

SEP 11 1984

Docket No. 50-458

APPLICANT: Gulf States Utilities Company (GSU)  
FACILITY: River Bend Station (RBS)  
SUBJECT: SUMMARY OF MEETING TO DISCUSS REACTOR SHIELD BUILDING SHEAR REINFORCEMENT

The meeting was held in Bethesda, Maryland on June 20, 1984. A list of persons participating in the meeting is included as Enclosure 1.

Enclosure 2 summarizes the staff's evaluation of the shear reinforcement at River Bend Station. Included in this attachment are additional questions which GSU will be required to answer prior to the satisfactory resolution of this issue. These questions will be included as a part of the Integrated Design Inspection report.

Original signed by:

E. J. Weinkam, III, Project Manager  
Licensing Branch No. 2  
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Enclosures: As stated

cc: See next page

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Enclosure

River Bend Shear Reinforcement

June 20, 1984

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RIVER BEND UNIT 1  
CONTAINMENT SHIELD BUILDING  
SHEAR REINFORCING Z BAR ANCHORAGE

Shear reinforcement in the form of Z shaped #8 reinforcing bars is used in the lower area of the Shield Building for the Unit 1 containment. This type of reinforcement was provided to carry radial shear stresses in this area and is reported by the licensee to be mainly associated with the accident temperature loads.

Questions were raised by the staff during an IDI audit of April 23, 1984, regarding the adequacy of the development length of these Z bars. This development length is required to properly anchor the bars so that the tensile forces can be developed. To answer these questions the applicant presented the justification for the procedure used to compute the development length of these radial shear bars in a meeting held in Bethesda, MD. on June 20, 1984. The radial shear reinforcing bars are Z shaped with the main portion of the bar 45 degrees to the horizontal with a portion bent so that it is vertical and parallel to the vertical reinforcing bars in the inside and outside face of the Shield Building wall. One end of the bar is bent upward and the other end is bent downward, refer to Figure 1 for more details.

In calculation by the applicant for the drywell wall, weir walls and the reactor support the development length of Z bars was taken to be equal to the vertical length of the Z bar outside the 45 degree bend, which is consistent with the industry practice.

The calculations for Shield Building wall used a different procedure for determining the development length. The Z bars do not entirely comply with the code requirements, particularly the provisions of Section 12.13 of the ACI code. The code requires an effective embedment of  $.5 l_d$  ( $l_d$  is development length) plus a standard hook or an embedment of  $l_d$  calculated or no less than 24 bar diameters as required by section 12.13.1.2 of ACI 318-71 for the anchorage of shear reinforcement. The Z bars provided by the applicant do not employ a standard hook as is required. Instead, a 45 degree bend is provided with a 6 inch length of Z bar parallel to the main reinforcing bars.

The applicant stated during the June 20, 1984 meeting that the Z bars were not needed since the annulus volume between the Shield Building wall and the steel containment shell is filled with concrete. The concrete is 25 feet deep and produces a reduction in the thermal gradient with its accompanying reduction in the radial shear. The applicant concluded that the existing design is acceptable. However, before the staff can reach a conclusion the following four additional pieces of information are required.

The following four items are:

1. As stated by the applicant during the Bethesda meeting the demand for shear reinforcing was reduced when the concrete fill between the Shield Building and the containment steel shell was provided which resulted in a reduction in the design temperature from 195 degrees F. to 150 degrees F. The calculations pertaining to the redefinition of the temperature gradient and resulting thermal loads should be summarized and provided to the staff for review.

2. The required reinforcing bar area  $A_v$  prior to the addition of the concrete of the concrete fill was shown by the applicant to be equal to .569 square inches. Calculations pertaining to the determination of the required area before and after the concrete fill was added, should be provided to the staff for review.
3. Explain how the critical section or sections were determined including the rationale for assuring the most critical sections were evaluated.
4. Provide the results of the evaluation for loads on Shield Building wall at the top of the annulus fill concrete at elevation 95'-0".

