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MIDLAND PROJECT
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IE BULLETIN 79-02, REVISION 2
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- References:
1. S H Howell to J G Keppler, Serial 7234, Howe 195-79, dated July 3, 1979
 2. S H Howell to J G Keppler, Serial 7433, Howe 223-79, dated August 15, 1979
 3. S H Howell to J G Keppler, Serial 7649, Howe 260-79, dated September 28, 1979

We have reviewed IE Bulletin 79-02, Revision 2 on the subject of "Pipe Support Base Plate Designs Using Concrete Expansion Anchor Bolts" against the Midland Plant Unit 1 and 2 design. Attached are three (3) copies of the results of that review which address Items 5 and 6.

We have also reviewed the revised (R2) sections of Items 2 and 4 of the subject bulletin and verified that no changes to our previous responses provided in References 1, 2 and 3 are required.

SHH/jm

CC: Director, NRC Office of Inspection & Enforcement
Director, Nuclear Reactor Regulation

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RESPONSE TO IE BULLETIN 79-02, REVISION 2
ITEMS 5 AND 6Question 5

Determine the extent that expansion anchor bolts were used in concrete block (masonry) walls to attach piping supports in Seismic Category 1 systems (or safety related systems as defined by Revision 1 of IE Bulletin No. 79-02). If expansion anchor bolts were used in concrete block walls:

- a. Provide a list of the systems involved, with the number of supports, type of anchor bolt, line size, and whether these supports are accessible during normal plant operation.
- b. Describe in detail any design consideration used to account for this type of installation.
- c. Provide a detailed evaluation of the capability of the supports, including the anchor bolts, and block wall to meet the design loads. The evaluation must describe how the allowable loads on anchor bolts in concrete block walls were determined and also what analytical method was used to determine the integrity of the block walls under the imposed loads. Also describe the acceptance criteria, including the numerical values, used to perform this evaluation. Review the deficiencies identified in the Information Notice on the pipe supports and walls at Trojan to determine if a similar situation exists at your facility with regard to supports using anchor bolts in concrete block walls.
- d. Describe the results of testing of anchor bolts in concrete block walls and your plans and schedule for any further action.

ResponseInvestigation of Expansion Anchors in Block Walls

Expansion anchors will be utilized to support field run small Seismic Category I piping on block walls.

- a. A listing of systems, number of supports, type of anchor bolts, line size, and accessibility is not available because the routing of these pipes is not established at this time. Approximately 500 attachments will be made to block walls, primarily in the auxiliary building between elevations 610' and 640'.

For pipe supports not yet installed, the 'block wall permit' provides the necessary documentation and approval required prior to installing expansion anchors in block walls.

- b. Block wall attachments will be used only if there is no other feasible alternative for support. The specification for expansion anchors (Attachment 1) limits the loads to 400 pounds per bolt when two bolts are installed in the same block or 600 pounds per bolt when one bolt is installed in the block. The bolt size is limited to a 5/8-inch diameter anchor and has a minimum embedment of 4 inches located in the center of the grouted cell.
- c. The concrete block walls are designed using the ultimate strength method described in ACI 318-71, using the weakest masonry element for concrete strength. This acceptance criteria is consistent with Subsection 3.8.4 of the FSAR.

The loading combinations are consistent with the criteria of FSAR Subsection 3.8.4 for reinforced concrete structures, which include tornado differential pressure and seismic loadings. Loads due to thermal and dynamic effects are considered when applicable.

Allowable design loadings for block walls are given in Drawing 7220-C-2050(Q) (Attachment 2), and are applicable for expansion anchors, grouted anchors, or through bolts.

The following procedures are followed for design of block walls in Drawing 7220-C-2050(Q). Block wall capacities are checked against acceptance criteria for three types of loadings.

- Case 1. Wall frequencies were determined with concentrated loads at critical locations on the wall. From this frequency, a response acceleration was determined. Wall stresses were calculated using this acceleration.
- Case 2. Wall stresses were determined for a vertical load acting 12 inches from the face of the wall.
- Case 3. Wall stresses were determined for a horizontal force acting normal to the wall.

The loads on each specific wall were reviewed and checked for interaction as described in Drawing 7220-C-2050(Q).

- d. A testing program was conducted at the jobsite and verified the acceptability of the expansion anchor design loads used in block walls. Because this testing program verified the adequacy of the loads, no further testing program is planned. However, inprocess testing of expansion anchors will continue in order to verify the installation of the anchors.

Question 6

Determine the extent that pipe supports with expansion anchor bolts used structural steel shapes instead of base plates. The systems and lines reviewed must be consistent with the criteria of IE Bulletin No. 79-02, Revision 1. If expansion anchor bolts were used as described above, verify that the anchor bolt and structural steel shapes in these supports were included in the actions performed for the Bulletin. If these supports cannot be verified to have been included in the Bulletin actions:

- a. Provide a list of the systems involved, with the number of supports, type of anchor bolt, line size, and whether the supports are accessible during normal plant operation.
- b. Provide a detailed evaluation of the adequacy of the anchor bolt design and installation. The evaluation should address the assumed distribution of loads on the anchor bolts. The evaluation can be based on the results of previous anchor bolt testing and/or analysis which substantiates operability of the affected system.
- c. Describe your plans and schedule for any further action necessary to assure the affected systems meet Technical Specifications operability requirements in the event of an SSE.

ResponseStructural Steel Shapes Used for Base Plates

Pipe supports using structural shapes for base plates comprise less than 5% of the total number of base plates. These supports are utilized for small piping with small loads. Design of these anchor bolts and corresponding structural supports is in accordance with the response to IE Bulletin 79-02, Rev 1. Procedures followed for installation, testing, and inspection are in accordance with specification requirements (Attachment 1).