procedure (IP) to ensure that significant events of generic interest are reported to industry via NUCLEAR NETWORK. This procedure will address the input of data and information from the Engineering, Construction, and Operations departments and will be issued by October 1985.

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INDUSTRY OPERATING EXPERIENCE REVIEW

PERFORMANCE OBJECTIVE: Significant industry operating experiences should be evaluated, and appropriate actions should be undertaken to improve safety and reliability.

SOER STATUS

The status of Significant Operating Experience Report (SOER) recommendations is as follows:

<u>Number of Recommendations</u>	<u>Action Taken</u>
112	Satisfactory
10	Not applicable
14 (1 red tab)	Pending - awaiting decision
155 (38 red tab)	Pending - awaiting implementation
0	Needs further review
65	Previously evaluated as satisfactory or not applicable

The following recommendations are pending - awaiting decision:

<u>SOER Number</u>	<u>Recommendation Number</u>
80-1	1
80-2	1, 2
81-12	2
85-2	1, 2, 3, 4, 5, 6, 7, 8, 9, 10

The following recommendations are pending - awaiting implementation:

<u>SOER Number</u>	<u>Recommendation Number</u>
80-3	1, 2
80-4	1, 2, 3
80-5	2
81-1	1
81-2	4, 5, 6
81-3	2
81-4	2, 2a, 2b, 3, 4
81-7	2
81-9	1, 2b, 2c
81-12	1, 3, 4a, 4b
81-15	2c, 3
81-16	1, 2, 3
81-17	1, 2, 3
82-1	1, 2a, 2b, 2c, 2e, 3
82-4	1, 2, 3
82-5	1, 2, 3, 4, 5, 6

82-6	2b, 3, 5
82-7	1, 2, 3, 4a, 4b, 4c, 4e, 4e, 4f, 5
82-8	4
82-9	1, 2, 3, 4, 8, 9
82-10	1, 2, 3, 4, 5, 6, 7
82-12	1, 3, 4, 5
82-13	1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13
82-15	2, 3, 4, 5, 6
82-16	1, 2
83-1	1, 2, 3, 4, 6, 7, 8, 9
83-2	11, 12
83-3	6, 9, 11
83-5	7, 9
83-6	4
83-8	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
83-9	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
84-1	4
84-3	3, 4, 5, 6
84-4	3, 4
84-5	1, 3, 4
84-6	1, 2, 3, 4, 7
84-7	1, 2
85-1	4, 5

An update on the status of each recommendation listed in the "pending - awaiting decision" or "pending - awaiting implementation" categories shown above is requested in the six-month follow-on response to this report. In addition, the status of each red-tab SOER recommendation received subsequent to this evaluation should be included in the six-month follow-on response. A tabular summary, similar to that above, is requested.

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APPENDIX I

Summary of Outstanding Response Action from Previous Evaluation (1984)

TEST CONTROL

ORGANIZATION AND STAFFING FOR TESTING

Finding (TC.2-1)	The interfaces between Start-up and other organizational groups need improvement. Functional responsibilities are not always clearly understood and interfacing procedures sometimes refer to nonexistent steps, personnel or avenues of communication.
Recommendations	Define the roles of the various Start-up Coordinators and make them functionally responsible for reviewing Start-up interface documents relevant to their area of responsibility. This review should be conducted promptly and the necessary changes factored into the procedures to ensure program consistency. Start-up Coordinators should be made functionally accountable for the smooth operation of various interfaces and should have the freedom to identify organizational differences. Potential problems should be brought to the attention of appropriate management for timely resolution.
Response	Recent organizational changes within Start-up and various project groups that interface with Start-up have resulted in review and revision of many project procedures and instructions. The following types of procedures are in the process of being reviewed and/or revised: <ul style="list-style-type: none"><li>a. EDP-Engineering Department Procedures (Bechtel Engineering)</li><li>b. WPP/QCI-Work Plan Procedures/Quality Control Instructions (Bechtel Construction)</li><li>c. CSP-Construction Site Procedures (Ebasco Construction)</li><li>d. ASP-Administrative Site Procedures (Ebasco Construction)</li><li>e. SAI-Start-up Administrative Instructions (Start-up)</li><li>f. PEP-Project Engineering Procedure (HL&amp;P Engineering)</li></ul>

- g. OQAP-Operations Quality Assurance Plan (Operations Quality Assurance)
- h. TGP- Temporary General Procedures (HL&P NPOD)

Responsibilities and lines of authority and communication will be clearly spelled out in these procedures. Procedure revisions will be complete by January 1, 1985. The procedures will also receive inter-organizational reviews.

Start-up will issue a Start-up Directive describing and clarifying interfacing coordinator responsibilities and lines of authority.

**Status**

Subsequent to the above response, an additional organization change was implemented by the creation of a Systems Completion Group. Consequently, the review and revision of project procedures applicable to Start-up responsibilities continues and was actively ongoing during the evaluation.