

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51

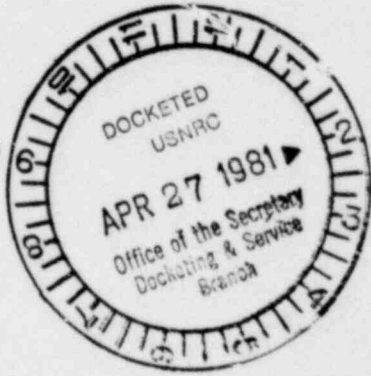
RELATED CORRESPONDENCE

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of: §  
HOUSTON LIGHTING & POWER § Docket Nos. 50-4980L  
COMPANY, ET AL. § 50-4990L  
(South Texas Project, §  
Units 1 & 2) §  
\_\_\_\_\_ §

TESTIMONY ON BEHALF OF HOUSTON LIGHTING & POWER COMPANY, ET AL.  
OF  
RICHARD W. PEVERLEY  
ON  
INTERVENORS' CONTENTION 1(1)



DS03  
S0/1

1  
2  
3  
4 UNITED STATES OF AMERICA  
5 NUCLEAR REGULATORY COMMISSION  
6  
7

8 BEFORE THE ATOMIC SAFETY AND LICENSING BOARD  
9

10  
11 In the Matter of: §  
12 §  
13 HOUSTON LIGHTING & POWER § Docket Nos. 50-498OL  
14 COMPANY, ET AL. § 50-499OL  
15 §  
16 (South Texas Project, §  
17 Units 1 & 2) §  
18 §

19  
20 TESTIMONY OF RICHARD W. PEVERLEY  
21 ON INTERVENORS' CONTENTION 1(1)  
22

23  
24 Q. 1 Please state your name and occupation.

25  
26 A. 1 I am Richard W. Peverley. I am Assistant Engineering  
27 Project Manager-Special Services, for Brown & Root, Inc. (B&R).  
28

29  
30 Q. 2 Please describe your professional qualifications and  
31 employment background.  
32

33  
34 A. 2 These matters are set forth in my testimony on  
35 Contention 1.7 (a), (b), and (c) in this proceeding.  
36

37  
38 Q. 3 What is the purpose of your testimony?

39  
40 A. 3 I will address Contention 1(1), which relates to a  
41 surveying error which occurred in 1978 during the surveying of  
42 the basemat of the Unit 2 Mechanical-Electrical Auxiliary  
43 Building (MEAB). I will describe the error, the engineering  
44 response to the error, and the steps taken to prevent recurrence  
45 of similiar errors. I will also show that the error involved  
46 no viciations of 10 CFR Part 50, Appendix B.  
47  
48  
49  
50  
51

1  
2  
3  
4  
5 Q. 4 Please describe the dimensional surveying error that  
6 occurred in the basemat of the Unit 2 MEAB.  
7

8  
9 A. 4 In September 1978, B&R Field Engineers discovered a  
10 one foot error in the dimensions of the basemat for the Unit 2  
11 MEAB while attempting to lay out a sump in the building basemat.  
12 B&R Houston Engineering and Quality Assurance (QA) were informed  
13 of the error, a Nonconformance Report (NCR) describing the  
14 problem was written, and HL&P was notified. The incident was  
15 reported to the NRC by HL&P on October 4, 1978. The matter was  
16 then assigned to B&R Houston Engineering to determine the  
17 corrective action to be taken and to provide an assessment of  
18 the safety implications, if any, of the incident.  
19  
20  
21  
22  
23  
24  
25  
26

27 Q. 5 What role did you have in the investigation and  
28 analysis of the surveying error?  
29

30  
31 A. 5 It was my responsibility to coordinate and manage  
32 the engineering review of the incident and to formulate the  
33 appropriate corrective action plan. I also reviewed information  
34 regarding the causes of the surveying error, and the recurrence  
35 control measures to prevent similar errors.  
36  
37  
38  
39