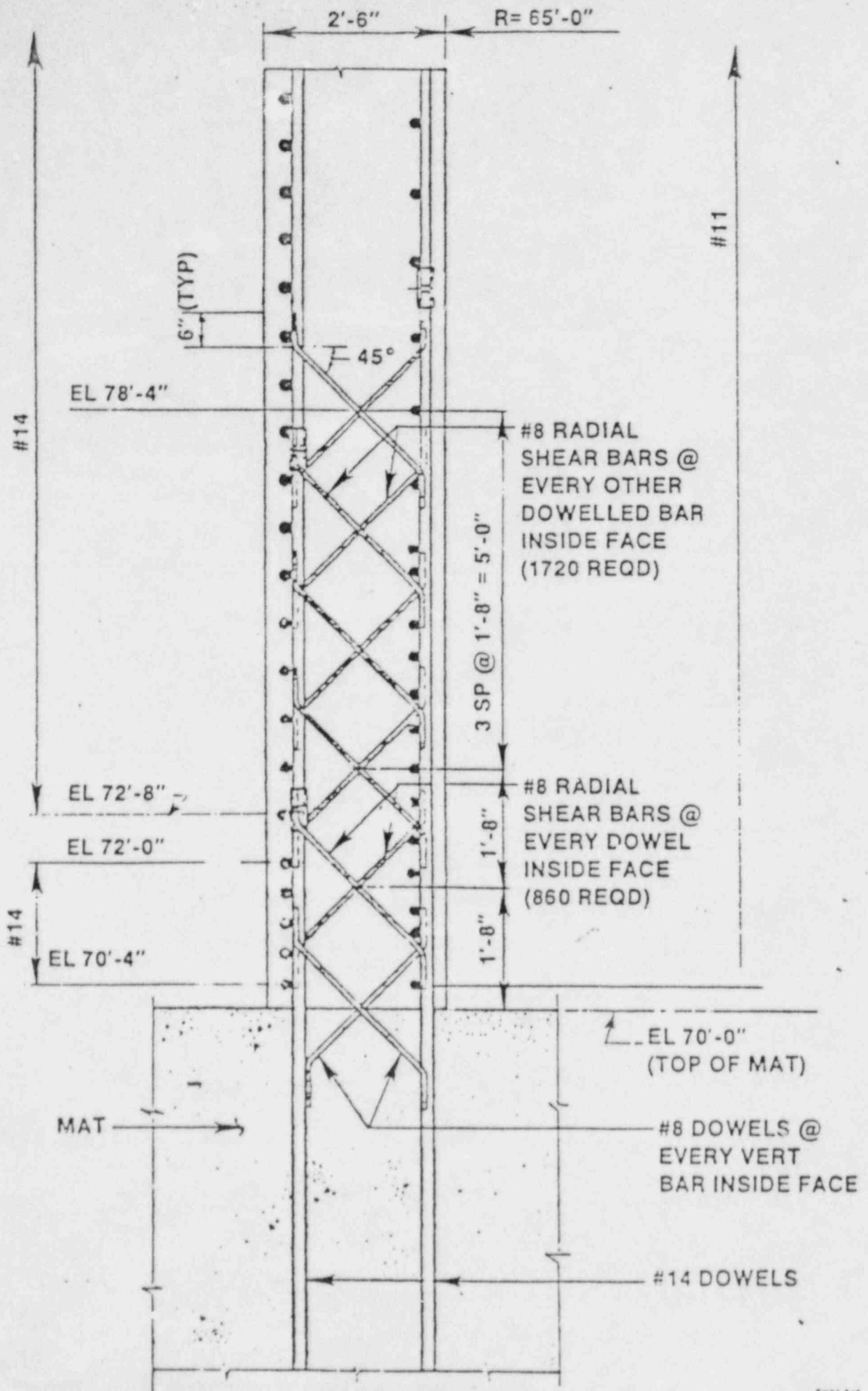


FIGURE 1



River Bend Station

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