

NINE MILE POINT UNIT 1 NUCLEAR POWER PLANT  
REVIEW OF PIPING REANALYSIS PER I&E BULLETIN 79-07  
SAFETY EVALUATION REPORT

INTRODUCTION

By letters dated April 25, 1979 and June 12, 1979 the licensee (Niagara Mohawk Power Corporation) responded to Inspection and Enforcement (I&E) Bulletin 79-07 (dated April 14, 1979) for Nine Mile Point Unit 1 Nuclear Power Plant. Seven systems located inside containment were identified as having been designed using an incorrect piping computer code. These systems have been reanalyzed with a code which uses acceptable seismic response combination techniques and the new results showed that piping stresses remained within code allowable (ASA B31.1, 1955) and that piping supports, penetrations, nozzles and equipment loadings remained within original design conditions.

DISCUSSION

The affected systems identified by the licensee are:

- A. Reactor Recirculation
- B. Shutdown Cooling
- C. Emergency Condenser Returns
- D. Reactor Cleanup
- E. Reactor Drain
- F. Reactor Feedwater
- G. Control Rod Drive

NMPC has stated that the method of algebraic (considering signs) summation of the codirectional spatial components was used for the original analysis of safety related piping systems as identified above at Nine Mile Point Unit 1 during 1972. The computer code used was the 1972 Version of ADLPIPE Code.

The licensee has indicated that the following computer codes were used in the reanalysis of these systems.

- . ADLPIPE - Teledyne Engineering Services (TES)
- . TMRSAP - Teledyne Engineering Services (TES)

TES has stated that it used a version of ADLPIPE, dated 1975, thru the CDC Cybernet system.

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This code was used to generate responses to the individual seismic excitation components. The modal response due to each excitation were combined (internally) by the SRSS method; these responses were then combined externally (manually) also by the SRSS method. Since the combination of the responses to the earthquake components is performed externally, TES has not been requested to submit the Fortran listing of this version of ADLPIPE; they have, however, described their method of combination and have committed to solve a set of NRC generated benchmark problems as part of the code or technique verification effort. We find this commitment acceptable.



TES has also stated that it used the code TMRSAP. This is a proprietary version of the code SAP IV which uses absolute summation for the intramodal components and SRSS for the intermodal components. No modifications were made to the dynamic response portion of the code. In addition, a set of NRC benchmark problems are presently being solved by TES as part of the code verification effort.

NMPC has indicated that the company, in conjunction with an Inspection and Enforcement inspector, verified that the drawings accurately depicted the as-built condition of the plant.

The licensee has stated that with the exception of the cleanup system discharge, all of the piping systems identified above were reanalyzed in April 1979 using the updated ADLPIPE computer code. The results of these reanalyses show that stresses of all piping remain within code allowable ranges and the strength of structural attachments is within the design conditions.

The licensee has also stated that in late 1978 through early 1979, seismic analysis was performed for the re-route of the Cleanup System discharge to the Feedwater System by Teledyne Engineering Services using the TMRSAP Code. The TMRSAP Code calculated the earthquake component effects simultaneously. For each mode codirectional components were added absolutely after which modal values were combined by the Square Root of the Sum of Squares method. This code will be verified as part of the NRC Code verification effort.

The licensee has indicated that the relatively minor increased stress levels at certain points in the reanalyzed piping lines has no effect on their pipe break analysis.

The NMPC's response to I&E Bulletin 79-02 states that the reanalysis has resulted in stress increases at ten restraints. These restraints have been reanalyzed and found acceptable to support the increased loads. Since the restraints where loads have increased are not supported by concrete anchor bolts, the reanalysis has no effect on the testing and inspection performed under I&E Bulletin 79-02.

In response to I&E Bulletin 79-04 the licensee has indicated that no VELAN swing check valves are installed in Seismic Category I piping systems at Nine Mile Point Unit 1.

#### EVALUATION

The reanalysis method used was a lumped mass response spectra modal analysis. The majority of piping systems reanalyzed used Regulatory Guide 1.92 for the combinations of modal responses and spatial components. This dynamic analysis procedure is acceptable. The procedure used for the clean-up system discharge to the Feedwater System is also acceptable.

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For the seven systems of concern the licensee utilized the computer codes as is, discussed above. In addition to satisfying the code verification requirements, the licensee has also agreed to provide the NRC two problems for confirmatory analysis

These confirmatory problems will be solved independently by consultants to the NRC at Brookhaven National Laboratory. The models submitted for these piping problems will be confirmed by the licensee as corresponding to the "as-built" condition. We find these commitments acceptable.

We find the licensee's responses concerning I&E Bulletin 79-02 and 79-04 acceptable for the piping systems reanalyzed. The reanalysis has no effect on Nine Mile Point Unit 1 pipe break criteria for the piping systems involved.

#### CONCLUSION

Based on the discussion and evaluation presented above, we conclude that the requirements set forth in I&E Bulletin 79-07 are adequately satisfied to allow resumption of power operation provided that the information necessary for code verification be provided within 30 days of unit startup.