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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY & LICENSING BOARD

In the Matter of

HOUSTON LIGHTING & POWER COMPANY

(Allens Creek Nuclear Generating  
Station, Unit 1

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Docket No. 50-466

HOUSTON LIGHTING & POWER COMPANY'S SUPPLEMENTAL  
FINDINGS OF FACT ON TEXPIRG ADDITIONAL  
CONTENTION NO. 31, TECHNICAL QUALIFICATIONS

I.

In accordance with the schedule established by the Board on April 14, 1982, the Applicant submits herein certain supplemental findings of fact on TexPirg Additional Contention 31 (Technical Qualifications). Applicant's initial findings, on this issue are contained in paragraphs 306 through 315 of "Applicant's Proposed Findings of Fact and Conclusions of Law on Radiological Health and Safety Issues in the Form of an Initial Decision", January 8, 1982. Applicant has reviewed paragraphs 306 through 315 and has determined that no changes are required in those paragraphs as a result of the April 12-14 hearings on this issue, with a few minor exceptions noted in Part III below.

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## II.

The following proposed findings should be added as supplements following paragraph 314 of the proposed findings filed by Applicant on January 8, 1982:

314A On October 15, 1981, Intervenor Doherty filed a motion requesting that the Board order Applicant and Staff to submit additional testimony on TexPirg Additional Contention 31, in light of a report on Brown & Root's engineering performance at the South Texas Project Nuclear Plant submitted by the Quadrex Corporation to Applicant in May, 1981. The Board denied Mr. Doherty's motion without prejudice but stated that Mr. Doherty could file a new motion specifying those portions of the Quadrex Report which indicated that organizational changes (which were either not previously averted to or inadequately addressed in prior testimony) ought to be made insofar as the Allens Creek facility is concerned and/or indicate that modifications (which were either not previously averted or were inadequately addressed in prior testimony) ought to be made in the supervision of the Allens Creek construction. On December 7, 1981, Mr. Doherty refiled his motion and set forth 15 specific findings (labeled A through O in his motion) which he alleged were derived from the Quadrex Report and which, according to

Mr. Doherty's allegations, raised a question about the adequacy of Applicant's organization for the design and construction of Allens Creek. On January 28, 1982, the Board issued an order granting Mr. Doherty's motion and directed the Applicant and Staff to present additional testimony as to whether additional organizational changes and/or supervisory modifications should be invoked at Allens Creek in light of Mr. Doherty's allegations. Further hearings on this issue were held on April 12, 13, and 14, 1982.

314B In the course of the hearings, the Board did not undertake to determine the validity of the findings in the Quadrex Report as they related to STP. The Board recognized that the question of whether the findings cited by Mr. Doherty were valid and whether or not those findings reflected upon the adequacy of the design of the South Texas Project were solely within the jurisdiction of the NRC Atomic Safety and Licensing Board conducting licensing proceedings on STP. Indeed, the Board recognized that the accuracy of the Quadrex Report was still undergoing review by the Applicant, its current architect-engineer (Bechtel Power Corp.) and the NRC Staff. That review is not expected to be completed until later this year and the Licensing Board in the STP proceeding has determined that it is proper to defer consideration of

Quadrex related matters until those reviews have been completed. \*/ In light of these facts, the Board proceeded to assume, solely for the purposes of these additional hearings, that the findings were valid and then undertook an examination as to whether organizational changes and/or supervisory modifications would be necessary to prevent such engineering design problems at the Allens Creek project.

