

The Light company

Houston Lighting & Power P.O. Box 1700 Houston, Texas 77001 (713) 228-9211

June 13, 1983
ST-HL-AE-955
File Number: G12.96

Mr. John T. Collins
Regional Administrator, Region IV
Nuclear Regulatory Commission
611 Ryan Plaza Dr., Suite 1000
Arlington, Texas 76012

Dear Mr. Collins:

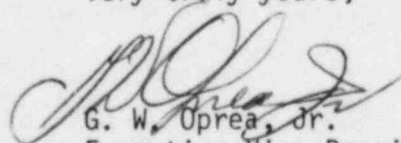
South Texas Project
Units 1 & 2
Docket Nos. STN 50-498, STN 50-499
Seventh Interim Report Concerning Computer Program Verification

On May 8, 1981, pursuant to 10CFR50.55(e), Houston Lighting & Power Company (HL&P) notified your office of an item concerning computer program verification. The sixth interim report, submitted on December 22, 1982, indicated that the next report would be submitted by May 12, 1983. In a subsequent conversation between M. E. Powell of HL&P and W. A. Crossman of your office, an extension of the submittal date to June 13, 1983 was obtained. The extension to June 13, 1983 was based on our plans to submit a final report at that time. However, all action items necessary to prepare a final report were not completed. In particular, further corrective action related to certain codes used by the civil disciplines and pipe stress and supports group is required.

Enclosed is our seventh interim report concerning this item. We anticipate submitting our next report by October 14, 1983.

If you should have any questions concerning this item, please contact Mr. Michael E. Powell at (713) 877-3281.

Very truly yours,



G. W. Oprea, Jr.
Executive Vice President

SSR/kr
Attachment

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cc: G. W. Oprea, Jr.
J. H. Goldberg
J. G. Dewease
J. D. Parsons
D. G. Barker
M. R. Wisenburg
R. A. Frazar
J. W. Williams
R. J. Maroni
J. E. Geiger
H. A. Walker
S. M. Dew
J. T. Collins (NRC)
H. E. Schierling (NRC)
W. M. Hill, Jr. (NRC)
M. D. Schwarz (Baker & Botts)
R. Gordon Gooch (Baker & Botts)
J. R. Newman (Lowenstein, Newman, Reis, & Axelrad)
STP RMS
Director, Office of Inspection & Enforcement
Nuclear Regulatory Commission
Washington, D. C. 20555

G. W. Muench/R. L. Range
Central Power & Light Company
P. O. Box 2121
Corpus Christi, Texas 78403

Charles Bechhoefer, Esquire
Chairman, Atomic Safety & Licensing Board
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

H. L. Peterson/G. Pokorny
City of Austin
P. O. Box 1088
Austin, Texas 78767

Dr. James C. Lamb, III
313 Woodhaven Road
Chapel Hill, North Carolina 27514

J. B. Poston/A. vonRosenberg
City Public Service Board
P. O. Box 1771
San Antonio, Texas 78296

Mr. Ernest E. Hill
Lawrence Livermore Laboratory
University of California
P. O. Box 808, L-46
Livermore, California 94550

Brian E. Berwick, Esquire
Assistant Attorney General
for the State of Texas
P. O. Box 12548
Capitol Station
Austin, Texas 78711

William S. Jordan, III
Harmon & Weiss
1725 I Street, N. W.
Suite 506
Washington, D. C. 20006

Lanny Sinkin
Citizens Concerned About Nuclear Power
5106 Casa Oro
San Antonio, Texas 78233

Citizens for Equitable Utilities, Inc.
c/o Ms. Peggy Buchorn
Route 1, Box 1684
Brazoria, Texas 77422

Robert G. Perlis, Esquire
Hearing Attorney
Office of the Executive Legal Director
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Revision Date 04-29-83

Seventh Interim Report
Concerning
Computer Program Verification

I. Summary

A review of the Brown & Root, Inc. (B&R) engineering effort on STP indicated that computer program verification methods lacked adequate visibility to the user as to whether or not the program versions in use were verified. The findings of the review did not define technical inadequacies that would compromise the safety of the plant.

Subsequent to assuming design responsibility for STP, Bechtel developed and implemented a verification program for review and acceptance of, B&R's computer calculations and Computer Program Verification Reports (CPVRs). The results and status of this verification program are given in Section III of this report.

