UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAR 27 1980

MEMORANDUM FOR: Harold R. Denton, Director
Office of Nuclear Reactor Regulation

FROM: Robert J. Budnitz, Director
Office of Nuclear Regulatory Research

SUBJECT: RESPONSE TO REQUEST FOR CONFIRMATORY RESEARCH RELATED TO THE BEHAVIOR OF SAFETY AND RELIEF VALVES AND ASSOCIATED BLOCK VALVES (RR-NRR-80-01)

This memorandum is in response to your request, designated NRR-80-01, asking the Office of Nuclear Regulatory Research to undertake a program to fulfill the information needs described in the research request.

The program requirements were sent to Department of Energy Laboratories with a request for an expression of interest from them to be the RES contractor to overview the industry safety and relief valve research program. Following the review and evaluation of the eight responses, INEL has been selected as the system integrator (overview contractor).

A draft workscope is enclosed. This workscope is essentially the program requirements and information needs from your research request.

The purpose of the systems integrator is to:

1. Act as a focal point for collection of all data that would contribute to the information needs.

2. Review the industry programs, including detailed reviews of the test facility instrumentation, test procedures, and test conditions, to ensure that the tests will adequately demonstrate operability of the valves.

3. Review methods of analysis used by the industry to interpolate test results to other untested pipe and valve configurations.

4. As required, provide independent analysis using existing critical flow models and system codes.

With your concurrence, we propose to have INEL start immediately. They will monitor the EPRI program for pressurizer safety and relief valve as well as the program being formulated by the BWR owners group for BWR safety and relief valves.

If you agree with the approach described above and the scope of work enclosed, please indicate by signing the appropriate signature block and returning a copy to me.

Bob Budnitz

Robert J. Budnitz, Director
Office of Nuclear Regulatory Research

Enclosure: Workscope

I agree, the research project described above is responsive to NRR's request for confirmatory research.

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

SCOPE OF WORK

TITLE: BEHAVIOR OF SAFETY AND RELIEF VALVE ASSOCIATED BLOCK VALVE AND PIPING

NRC TECHNICAL MONITOR: M. D. STOLZENBERG

PRINCIPAL INVESTIGATOR: D. HALL

OBJECTIVE:

ENSURE THAT INDUSTRY SAFETY AND RELIEF VALVE TEST PROGRAMS AND ANALYTICAL TECHNIQUES DEMONSTRATE THE ADEQUACY OF PRIMARY SYSTEM SAFETY AND RELIEF VALVES AND ASSOCIATED BLOCK VALVE AND PIPING.

THE WORK TO ACCOMPLISH THE OBJECTIVES SHOULD INCLUDE:

1. MONITOR INDUSTRY TEST PROGRAMS TO ENSURE THAT THE LICENSING REQUIREMENT ISSUED AS A RESULT OF THE TMI LESSONS LEARNED SHORT-TERM RECOMMENDATIONS WOULD BE SATISFIED BY THE TESTS. THIS SHOULD INCLUDE THE FOLLOWING:

   A. REVIEW PROPOSED TEST PROGRAMS TO ENSURE TESTING WILL PROVIDE INFORMATION TO DEMONSTRATE FUNCTIONABILITY OF SAFETY AND RELIEF VALVE SYSTEMS FOR TWO PHASE AND PURELIQUID DISCHARGES.

   B. DETERMINE WHETHER ADDITIONAL TEST DATA COULD BE OBTAINED FROM INDUSTRY TESTS TO PERMIT VERIFICATION OF CALCULATIONS OF (3) AND (4) BELOW.

   C. MONITOR AND EVALUATE TESTING AND COLLECTION OF DATA.

   D. MONITOR AND EVALUATE APPLICATION OF TEST DATA TO EXISTING VALVES AND SYSTEMS OTHER THAN SPECIFIC APPLICATION TESTED.

2. IDENTIFY ANY EXISTING MODEL(S) THAT COULD BE USED TO DESCRIBE THE FLOW THROUGH SAFETY AND RELIEF VALVES AS AFFECTED BY THE DYNAMICS OF VALVE DISC MOTION. THIS SHOULD INCLUDE STEAM, TWO PHASE, AND SUBCOOLED WATER DISCHARGE CONDITIONS.

3. COMPARE CALCULATIONS WITH EXPERIMENTAL DATA FROM THE TESTS IN U.S. AND ABROAD. (INDUSTRY IS DOING THIS; NRC TO AUDIT AND SUPPLEMENT IF NEEDED.)

4. MODIFY MODELS AS DATA ARE DEVELOPED AND COMPARE WITH CALCULATIONS.

5. VERIFY THE HYDRAULIC LOAD CALCULATIONS IN THE VALVE ASSOCIATED PIPING AND SUPPORTS FOR BOTH STEADY-STATE AND TRANSIENT TESTS.

6. CLASSIFY POTENTIAL VALVE FAILURE MODES ASSOCIATED WITH VALVE OPERATION.

7. MONITOR AND EVALUATE TEST DATA FOR FOREIGN FACILITIES FOR APPLICATION TO INFORMATION NEEDS.

8. DETERMINE NEED FOR ADDITIONAL TESTING DEPENDING UPON PROJECTED RESULTS OF U.S. AND FOREIGN TESTS.

9. IDENTIFY POSSIBLE CORRECTIVE MEASURES IF FAILURE MODES ASSOCIATED WITH VALVE OPERATION ARE DISCOVERED.