



Docket No. 50-346

License No. NPF-3

Serial No. 1-137

June 16, 1980

RICHARD P. CROUSE
Vice President
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(419) 259-5221

Mr. James G. Keppler
Regional Director, Region III
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Dear Mr. Keppler:

IE Bulletin No. 79-14, dated July 2, 1979, requested that we develop and implement an inspection program to verify that the Davis-Besse Nuclear Power Station Unit 1 seismic analysis input of safety related piping systems conforms to the actual field conditions.

On October 19, 1979, we submitted to you the results of our detailed engineering reviews for normally accessible safety related piping. As part of that submittal, we transmitted our schedule for follow-on analytical work required under Item No. 4B of the Bulletin. On March 25, 1980, we submitted a revised schedule for the above follow-on analytical work. Attached is a description of the results of our follow-on analysis of the identified discrepancies for normally accessible safety related piping in accordance with Item No. 4B of the Bulletin.

Yours very truly,

A handwritten signature in cursive script, appearing to read 'R. Crouse'.

RPC:CLM

db d/l

cc:
U.S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Division of Reactor Operation Inspection
Washington, D.C. 20555

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Seismic Analysis For As-Built
Safety Related Piping Systems

Response to NRC IE Bulletin No. 79-14

Davis-Besse Nuclear Power Station Unit 1

I. INTRODUCTION

NRC IE Bulletin 79-14, dated July 2, 1979, Revision 1, dated July 18, 1979, Supplement 1, dated August 15, 1979, and Supplement 2, dated September 7, 1979, required all power reactor facility licensees to verify that the seismic analysis of safety-related piping systems applies to the actual as-built configuration of systems. The action items identified in the Bulletin apply to all safety-related piping, 2-1/2 inches in diameter and greater, and to Seismic Category I piping, regardless of size, which was analyzed by computer.

The response to Item 1 of the Bulletin was submitted on August 1, 1979 (Serial No. 1-81). A response to Item 2 of the Bulletin was submitted on October 1, 1979 and October 19, 1979 (Serial Nos. 1-93 and 1-95). The October 19, 1979 submittal also contained a partial response to Item 4 of the Bulletin. The partial response included the evaluation of the identified nonconformances upon system operability and an estimated date for completion of the reanalysis of the piping and supports for the normally accessible systems. On March 24, 1980 (Serial No. 1-121), a status report on the progress of the reevaluation effort for the accessible piping was submitted, along with the revised estimated completion date and the schedule for the submittal of the results of the reanalysis.

This report provides a partial response to Item 4 of the Bulletin, describing the results of the normally accessible piping stress reanalysis incorporating the as-built configuration of the piping and support systems.

II. Review of Inspection and Results

Inspection of all normally accessible safety-related piping as defined in the Bulletin, including both redundant trains, was performed as described in our response to Item 1 of the Bulletin. The inspection teams began the walkdown inspections at the site on July 30, 1979 and completed the effort on September 21, 1979. Clearances for all whip restraints on accessible piping were checked during the April 1980 refueling outage and have been found to have no affect on the stress analysis. Preliminary evaluation and detailed engineering reviews were completed in accordance with Supplements 1 and 2 of the Bulletin. Discrepancies identified by both the inspection team and the stress analyst were tabulated and shown in Attachment 1 to the October 19, 1979 submittal. These reviews supported the preliminary evaluation that the operability of safety-related systems were unaffected.

III. Description of Stress Reanalysis and Results

In Attachment I to the October 19, 1979 submittal, it was anticipated that 89 of the 220 original stress calculations would require complete computer reanalysis. An additional 98 of the 220 stress calculations were to require a simple hand calculation to resolve the discrepancies, and 33 calculations did not require any piping reanalysis. During the course of the reanalysis effort, a number of stress calculations were re-evaluated by the stress analyst based on the results of the calculations performed thus far and it was determined that a more extensive computer analysis would be required. As a result, the reanalysis consisted of a total of 150 stress calculations which were completely computer reanalyzed, an additional 40 stress calculations which were resolved by means of a simple hand calculation, and 30 calculations which required no reanalysis.

None of the 190 stress calculations reanalyzed required the rerouting of any piping. Several of the stress calculations did require the addition or relocation of a support. However, the vast majority of the stress calculations, that were reanalyzed, only revised the calculated load transmittal to the existing supports.

IV. Support Reanalysis and Modifications

Pipe supports/anchors on the accessible safety-related piping, as defined by the bulletin, were reanalyzed for two different reasons. The piping system stress calculation reanalysis generated revised support loads that were higher than the original design loads or the inspection identified discrepancies that existed between the design drawings and the as-built configuration. In the first case, the supports were reanalyzed for the higher loads and, in the latter, an analysis was performed to verify the adequacy of the support.

Both of these cases combined have generated structural reanalysis for a total of approximately 1000 supports and anchors out of the total of 2500 on the accessible piping. Of this 1000, approximately 210 supports/anchors have been identified as requiring some modification to the structure to either return it to its design condition or to modify it to accommodate its new loading condition.

These modifications can be classified into three categories:

1. a minor revision
2. a moderate change or addition, and
3. a major structural rework or complete redesign of the support.

Typically, minor revisions consist of the replacement of a missing weld or the addition of a small stiffener or gusset plate. Such minor modifications comprise approximately 48 percent of the total number of support modifications.

The moderate change or addition includes, for example, the replacement of a baseplate or the addition of a brace or kicker to the support structure. Modifications in this category would not require the complete dismantling of the support but would rather affect only a portion of the structure. Approximately 43 percent of the support modifications fall in this category.

The addition of a pipe support/anchor or the redesign or relocation of the entire support is considered a major modification. Such major modifications consist of approximately 9 percent of the total number of support/anchor rework.

In addition, some structural redesigns were due to a lack of consideration of the location of the building seismic joint in the design process. Fourty-four (44) supports and one (1) anchor were redesigned so that the differential seismic movement of separate building areas would not have to be considered in either the piping stress calculation or in the structural analysis of the support/anchor.

V. Schedule for Completion of Support Modifications

As stated previously, approximately 210 pipe supports/anchors have been identified as requiring some modification to the structure. At this time, work packages for 67 supports/anchors have been issued providing the engineering design required to make the field modification. The remainder of these design modifications are in some stage of the engineering design cycle. The remaining work packages are being given expeditious treatment and the projected completion date for issue of the last package is November 1, 1980.

Based on this engineering schedule, implementation of the work packages in the station is expected to be complete by March 1, 1981.

VI. Schedule for Issue of As-Built Drawings

The current schedule for completion of as-built drawings for piping supports/anchors located on accessible safety-related piping is July 1, 1981.

VII. Conclusions

IE Bulletin 79-14 inspection of the normally accessible piping did uncover minor discrepancies between the design and the as-built configuration of the piping and supporting systems. The affect of these discrepancies has been evaluated in detail and the preliminary conclusions made in our October 19, 1979 response are still valid, that, no deficiency has been discovered that would have adversely affected the operability of any safety-related system.