314C The Applicant presented two witnesses, Mr. Jerome H. Goldberg, HL&P's Vice President of Nuclear Engineering and Construction, and Mr. Louis J. Sas, the Vice President of Engineering for Ebasco Services, Inc. Mr. Goldberg had previously testified on this subject. The Staff recalled its previous witnesses, Mr. Allenspach and Mr. Gilray. Mr. Gilray and Mr. Allenspach testified that they had not mentioned the Quadrex Report in their testimony in October because they were not aware of it. (Testimony of Frederick R. Allenspach and John W. Gilray, p. 2, following Tr. 21972). Mr. Goldberg testified that although he had been aware of the Quadrex Report at the time of his previous testimony, he had not considered it relevant to the issues then being considered by the Licensing Board. (Testimony of Jerome H. Goldberg, pp. 3-4, following Tr. 21424). Mr. Goldberg, Mr. Allenspach and Mr. Gilroy all testified that they did not

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\*/ Houston Lighting & Power Co., et al. (South Texas Project, Units 1 and 2), Memorandum and Order of March 25, 1982.

believe that the Quadrex Report on Brown & Root's performance at STP raised any issues which called for additional organizational changes at Allens Creek beyond those which they had already described in their testimony presented in October, 1981.\*/ The record shows that the changes in HL&P's organization, which had been described at the earlier hearings, had been begun before the issuance of the Quadrex Report and were designed to cope with a broad range of problems at STP, including the types of problems that were later reported by Quadrex. (Testimony of Jerome H. Goldberg, p. 4, following Tr. 21424; Tr. 21539-40; testimony of Frederick R. Allenspach and John W. Gilray, pp. 2-4, following Tr. 21972.) In particular, the Staff witnesses stated, without qualification, that the Quadrex Report did not change the conclusions in their prior testimony, because: (1) the architect-engineer at Allens Creek will be Ebasco and the Quadrex assessment related solely to deficiencies in the Brown & Root organization; (2) HL&P had substantially improved its management control over its nuclear projects through various actions,

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\*/ Mr. Goldberg did testify that HL&P had added an engineering assurance group since his previous testimony but that the creation of that group was not prompted by the Quadrex Report. (Goldberg, p. 5; Tr. 21487-89).



such as hiring new personnel with extensive nuclear engineering and construction experience; and (3) the overall QA programs of HL&P have been revised to include improved controls and procedures to provide a more effective management system in carrying out the program. (Id., p. 3,4; Tr. 22011-22012).

314D The Applicant also emphasized that there was a substantial difference between the experience and capability of Ebasco, as compared to Brown & Root, to undertake engineering design. Thus, there is no reason to expect that Ebasco will incur any of the problems experienced by Brown & Root. (Goldberg, pp. 5-6; testimony of Louis J. Sas, pp. 2-3, following Tr. 21415.). In this regard the Applicant presented a review by Quadrex of Ebasco's engineering efforts at Allens Creek. (Applicant's Exhibit 29). Quadrex found that Ebasco's practices meet or exceed industry standards, thus confirming Mr. Goldberg's opinion that Ebasco is well qualified to design Allens Creek. (Goldberg, pp. 5-6; Tr. 21452). Nonetheless, Mr. Sas addressed each of the paragraphs A through O of Mr. Doherty's motion and explained how Ebasco was organized to prevent the types of problems that Quadrex had raised with respect to the work performed by Brown & Root.

314E As to paragraphs A & B of Mr. Doherty's motion (Systems Integration Overview and Interface Among Engineering Disciplines), Mr. Sas explained that systems integration and interface relationship among engineering disciplines are all integral parts of the systems engineering process at Ebasco. The Ebasco engineering team is organized so as to assure that project disciplines effectively interface with each other. In this regard, it is noteworthy that Ebasco has designed and constructed numerous nuclear power plants and the benefits of this experience are available to, and are reflected in, the ACNGS project team. (Sas, pp. 5-6)

314F The Ebasco Quality Assurance (QA) Program contains specific measures intended to assure the proper exchange of information both within and between interfacing disciplines. This process, described in the QA Program Manual Section QA-I-4, afford disciplines the opportunity to review, comment and approve design documents generated by others which can affect their work. (Sas, p. 6).

314G The Ebasco project team for ACNGS has taken a further step to assure good systems engineering in developing System Design Descriptions (SDD) for each system in the plant. The SDD format includes functions and design requirements, design description, system limitations, operation, casualty events and recovery procedures, and maintenance. Consequently,

the SDD contains all the design criteria for that system, and includes a list of interfaces with other systems. System interfaces overlap each other since they are included in the SDD for the interfacing system as well. Thus, the use of SDDs provides an extra layer of assurance that the plant systems are properly integrated. (Sas, p. 7).

