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June 20, 1977

Mr. Robert L. Tedesco
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Tedesco:

We have reviewed and evaluated the report, "Crosby Relief Valve Loads Tests - Test Plan" (NEDM-20988). The results of this review, in the form of comments and questions, are attached.

The review was conducted by Dr. Chee Tung, in collaboration with our consultant, Professor Peter Huber of M.I.T.

Sincerely yours,

George Maise

George Maise, Group Leader
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GM/dt
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INTERNAL WORKING DRAFT

Draft of Formal Questions to be

Submitted to G.E. on "Caorso Relief Valve

Loads Tests - Test Plan"

June 1, 1977

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1. The objectives of the Caorso test are to accumulate test data for SRV quencher devices in Mark-II containment. But the test matrix that has been chosen has not been motivated or justified on the basis of already available large-scale quencher data. It is not shown how the Caorso tests are expected to repeat, extend, or otherwise add to the existing data base. More specifically, the report does not describe how the tests on sequential actuations and changes in discharge line initial conditions will tie in with the trends already demonstrated in full-scale tests. The information as provided is not sufficient to allow a complete evaluation. Additional information is required as follows.

. What are the data trends expected in each run and will the tests provide unambiguous evidence of these trends?

. Three discharge times, 2, 5, and 15 sec, have been selected for first actuations. Will these three times be sufficient to document load trends in first pops associated with varying discharge times?

. It is known that loads are expected to increase in sequential valve actuations. The discharge time of each actuation as well as the interval between actuations is thought to be important. Will the sequential actuations proposed in the test matrix adequately demonstrate the importance of each of these factors?

. Will the data from the proposed matrix be sufficient to allow a clear prediction of the maximum loads that may be expected?

2. The previous large-scale quencher test data (NEDO-11314-08) exhibited a very high degree of scatter. The Caorso test matrix indicates that most of the condition of interest will be repeated only once. Is the choice of tests sufficiently redundant? Clearly, there must be a balance between a limited number of redundant tests and a large number of tests designed to explore a greater range of discharge conditions. Is the proposed matrix an optimum choice in this regard?

3. Relief valve tests on the Caorso Plant are proposed as part of the Mark-II long term program. Caorso is the first BWR plant utilizing a Mark-II containment and also the first GE BWR plant to incorporate the quencher. It presents the first opportunity for GE to obtain full-scale data on air clearing loads with a quencher device. Therefore, it is requested that there be a discussion of the proposed tests in the perspective of the overall quencher load problem. More specifically, are the initial conditions (in the case of sequential actuations) or the boundary conditions (in the case of multiple actuations) that are to be tested at Caorso reasonably typical of those expected in Mark-II plants in general? The possible variations, from plant to plant, in discharge line initial conditions, the possibility of leaking SRV's in one or more discharge lines, etc. must be addressed.

4. It is known from available quencher data that the subsequent actuations generate higher hydrodynamic loads on the surrounding structures than the first actuations. There are many factors involved which could affect the hydrodynamic loads. On page 4-6 it is remarked that a complete understanding of the phenomena requires data on pool temperature in the vicinity of the quencher, pipe temperature and pressure following valve closure, flow rate of air through the vacuum breaker and dynamics of back flow of water. The staff agrees that the air temperature history inside the pipe could be important. No sufficient information has been given in the test plan regarding the measurement of air temperature in the pipe. We require clarification on what measurements or calculations will be made to monitor this temperature.

5. There are six flow probes to be located in vertical array (see page 5-18 for details) with three sensing elements pointing directly toward quencher A and three directly away. Are they sufficient to map the velocity field in the pool or to identify all velocities of significant interest?

6. The sensor failure rate is quite high in the Monticello Plant test program (about 14% failure and 17% under suspicion). The sensors of the same manufacturer and model number used in the Monticello Plant will also be used in the Caorso Plant. Will there be sufficient redundancy to insure that all necessary measurements will be obtained as planned?