

**HOUSTON  
Lighting  
& Power  
Company**

Electric Tower  
P.O. Box 1700  
Houston, Texas 77001

Mr. T. H. Gamon  
Quality Assurance Manager  
Brown & Root, Inc.  
P. O. Box 3  
Houston, TX 77001

SUBJECT: AUDIT OF BROWN & ROOT ENGINEERING  
AUDIT NO. BR-28

Dear Mr. Gamon:

Transmitted herewith is the report of the Quality Assurance audit of Brown & Root Engineering performed on September 4-7, 1979 at the Clinton Drive offices. The purpose of the audit was to review the Brown & Root Engineering Quality Assurance Program for the South Texas Project and verify the implementation to the requirements of 10CFR50 Appendix B, ANSI N45.2 and the Brown & Root Engineering Procedures.

The Audit Team identified several problem areas which are documented on the attached Audit Deficiency Reports. The major problem areas identified were shielding design calculations, ALARA Review and Supplier Deviation Requests. It is felt that these areas are not adequately controlled and a thorough review should be performed. It is requested that Brown & Root respond to the identified Audit Deficiencies by October 26, 1979.

Very truly yours,

*R. A. Frazer*  
R. A. Frazer, Manager  
Quality Assurance Department

NUCLEAR REGULATORY COMMISSION

RAF:pab  
Attachment

cc: Messrs. D. G. Barker  
W. N. Phillips  
T. D. Stanley  
D. R. Valley  
Audit File (BR-28)  
RMS

cket No. STN 50-4980L Official Exh. No. CCANP 123  
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CCANP #123

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September 27, 1979

ST-HL-BR-4374  
SFN: Q-5000

I-CCANP-123  
8/6/85

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OFFICE OF SECRETARY  
DOCKETING & SERVICE  
BRANCH

## OFFICE MEMORANDUM

October 1, 1979

To Mr. D. G. Barker  
From Mr. T. D. Stanley *W. N. Phillips for*  
Subject Quality Assurance Audit of  
Brown & Root Engineering  
Audit No. BR-28  
RE: ST-HL-13847, ST-HL-BR-4374

ST-HL-13870  
SFN: Q-5000

0006908

The Quality Assurance Department, with technical assistance from the Health Physics Group, performed an audit of the Brown & Root Engineering Department. An extensive review of the shielding design calculations, ALARA review and Supplier Deviation Requests was performed during the audit. The auditors identified numerous deficiencies that indicate a breakdown of the B&R engineering program in these areas.

Due to the significance of these audit deficiencies, we recommend that you require B&R to perform a complete engineering review of the shielding design and ALARA review documentation to assure no regulatory requirements have been violated. We also recommend that B&R be required to review all past SDRs to assure no quality requirements were eliminated or violated.

If there are any questions, please contact myself or the Audit Team Leader, Mr. D. R. Valley, for further explanations.

TDS:pab

cc: Messrs. E. A. Turner  
R. A. Frazer  
W. N. Phillips  
Audit File (BR-28)  
RMS

OFFICE MEMORANDUM

October 1, 1979

To Mr. E. A. Turner

ST-HL-13847

From Mr. R. A. Frazar

SFN: Q-5000

Subject Quality Assurance Audit of  
Brown & Root Engineering  
Audit No. BR-28  
RE: ST-HL-BR-4374

6866

Transmitted herewith is the report of the announced Quality Assurance audit of Brown & Root Engineering that was conducted on September 4-7, 1979 at the Clinton Drive offices. A copy of the report will be transmitted via the referenced letter to the Brown & Root Quality Assurance Manager.

The purpose of the audit was to review the Quality Assurance Program for the engineering and design for the South Texas Project and verify its implementation to the requirements of 10CFR50 Appendix B, ANSI N45.2 and the Brown & Root Engineering Procedures. There were seventeen audit findings identified during the audit; eleven were classified as discrepancies and six as concerns. The audit findings indicated two major problem areas.