314H Mr. Goldberg emphasized, as he had his prior testimony, that he has directed the reorganization of the HL&P project teams into systems groups and has staffed those groups with experienced engineers who can assure effective implementation of a systematic design process. The systems groups will be responsible for assuring that Ebasco achieves effective systems integration and interface of engineering disciplines. (Goldberg, Tr. 21493-99; 21505-21509). The HL&P Project Engineering Team will review the Ebasco practices and procedures before they are implemented (Goldberg, Tr. 21579-81). The engineering assurance group would also provide an additional measure of review to assure that plant systems are properly integrated. (Goldberg, Tr. 21494).

314I In reply to paragraph C of Mr. Doherty's motion (Input Data Review), Mr. Sas testified that vendor supplied input data is reviewed by Ebasco for reasonableness, completeness and interface with Ebasco design. Before a vendor is approved to provide safety-related services and/or components, his



QA/QC program is audited and approved by Ebasco against 10 CFR 50 Appendix B requirements. This audit assures Ebasco and HL&P that the vendor's QA/QC program will satisfy all applicable NRC requirements. Since certified vendor reports are covered by this approved QA/QC program, re-verification by Ebasco and HL&P is not required nor is it necessary.

Input data generated within Ebasco is verified by the initiating department prior to its release for use in accordance with existing corporate design control procedures. (Sas, p. 8). Implementation by Ebasco of this program is audited by HL&P in accordance with HL&P's QA procedures. (Sas, p. 8; Goldberg, Tr. 21581-85).

314J With respect to paragraph D of Mr. Doherty's motion (Calculational Errors), safety-related design calculations performed by Ebasco are prepared and independently checked or verified by individuals competent in the subject activity. This independent verification assures that calculational errors will be eliminated prior to the release of the calculation. Implementation of this program by Ebasco is audited by HL&P in accordance with HL&P QA procedures. (Sas, p. 9).

314K Mr. Sas testified that as to paragraph E of Mr. Doherty's motion (Vendor Surveillance), verification and checking of the work done by major contractors and suppliers (including

vendor reports) is done by the subcontractor/supplier originating the work. Contracts for safety-related work are given only to qualified companies which have demonstrated competence and experience in their field of endeavor and have an approved Quality Assurance Program (QAP) in operation. The QAP is reviewed and approved by HL&P and/or Ebasco during the vendor selection process, and compliance with the QAP during performance of the work is checked through periodic audits of the subcontractor/supplier by HL&P and/or Ebasco. (Sas, pp. 9-10).

314L As to paragraphs F and I (Plant Modes and Conditions), ACNGS safety-related systems and components are designed to accommodate the single failure of safety-related components following an initiating event, the various plant conditions of design, and plant process conditions as described in PSAR Chapter 3 and 10 CFR 50 Appendix A. Ebasco satisfies these commitments via the design control process described in PSAR Chapter 17 Section 17.1.3A and Ebasco Topical Report (ETR)-1001 Sections QA-I-4 and QA-II-1. The plant operating modes and conditions are stated in the System Design Description documents. All project procurement and design documents, including the PSAR, are revised as necessary in accordance with the above mentioned Quality Assurance Procedures.

Conformance to these procedures is audited by HL&P in accordance with HL&P QA procedures. (Sas, p. 10). Mr. Goldberg also noted that HL&P is aware of the importance of developing plant operating conditions at an early stage so that the architect/engineer can design the plant initially to accommodate those conditions. (Goldberg, Tr. 21593-97, 21604-06, 21630-33).

314M Mr. Sas stated in connection with paragraph G (Safety-Related Classification) that the procedure for classification of design items as safety-related is described in PSAR Appendix O Item I.F.1 and in ETR-1001 Section QA-I-4.

