

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
)
UNION ELECTRIC COMPANY) Docket No. STN 50-483 OL
)
(Callaway Plant, Unit 1)

AFFIDAVIT OF KIRIT G. PARIKH

COUNTY OF MONTGOMERY)
) ss:
STATE OF MARYLAND)

KIRIT G. PARIKH, being duly sworn, deposes and says:

1. I am employed by Bechtel Power Corporation, Gaithersburg Power Division, Gaithersburg, Maryland. My present position is Engineering Supervisor. I have previously testified on behalf of Applicant in this proceeding on the embedded plate issue, submitting prefiled written testimony dated November 6, 1981 (Applicant Embed Testimony) and appearing for oral testimony at the hearing on this issue on November 18, 19 and 20, 1981. A complete statement of my professional qualifications is incorporated in Applicant Embed Testimony, following Tr. 501, at 5 and Attachment 3.

2. On February 19, 1982 JI filed their "... Motion for Admission of Additional Evidence", which seeks the introduction into evidence of a Bechtel Power Corporation letter to Union Electric Company, dated April 9, 1980 ("BLUE 675"), with an Attachment entitled "Listing of Plates with Manually Welded Studs Installed in Concrete by 6/9/77."

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The 14-page Table included in this document (hereinafter referred to as "the Table"), was prepared under my supervision with some of the supporting calculations personally prepared by me. I am submitting this Affidavit in order to correct certain mischaracterizations and misinterpretations of the data in the Table, which are contained in Joint Intervenors' Motion and in their "...Proposed Findings of Fact and Conclusions of Law," dated March 1, 1982.

3. Contrary to Joint Intervenors' representation, the data in the Table fully supports the Bechtel engineering analysis which determined that the deviations from the required weld detail identified on manually welded embeds would not adversely affect the load carrying capacity or design safety margin of such embeds. The Table is nothing more than a detailed, plate-by-plate breakdown of the load carrying capacity data for the manually welded plates which was introduced into the record in this proceeding by Applicant. See Applicant Ex. 4 at Appendix B, Calculation Sheet 3.

4. The Table, in its columns headed "Location of Plate Model" and "Plate No. Civil Dwg." together with certain entries in the "Remarks" column lists and provides information identifying the location and type of plate for all manually welded embeds installed in concrete at the Callaway Plant prior to June 9, 1977.

5. In the column headed "Capacity of Plate", the Table provides the "design load" or "load capacity" of each manually welded embed. The design load for a particular type of plate, however, is always less than the plate's full structural capacity. Rather the design load incorporates a minimum safety factor of at least 2.0 against the yield limit state of

the plate and the tensile capacity of the anchor rods. See Applicant Embed Testimony at 34. For example, in the design process, a plate with a full structural capacity of at least 50,000 lbs. would be assigned a design load of no more than 25,000 lbs. Accordingly, even if loaded to its full design load of 25,000 lbs., the plate would have a margin of safety of 2.0. In most cases, however, the actual load on a plate is considerably less than its design load capacity, thereby providing an additional margin of safety. It is, however, accepted engineering practice to load a plate to its full design load capacity.

6. The column headed "Load on Plate" provides the actual load imposed on each plate. This load is the maximum load which it has been calculated could be imposed on the plate during the life of the plant and includes dead loads, live loads and seismic loads. As can be seen on the Table, in two cases the "load on plate" equals the "capacity of plate", providing a minimum safety margin of 2.0. For all other plates, the actual load is less than the plate capacity providing increased margins of safety.

7. The column entitled "Reduced Plate Capacity" contains the results of calculations I performed to determine the effect of undersized anchor rod welds on the load carrying capacity of the manually welded plates. These calculations were reviewed and approved by other engineers in the Bechtel organization. The calculations provide the reduced plate capacity for each type of manually welded embed, assuming that each anchor rod on each such plate is undersized 1/8 inch for the entire 360° circumference of the weld. Additional conservative assumptions were also used in these calculations. See Applicant Embed Testimony at 37. The method used to calculate the reduced plate capacities was the same as that used in calculating the original design loads. Accordingly, the reduced plate

capacities also incorporates an inherent margin of safety, allowing the embeds to be loaded up to the full amount of the recalculated capacities. Because of additional conservatisms assumed in the recalculations, the smallest minimum safety factor was determined to be slightly less than 2.0. See Applicant Embed Testimony at 38.

8. After performing these recalculations, the reduced plate capacities were then compared to the actual load (column headed "Load on Plate") of each manually welded embed installed at Callaway prior to June 9, 1977. A review of the data in the Table reveals that in no case does the actual load on a plate exceed its reduced plate capacity. While it is true that in a few instances the actual load equals or is just less than the reduced plate capacity, this does not mean, as Joint Intervenors argue, that "in many cases there is little or no margin for error" or that "[i]f Bechtel's calculations are wrong and the reduced load capacity is lower, plate failure can be expected." See Joint Intervenors' Motion at 3,4. Rather, since each manually welded plate, even with its recalculated load carrying capacity, retains its inherent margin of safety, (See para. 7, supra; Applicant Embed Testimony at 38; Applicant PF 71(1)), it may be safely loaded to its full "reduced" capacity.

9. Joint Intervenors also argue that the absence of entries in the column headed "Type of Load of Plate" on the Table means that "...in its engineering analysis, Bechtel apparently did not know, or at least did not consider, the type of load on each plate." See Joint Intervenors' Motion at 4. This statement is untrue. As is clearly reflected in the record in this proceeding, all manually welded plates

support structural steel framing. See Applicant Embed Testimony at 34; Applicant PF 66. This information was used in determining the actual load imposed on each plate, but since the type of load was the same for all plates, I determined that it was not necessary to make entries in this column. Similarly, since there was no additional loads imposed on any of the plates, I determined that no entries were needed in the column captioned "Add'nl Loads."

Kirit G. Parikh
Kirit G. Parikh

NOTARIZATION

Subscribed and sworn to before me, the undersigned officer,
this 16th day of March, 1982.

Leane J. Carpenter
Notary Public

My commission expires: July 1, 1982