The first problem area is in the shielding design calculations and ALARA review because of the following deficiencies. First, there was no sub-contract issued to NUS Corporation (NUS) to give NUS the requirements for performing the shielding design calculations. Also, Brown & Root has no requirements for review or approval of the shielding design calculations received from outside organizations such as NUS. The auditors could find no documentary evidence that Brown & Root had approved any shielding design calculations as being final. The shielding design calculations performed by Brown & Root had no computer models in sufficient detail to allow an adequate review. Flux-to-dose conversion factors were not used to give area dose rates. Ceiling and floor shielding design calculations could not be found. References and drawings in the design calculations were not dated or identified by revision number. Finally, the computer printouts of Brown & Root and NUS design calculations are not being maintained in the Engineering Document Control Center for turnover documentation.

The second problem area is the handling of Supplier Deviation Requests (SDRs). The deficiencies indicate that Brown & Root is not following their procedure for SDRs.

Because of the significance of the deficiencies identified during the audit, the Quality Assurance Department has recommended that the Manager, South Texas Project request that Brown & Root perform a complete engineering review of the shielding design and ALARA review documentation (ST-HL-13870), and that Brown & Root review past SDRs to assure that no quality requirements were eliminated or violated.

The deficiencies identified as a result of this audit must be corrected

OFFICE MEMORANDUM

To

From

0006867

Subject Quality Assurance Audit of  
Brown & Root Engineering, page two

in a timely manner in order to ensure that the quality program is not compromised to an unacceptable level.

RAF:pab  
Attachment

cc: Messrs. R. M. McCuiston  
A. R. Beavers  
J. H. Ferguson  
W. M. Menger  
J. W. Arlitt  
W. B. Little  
D. R. Betterton  
D. G. Barker  
L. B. Horrigan  
R. E. Fulghum  
W. N. Phillips  
T. D. Stanley  
D. R. Valley  
Audit File (BR-28)  
RMS

# HOUSTON LIGHTING & POWER COMPANY (HL&P)

AUDIT NUMBER BR-28  
 AUDIT DATE 9/4-7/79  
 AUDIT TYPE External

0006868

ORGANIZATION AUDITED: Brown & Root Engineering Houston, Texas  
 (Name) (Address)

PRODUCT/SERVICE: South Texas Project Design Engineering

PRIME CONTACT: \_\_\_\_\_  
 (Name) (Title) (Phone)

## AUDIT TEAM

<u>NAME</u>	<u>ORGANIZATION</u>
<u>D. R. Valley</u> (Team Leader)	<u>HL&amp;P QA</u>
<u>M. L. Abbe</u>	<u>HL&amp;P QA</u>
<u>P. W. Ratter</u>	<u>HL&amp;P QA</u>
<u>R. L. Baron (Technical Asst.)</u>	<u>HL&amp;P Health Physics</u>
<u>K. J. Moles (Technical Asst.)</u>	<u>HL&amp;P Health Physics</u>

## PERSONNEL CONTACTED

<u>NAME</u>	<u>ORGANIZATION</u>	<u>TITLE</u>
<u>0* T. D. Stanley</u>	<u>HL&amp;P QA</u>	<u>Project QA Supervisor</u>
<u>0* R. W. Peverley</u>	<u>B&amp;R Engineering</u>	<u>AEPM Eng. Support</u>
<u>0 J. E. Paden</u>	<u>B&amp;R Engineering</u>	<u>Quality Engineer</u>
<u>0* R. W. Bass</u>	<u>B&amp;R Quality Assurance</u>	<u>Audit Section Manager</u>
<u>0* D. W. Janecke</u>	<u>B&amp;R Quality Assurance</u>	<u>Houston QA Coordinator</u>
<u>0* J. R. Childers</u>	<u>B&amp;R Quality Assurance</u>	<u>QA Coordinator</u>
<u>* R. A. Witthauer</u>	<u>B&amp;R Engineering</u>	<u>AEPM Engr. Production</u>
<u>0* J. W. Grimes</u>	<u>B&amp;R Engineering</u>	<u>AIARA Reviewer</u>
<u>* R. G. Helms</u>	<u>B&amp;R Engineering</u>	<u>Proj. Quality Engineer</u>
<u>R. Mitchell</u>	<u>B&amp;R Engineering</u>	<u>Proj. Quality Engineer</u>

<u>NAME</u>	<u>ORGANIZATION</u>	<u>TITLE</u>
* V. Derryberry	B&R Engineering	EDCC Supervisor
* J. C. Shuckrow	B&R Engineering	Project Quality Engineer
* L. H. Solis	B&R Engineering	Disp. Project Engineer
* G. Millas	B&R Engineering	SAEPM Engineer
0 K. A. Swarts	B&R Engineering	Sr. Engr. Manager
C. Brister	B&R Engineering	Mat. Con. Coordinator
L. Lilleux	B&R Engineering	EDCC
G. Smith	B&R Engineering	Principle Engineer
R. Witte	B&R Engineering	EDCC
P. Painter	B&R Engineering	Engineer

0 = Pre-Audit Briefing

\* = Exit Interview

PURPOSE: To verify the implementation of the Brown & Root Engineering Procedures of the Engineering Design for the South Texas Project.

