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Dalwyn R. Davidson
VICE PRESIDENT
SYSTEM ENGINEERING AND CONSTRUCTION

April 15, 1982

Mr. A. Schwencer
Chief, Licensing Branch No. 2
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Perry Nuclear Power Plant
Docket Nos. 50-440; 50-441
"Fast Scram" Hydrodynamic
Loads on Control Rod Drive Systems

Dear Mr. Schwencer:

This letter is provided in response to your request for information dated March 29, 1982, regarding hydrodynamic loads on the Control Rod Drive (CRD) system.

In a letter dated March 11, 1982, to Mr. James G. Keppler, Director Region III, we identified possible deficiencies in the stress analysis for the CRD piping system, in accordance with 10 CFR 50.55(e). Hydrodynamic loads due to "fast scram" valve operation were not considered in the original CRD system piping stress analysis and pipe support design. Evaluation of these loads resulted in stresses in excess of ASME III Code Class 2 allowable stress limits on the CRD insert and withdrawal piping. As a result modifications to socket weld joint configurations have been implemented and modifications to piping supports are planned to eliminate the overstressed condition. These support modifications are thought to be minor; however, the details of these design modifications are not yet final.

In response to your specific requests, we offer the following information:

1. The above referenced evaluation was based on the use of 20 millisecond as an effective opening time for the scram valves.

2. An evaluation was performed of the hydrodynamic loads in the CRD system resulting from a valve actuation

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using the 20 millisecond effective opening time. This initial evaluation indicated ASME III Code Class 2 allowable stress limits were exceeded for both piping and supports. A subsequent evaluation has been conducted, following the weld configuration modifications identified above which eliminated the overstressed condition on the piping.

3. The "worst case" situation resulting in maximum hydrodynamic loads in the CRD system would be a scram during the start-up phase of the plant with no pressure in the reactor vessel. This cold scram condition was used as a basis in the above referenced evaluation.

4. The mathematical model used to calculate the hydrodynamic loads in the CRD system is based on RELAP-5 and conservatively represents the actual system condition. Investigations are continuing in an effort to refine the analysis and reduce the impact on pipe support modifications.

5. A comparison of existing design basis to the hydrodynamic loads evaluated in Item 2 above results in stresses in excess of ASME III allowables for certain piping supports. Support modifications, which are not yet finalized, will be implemented to eliminate the overstress condition for the piping supports.

It is expected that all investigations and design modifications will be completed by July 1, 1982. The proposed plan for structurally reinforcing the affected supports will be provided at that time.

In any event, the allowable stress limits of ASME III Code Class 2 will be met for the CRD system insert and withdrawal piping.

If you require any further information, please let us know.

Very Truly Yours,

Dalwyn R. Davidson

Vice President
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