40 Q. 6 What initial action was taken by Engineering in  
41 response to the surveying error?  
42

43  
44 A. 6 Initially, a series of meetings were held by B&R  
45 Discipline Project Engineers responsible for equipment in the  
46 area to discuss engineering redesign options. Engineering  
47  
48  
49  
50  
51

1  
2  
3  
4 disciplines represented in these meetings included Structural,  
5 Mechanical, Heating Ventilation and Air Conditioning, Instrumen-  
6 tation and Controls, Electrical, Plumbing and Architectural. As  
7 a result of these meetings, and after conducting further analysis,  
8 three engineering alternatives were identified -- each of which  
9 would have provided adequate engineering correction. These  
10 alternatives were to: (1) Demolish and replace the total slab;  
11 (2) Structurally modify the slab to bring it back to the  
12 originally-designed dimension; or (3) Leave the MEAB slab in  
13 its present dimensional configuration and redesign and relocate  
14 the interior equipment to accomodate the dimensional slab  
15 change.  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

26 Q. 7 Which of the alternatives, if any, was most prefer-  
27 able from a safety standpoint?  
28  
29

30 A. 7 B&R Engineering considered that all three alternatives  
31 were equally acceptable from a safety design standpoint, and  
32 all alternatives would have provided adequate assurance of  
33 plant structural integrity and would have been in compliance  
34 with all applicable design and regulatory requirements.  
35  
36  
37  
38  
39

40 Q. 8 Which engineering design alternative was selected  
41 and on what basis?  
42

43 A. 8 B&R submitted the three engineering alternatives to  
44 HL&P in early October 1978, and HL&P selected the third alter-  
45 native. Since all three alternatives were totally acceptable  
46 to assure a safe and adequate design, the decision was made to  
47  
48  
49  
50  
51



use the engineering redesign that had least impact on the on-going construction activities.

9 Once the decision was made as to the appropriate engineering redesign, how was that actually accomplished?

Redesign of the MEAB to compensate for the one foot dimensional error resulted in only interior spatial alterations. From Column Line A to Column Line H (see Attachment No. 1), the layout within the Building is unchanged from the original design. From Column Line H to Column Line M.8, the one foot has been compensated by reducing distances between column lines and removing excess floor space around the layout of systems and equipment. The general arrangement of equipment within the redesigned area is unchanged by the one foot dimension change. Approximately three-fourths of the Building (Column Line A to Column Line H) is unchanged from the original design and the redesign affected only the West one-fourth of the Building. In compacting this area of the Building, all safety criteria and bases, stated in the safety analysis report, were determined to have been met for layout of the systems and components. The following generic drawing categories were reviewed for the MEAB design:

- 1) Instrumentation plan drawings.
- 2) Electrical physical drawings.
- 3) Concrete drawings.

- 4) Steel drawings.
- 5) General arrangement drawings.
- 6) Floor and wall sleeve drawings.
- 7) Composite piping drawings.
- 8) Stress and isometric drawings.
- 9) Fabrication isometric drawings.
- 10) EVAC drawings.

Those drawings which previously had been issued and which required revision due to the interior redesign have been subsequently reissued. Other drawings affected by the interior redesign which had not been issued will be issued as planned during the normal course of engineering and construction activities.

Q. 10 Please describe the activities conducted to evaluate the consequences of the redesign upon safety criteria commitments.

A. 10 The redesign has been verified to ensure the following safety criteria have been met:

- 1) Mechanical and electrical separation-FSAR Sections 3, 7, and 8.
- 2) Protection against pipe break and associated jet impingement and pipe whip effects-FSAR Section 3.6.
- 3) Protection against internally generated missiles-FSAR Section 3.5.
- 4) Protection against fire hazards-FSAR Section 9.5.

5) Protection against sabotage (security considerations)-  
Security Plan.