#### DEFINITIONS:

HL&P audit deficiencies are categorized as follows:

CONCERN - A deficiency which, if not corrected, could lead to a discrepancy. A response as to corrective action taken is required.

DISCREPANCY - A deficiency in characteristics, documentation, or procedure which renders the quality of an activity unacceptable or indeterminate, and requires corrective action and follow-up to close out. Recurrence control is required.

SIGNIFICANT DISCREPANCY - A discrepancy which, due to its repetition or serious nature, requires immediate corrective action and follow-up to close out. Recurrence control is required.

DISCUSSION:

The audit team examined objective evidence to verify compliance with the Brown & Root Engineering Procedures. The following areas were examined for compliance with the B&R procedures:

1. Document Change Notices
2. Supplier Deviation Requests
3. ALARA Review
4. Specification preparation and control
5. Design verification
6. Processing Nonconformance Reports
7. Document and drawing control
8. Document Review process
9. Personnel training.

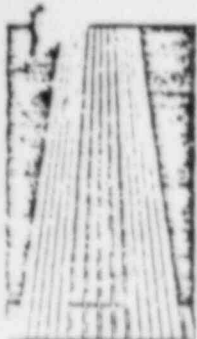
There were seventeen (17) audit deficiencies identified during the performance of the audit. Eleven (11) deficiencies were categorized as discrepancies and the remaining six (6) were categorized as concerns. These audit deficiencies are documented on the attached Audit Deficiency Reports.

SUMMARY:

Due to the significance of the deficiencies identified in the areas of ALARA Review, shielding design calculations and Supplier Deviation Requests (SDRs), the B&R engineering program needs strengthening to assure quality requirements are not violated. The audit team recommends a complete engineering review of shielding design and ALARA Review. Also, it is recommended that B&R perform a complete review of past SDRs to assure that no quality requirements were eliminated or voided.

Harold R. Calkins  
Audit Team Leader

9-26-79  
Date



# Houston Lighting & Power Company

Electric Tower  
P.O. Box 1700  
Houston, Texas 77001

Mr. T. H. Gamon  
Quality Assurance Manager  
Brown & Root, Inc.  
P. O. Box 3  
Houston, TX 77001

December 26, 1979

ST-HL-BR-4564  
SFN: Q-5000

0006900

SUBJECT: AUDIT OF BROWN & ROOT ENGINEERING  
AUDIT NO. BR-28

Dear Mr. Gamon:

We have received and reviewed the Brown & Root corrective action responses to the Audit Deficiency Reports (ADRs) Audit BR-28 of B&R Engineering. On several ADRs, the B&R corrective action responses are unsatisfactory. These ADRs are listed on Attachment I with a brief description of why the B&R response is unsatisfactory. It is requested that B&R submit revised corrective action responses on the attached forms by January 18, 1980.

The responses to the ADRs not listed on Attachment I are considered acceptable. Corrective action will be verified after acceptable responses are received on all ADRs from B&R.

If there are any further questions in resolving the ADRs, please contact myself or Mr. T. D. Stanley.

Respectfully yours,

R. A. Fratar, Manager  
Quality Assurance Department

RAF:jam  
Attachment

cc: Messrs. E. A. Turner  
R. M. McCuiston  
A. R. Beavers  
J. H. Ferguson  
W. N. Menger  
J. W. Arlitt  
W. B. Little  
D. R. Betterton  
D. G. Barker  
L. B. Horrigan

R. E. Fulghum  
W. N. Phillips  
T. D. Stanley  
D. R. Valley  
R. Baron  
Audit File (BR-28)  
RMS



ATTACHMENT I

0006901

1) BR-28-D-03

The corrective action response does not completely answer the deficiency. The deficiency is the Engineering Materials Control Coordinator is not getting the suppliers to return the completed Supplier Deviation Requests (SDR) within the time required by the B&R Procedure STP-DC-024-F.