II. Description of Deficiency

Refer to interim reports transmitted to the NRC by letters dated June 15, 1981, August 27, 1981, December 18, 1981, April 22, 1982, September 13, 1982, and December 22, 1982 (reference ST-HL-AE-678, 720, 769, 819, 880, and 916 respectively). In the Sixth Interim Report, a larger number of computer codes and calculations were reported as being considered for retention. Bechtel's corrective actions, (described below), have eliminated many of these from further consideration.

III. Corrective Action

Bechtel implemented a program utilizing its Engineering Department Procedures (EDPs) for the review and acceptance of B&R's computer calculations and CPVRs which is described in detail in the Fifth Interim Report (ST-HL-AE-880) to the NRC. This program has been audited by the NRC (Inspection Report 50-498 and 499/82-12, dated January 7, 1983). The program was found to be adequate and to conform to ANSI N45.2.11.

A. The Bechtel corrective action activities were directed towards first separating the computer codes into various categories of need for retention based upon a review a calculations using the program. This categorization involved a determination of the following:

- (1) Was the code utilized in design basis calculations? If not, do not complete the CPVR documentation.
- (2) Were the calculations subsequently superseded/replaced by calculations using different acceptable computer codes? If yes, do not complete the CPVR documentation.
- (3) Are the calculations currently scheduled for revision by Bechtel using Bechtel calculational codes because of design evolution, or finalization of input data? If yes, do not complete the CPVR documentation.

- (4) Upon review of the CPVR documentation, are significant documentation deficiencies identified? If yes, a parallel calculation will be completed by Bechtel to verify the calculation itself.
- (5) Finally, for the remaining computer codes, supplement any missing documentation or provide for code verification using Bechtel EDP methods. If satisfactory, retain the computer code. If not, revise the calculation.

Retention of a computer code for the design basis of the plant is defined to mean that the program verifications were found to meet the essential elements of Bechtel EDPs 4.36 and/or 4.37 and therefore can be generically utilized in accepting the entire body of B&R calculations using that code and supporting the existing design.

As a result of this evaluation logic, relatively few computer codes were designated for retention under this strict definition. It has been found that because of design evolution, identification of as-built conditions, and the need to revise design to meet new regulatory requirements, most codes, and therefore most related calculations, were eliminated from formal CPVR upgrading actions.

- B. As part of a previous program, 147 calculations and 26 CPVRs used by the B&R Nuclear Analysis discipline had received an independent review by Energy Incorporated (EI) as described in ST-HL-AE-819. The status of these items as a result of the Bechtel evaluation described in paragraph A is as follows:

Fifty-eight calculations were not used in the design or were superseded by other calculations primarily performed by NUS. Eighty-three (83) calculations have been or are being superseded by Bechtel calculations because the design has changed or computer program verification was inadequate. Six (6) calculations are being maintained in support of existing project design as a result of completing verifications of the computer code and/or the calculation itself.

Review of the 26 Nuclear Analysis CPVR's resulted in only one code being retained and in 25 codes not being required for project use for various reasons. If necessary to support the design basis, the calculations which utilized the codes not retained will be redone using verified codes or alternate methods.

- C. In addition Brown & Root had identified 57 significant computer programs used by the remaining disciplines (other than Nuclear Analysis) which had not been part of the EI review. Bechtel's review of the programs has resulted in 32 not being required for project use and 7 being retained for project use.

The remaining 18 have been evaluated and determined to warrant further action since calculations which the project intends to maintain utilize these codes. Two (2) of these codes are industry-standard codes in the pipe stress analysis and pipe

support design area, and merely require confirmation through the code vendor/sponsor of certain documentation and retrievability requirements. The remaining sixteen (16) are all in the civil/structural design or geotechnical scope of responsibility. Each has been evaluated and a worklist of remaining activities has been established to accomplish necessary action to allow retention of the computer program and any calculations based upon them.

- D. In addition, to the 57 codes identified by B&R, Bechtel has identified 6 more codes requiring evaluation. One (1) code has been identified as not being used for design. The other five (5) have been evaluated and added to the worklist described above for the remaining eighteen (18) B&R identified codes, resulting in a total of twenty-three (23) codes.

IV. Recurrence Control

Bechtel Engineering Procedures require that computer verification be performed either generically (for standard programs) or individually before a calculation using the program be approved as final. In addition, they define the required elements of such a verification. They thus provide adequate recurrence control.

V. Safety Analysis

Review of the B&R engineering effort during the transition program has not uncovered any technical inadequacies which resulted from the lack of computer verification that would have compromised the safety of the plant. The program described above will provide final assurance that the safety of the plant is not affected.