In addition, a review of designated engineering design documents for both Units was performed to assure that the facility design adequately reflected the requirements of Regulatory Guide 8.8 and HL&P's policy to provide those design features which will result in a reduction of radiation exposure to operators and maintenance personnel.

Q. 11 Please describe the likely cause of the surveying error.

A. 11 The surveying error most likely occurred because, instead of using the containment/reactor centerline as the reference as had been intended, the building slab survey calculations and layout in the field used the dimensions relative to column line R.1 in the Fuel Handling Building. Column line R.1 in the Fuel Handling Building is offset one foot to the west of the containment/reactor centerline (see Attachment No. 1) thus resulting in the east edge of the Mechanical-Electrical Auxiliary Building being laid out one foot short of the design.

Q. 12 Were there applicable QA/QC procedures that should have detected such errors prior to its detection by the field engineers attempting to try out the basemat sump?

A. 12 No. This is the type of mistake which could only be detected through appropriate precautionary steps by the

1  
2  
3  
4 surveyors themselves or by their supervisors. There is no  
5 applicable QA/QC procedure to detect these kinds of mistakes.  
6  
7

8 Q. 13 Is it common practice in surveying to have QC  
9 Inspectors check the surveyors work on a real-time basis.  
10

11 A. 13 No. This is not practical. The responsibility for  
12 any survey rests with the survey crew chief. He operates the  
13 transit and makes all of the required calculations. If the  
14 calculations are correct and the traverse is properly closed,  
15 there is a high degree of assurance that the work was done  
16 correctly. The only way that one could inspect a surveyor's  
17 work is to redo the survey. This would be impractical and is  
18 therefore not done.  
19  
20  
21  
22  
23  
24  
25  
26

27 Q. 14 Describe the involvement of QA in the surveying  
28 operations.  
29

30 A. 14 First, QA Engineers are responsible for reviewing  
31 and approving all construction procedures, including surveying  
32 procedures, to ensure that the necessary steps are included.  
33 Second, it is the responsibility of the QC Inspectors to make  
34 periodic inspections of the records to ensure that these proce-  
35 dures are being implemented. The QA auditing group also performs  
36 periodic audits on this operation.  
37  
38  
39  
40  
41  
42

43 Q. 15 Please describe the recurrence control measures  
44 that have been taken to assure that this error is not repeated.  
45  
46  
47  
48  
49  
50  
51



1  
2  
3  
4 A. 15 The Field Engineering department has implemented  
5 extensive reorganization and procedural changes since the  
6 survey error occurred. Personnel must meet increased qualifica-  
7 tion requirements before being hired into the survey group.  
8 Training meetings must be held every three to six months and  
9 must be attended by all personnel. All original control work is  
10 established by one crew permanently assigned to a particular  
11 building. All survey operations are checked by the supervisor.  
12 Major layouts are double checked. Procedures also require that  
13 all building layout points are traversed back to the original  
14 point so that closure occurs. These procedural changes should  
15 preclude the problem from recurring.  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