Ebasco Project Engineering is responsible for preparation and maintenance of the list of drawings and specifications which includes designation of an item as safety-related. The Project Engineer is specifically required to consult with the Project Licensing Engineer with regard to the safety and seismic classification of design items, and the list cannot be issued without the approval signature of the Project Licensing Engineer in this regard. The Project Licensing Engineer and his staff check the proposed classifications against relevant guidance such as PSAR Section 3.2 commitments and Regulatory Guides 1.26 and 1.29. Once approved within Ebasco, this list is subject to review and comment by HL&P. Ebasco updates this list semiannually,

implementing appropriate design review controls found in PSAR Section 17.1.3A and ETR-1001 Section QA-I-4. (Sas, p. 11). The HL&P Project Engineering Team and the HL&P Licensing Department will review the Ebasco classifications for accuracy and compliance with the Safety Analysis Report. (Goldberg, Tr. 21614-23).

314N As to paragraph H (NRC Requirements), the ACNGS design has been reviewed by the NRC Staff against virtually all of the latest licensing criteria. There have been two SER Supplements issued for ACNGS in the past year giving favorable evaluation of compliance with licensing criteria, including both TMI and non-TMI concerns. Moreover, there is a process in place (see PSAR Appendix O, Item I.C.5) to evaluate design, operating and construction experience. This same process is also used to evaluate significant new licensing criteria. (Sas, p. 12). Mr. Goldberg also explained that HL&P has adopted a very sophisticated tracking system to make certain that the commitments to NRC licensing requirements are incorporated into the plant design. (Goldberg, Tr. 21623-29)

314O Mr. Sas testified that as to paragraphs I and J of Mr. Doherty's motion, the single failure criterion is a well recognized criterion for safety-related systems. It is

considered by the originating disciplines during the design process and is an important aspect of the Ebasco Licensing Group's system review. The conformance to the single failure criterion is demonstrated in the Failure Modes and Effects Analyses (FMEA) in the SAR and is considered in licensing review of project safety-related documents (Flow Diagrams, Specifications, System Design Descriptions, Logic Diagrams, etc.). HL&P has committed to perform a Reliability Analysis Program study of the ACNGS design (see PSAR Appendix O, Item II.B.8.1). This study will provide an added layer of design review to assure that the single failure criterion has been adequately considered in the design. (Sas, p. 13). In addition, HL&P will monitor Ebasco to make certain its engineering team properly follows and implements the Ebasco guidelines for meeting the single failure criteria. (Goldberg, Tr. 21634-36).

314P In response to paragraph K of Mr. Doherty's motion (Implementation of Safety Analysis Commitments), Mr. Sas made it clear that the implementation of PSAR commitments in the design is a recognized area of special importance at Ebasco and is covered by PSAR Sections 17.1.3A and 6A and ETR-1001 Sections QA-I-2 and QA-I-4. (Sas, pp. 14-16). The



Ebasco procedures are discussed at length in both his testimony and the PSAR and there is no doubt that these procedures are adequate to assure implementation of FSAR commitments. The Ebasco system will be enhanced by use of HL&P's own tracking system mentioned above. (Goldberg, Tr. 21637-39).

314P As to paragraph L of the motion (Licensing Input), Mr. Sas explained that the Nuclear Licensing Group is integral to the design review process at Ebasco. Since they formally review safety-related design documents, this assures consistency in the understanding and implementation of licensing requirements. The Licensing Group's role in the design review process also enables it to update the SAR, for which it is responsible. If Licensing notes an inconsistency of safety importance between the design document and SAR, the inconsistency must be resolved prior to approval of the document. (Sas, p. 16). HL&P's Licensing Department also takes an active role in coordinating with the project team for Allens Creek. (Goldberg, Tr. 21649-50).

314Q In response to paragraph M (Consistency in Design Bases), Mr. Sas testified that Ebasco utilizes documented safety-related systems, structures and component design bases. These bases are established and documented in accordance with PSAR Section 17.1.3A and 4A and ETR-1001 Sections QA-I-4 and QA-II-1 and QA-II-4. These design bases

are further identified and maintained in various ACNGS specific control documents (e.g. PSAR, departmental Design Manuals, System Design Descriptions, Civil Design Criteria, Procurement Specifications, and Design Drawings) in accordance with the above approved procedures. (Sas, pp. 16-17). Conformance to these procedures is audited by HL&P in accordance with HL&P QA procedures, and HL&P will also conduct independent technical reviews in selected areas. (Sas, p. 17; Goldberg, Tr. 21656-58).