2) BR-28-D-04

The corrective action does not address the original deficiency, that the SDR form Block 19 has not been completed on at least 32 SDRs. It is recommended that these SDRs be reviewed and the justification for approval of the SDR should be attached to these SDRs. If a Document Change Notice(DCN) has been issued because of the SDR, then at a minimum, the DCN should be referenced in Block 19.

3) BR-28-D-05

Again, the corrective action response does not address the original deficiency, which is, any drawings, specifications, requisitions, etc. changed by the SDR were not referenced in Block 19. It is recommended the B&R review the SDRs to assure any document requiring change by the SDRs be referenced in Block 19 of the SDR's.

4) BR-28-D-06

The corrective action response is not acceptable. The B&R QA Manual requires that SDRs be reviewed by the same organization that approved the original document. A review of all SDRs should be completed and B&R QA will review the SDRs if B&R QA reviewed the original document and B&R QA will continue reviewing SDRs until a formal QA Manual change is made and approved by the ASME.

5) BR-28-D-07

The corrective action response is not acceptable. The HL&P Auditor should have used the B&R QA Manual to identify this deficiency but the deficiency still exists. B&R QA Manual Section 3.10 Engineering Consultants states, "All documents prepared by a consultant will be submitted to the responsible B&R Project Engineer for review and approval." First, the NUS Shielding Calculations were not approved by a B&R Project Engineer. Second, there is no procedure on how B&R will handle such a review and approval of Engineering Consultant Documents.

6) BR-28-D-08

The corrective action response is not acceptable. There must be some backup design calculations to prove that the area radiation limits set by the STP FSAR are not being exceeded by the B&R design. The auditors could not find nor obtain such backup design calculations.

7) BR-28-C-04

The corrective action response is unacceptable. The Auditor requested the MCC to define the B&R term "timely manner" and he gave the ten day time limit. If this is an unacceptable time frame in which to review and disposition SDRs, then define a time limit in which SDRs will be dispositioned. The deficiency identified SDRs that were still awaiting disposition after four months; thus, a specified time limit for SDR disposition needs to be proceduralized.

OFFICE MEMORANDUM

February 31, 1980

To Mr. T. D. Stanley

From Mr. D. R. Valley *Li*

Subject Resolution of Audit Findings of  
B&R Engineering  
Audit No. BR-28  
REF: ST-HL-BR-4564

0006893

A meeting, called by Mr. R. W. Peverly, was held on January 31, 1980 to discuss the resolution of Audit Deficiency Reports (ADRs) to Audit BR-28. In our evaluation of B&R original responses to the ADRs, (see letter ST-HL-BR-4564) we rejected seven of their ADR responses. Mr. Peverly presented the B&R proposed revised audit responses and stated he would have the formal ADR responses to HL&P by February 8, 1980.

Below is a brief description, by ADR, of the B&R revised ADR responses as presented in the meeting.

- BR-28-D-03 B&R has removed the ten day return of SDRs by suppliers from procedure STP-DC-024-F
- BR-28-D-04 B&R has reviewed all SDRs since June 1, 1979 and has completed all SDR forms block 19. Procedure STP-DC-024-F will be revised to instruct engineering to reference DCNs in block 19.
- BR-28-D-05 B&R reviewed all SDRs since June 1, 1979 and if the SDR required a change to another document, this document will be referenced in block 19.
- BR-28-D-06 B&R has revised the QA Manual to define exactly what SDRs the QA Department must review and approve.
- BR-28-D-07 B&R engineers will review all design calculations received from outside organizations and document their review.
- BR-28-D-08 B&R has compiled a partial listing of the design calculations requested. Those areas missing the required design calculations are being evaluated and new calculations will be performed and forwarded to HL&P.
- BR-28-C-04 B&R has developed a new system and the responsible engineer will be assigned a response due date by which the SDR will be evaluated and accepted or rejected. Procedure STP-DC-024-F will be revised to reflect this new system.

DRV:rer

cc: Messrs. R. A. Frazar  
W. N. Phillips  
P. W. Ratter  
Audit File (BR-28)