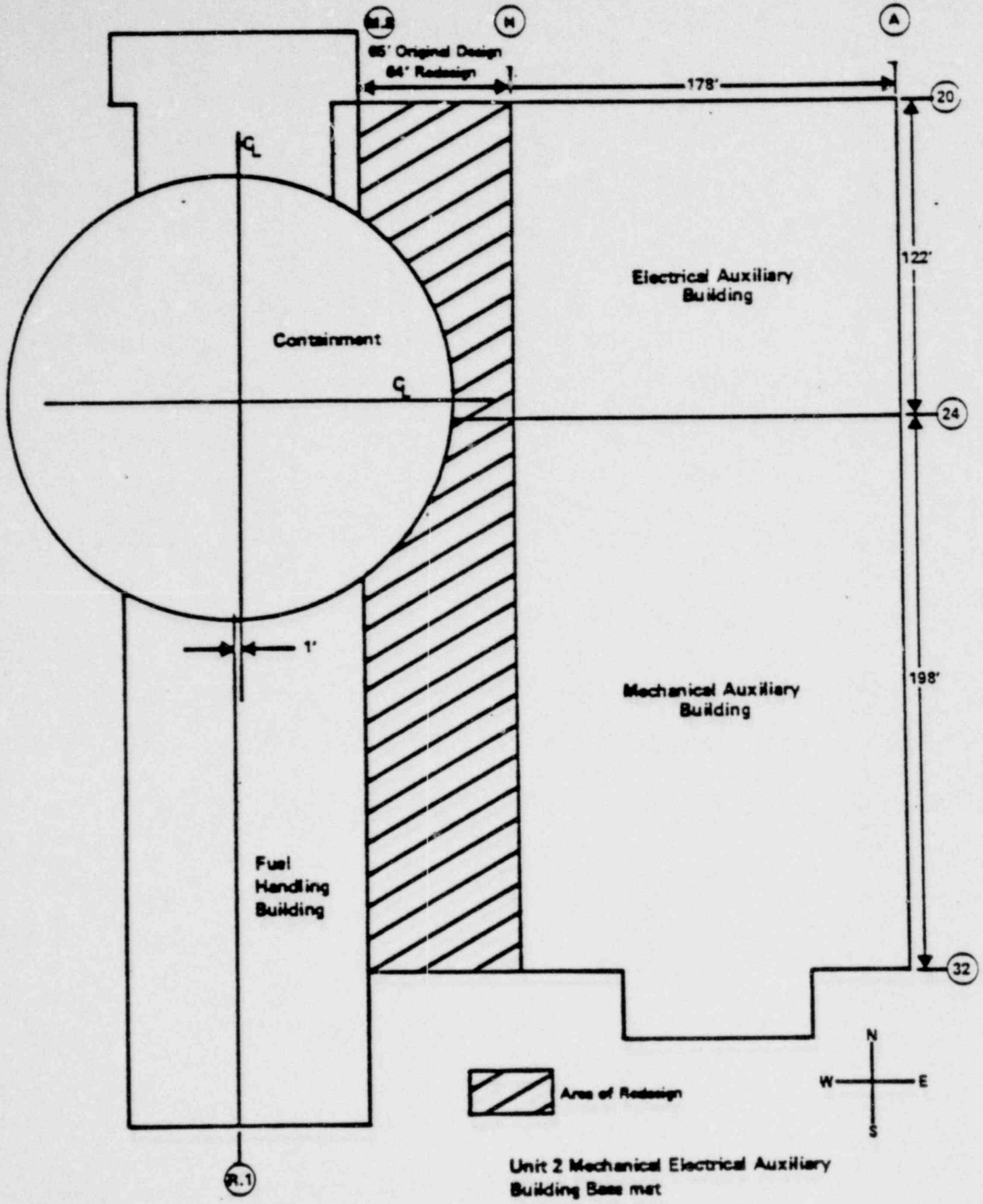
26  
27 Q. 16 Did this error constitute a violation of 10 CFR 50,  
28 Appendix B (Criterion X and XI), as alleged?  
29

30 A. 16 No. Criterion X concerns inspections and Criterion  
31 XI concerns test control. The act of surveying is not, by  
32 definition, a test. Testing is done to verify that activities  
33 satisfy specified requirements. Testing is ordinarily done when  
34 verification cannot be done by normal inspection methods.  
35  
36 Surveying is a basic activity and would not be considered to be  
37 a test. As previously stated, surveying is not amenable to  
38 inspection techniques either. Inspection is not required in  
39 surveying because self-checking by proper calculation checks  
40 and closure methods which are normally employed provide adequate  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51

assurance that the survey was conducted properly. Therefore, neither Criterion X, XI, nor any other section of Appendix B for that matter, is applicable to the surveying activity in question.

T.Hudson:11:02:D



Unit 2 Mechanical Electrical Auxiliary Building Base mat