314R In response to paragraph N (Equipment Specifications), both Mr. Sas and Mr. Goldberg testified that specific reliability values normally are not specified nor are they required to be specified. (Sas, p. 17; Goldberg, Tr. 21659-61) One exception to this is the specification for the safety-related Diesel-Generators which includes acceptance criteria for starting reliability in order to satisfy IEEE-387 and applicable NRC guidelines. Ebasco purchases safety-related equipment by utilizing specifications which detail ACNGS design bases, performance requirements and environmental qualification conditions. These specifications are controlled documents, prepared and maintained in accordance with PSAR Sections 17.1.3A and 4A and ETR-1001 Sections QA-I-4 and QA-II-4. In addition, the Applicant has committed to address NUREG-0718 Item I.C.5 "Procedures for Feedback of Operating, Design and Construction Experience" as described

in PSAR Appendix O. Under this program, components which prove themselves to be unreliable in operation at other operating facilities will be identified so that corrective measures can be implemented. (Sas, pp. 17-18).

314S As to paragraph O (Design Verification), approved design data is required for all Ebasco specifications released for engineering, material procurement and fabrication. Only the latest, approved-for-use data is used at the time the specification is issued. Preliminary design data and conservative estimates are utilized in the design and construction of various structures. Revisions to this data are possible and approved project procedures exist to allow for notification, evaluation and correction of any discrepancies, so that prior to fuel load and operation, these assumptions have been verified to assure that they are indeed conservative and that the design is adequate. Reliance on engineering assumptions is formally documented and controlled via conformance with PSAR Sections 17.1.3A and 6A and ETR-1001 Sections QA-I-4 and QA-II-2. (Sas, pp. 18-19).

### III.

In addition to the foregoing supplemental findings, Applicant proposes the following modifications to the previously filed findings:

310. Add the following footnote: "At the reopened hearings held on April 12-14, 1982, Mr. Goldberg indicated that the further engineering design work for the project had been suspended and that the HL&P and Ebasco staffs had been substantially reduced pending a determination by the NRC on the construction permit application. Neither Mr. Goldberg nor Mr. Sas expected any problem in restaffing upon resumption of work on the project. (Goldberg, Tr. 21938-42; Sas, Tr. 21948-55)."

313 Add the following transcript citation to the end of the first sentence: "Tr. 21956-61."

315 Add the following prior to the last sentence: "Nothing in the record suggests that there is any reason to believe that Allens Creek will experience either the type of construction related problems raised in TexPirg's contention or the type of engineering design problems raised by Mr. Doherty's motion to reopen the record."

IV.

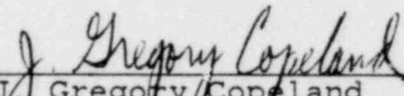
The Applicant respectfully request the Board adopt the foregoing supplemental findings as their own in the decision to be issued by the Board in this proceeding.

Respectfully submitted,

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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HOUSTON LIGHTING & POWER COMPANY	§	Docket No. 50-466
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CERTIFICATE OF SERVICE

I hereby certify that copies of Houston Lighting & Power Company's Supplemental Findings of Fact on TexPirg Additional Contention No. 31, Technical Qualifications in the above-captioned proceeding were served on the following by deposit in the United States mail, prepaid, or by hand-delivery this 21st day of April, 1982.

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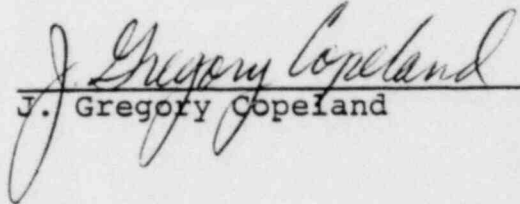
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