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Docket No: 50-220

Niagara Mohawk Power Corporation
ATTN: Mr. Gerald K. Rhode
Vice President - Engineering
300 Erie Boulevard West
Syracuse, New York 13202

Gentlemen:

RE: NINE MILE POINT NUCLEAR STATION, UNIT 1

Your letter dated July 31, 1975, referenced a report entitled, "Mark I Containment Status Report", dated July 31, 1975, prepared by the General Electric Company (GE). Based on our review of the GE status report, we find that we need additional information to complete our evaluation. The information required is listed in the enclosure.

For your information, a copy of the enclosure was sent by telecopy to Mr. T. Keenan, Yankee Atomic Electric Company (Mark I Owners Group coordinator) on September 9, 1975. In addition, most of the concerns listed in the enclosure have been the subject of discussions between the NRC staff and GE. It is anticipated that the responses to the enclosure will be presented in the final report of the Mark I short term program scheduled to be issued at the end of September, 1975, with the exception of the two items noted as long term program items.

Please contact us if there is any additional information needed regarding our request.

This request for generic information was approved by GAO under a blanket clearance number B-180225 (R0072); this clearance expires July 31, 1977.

Sincerely,

/S/

George Lear, Chief
Operating Reactors Branch #3
Division of Reactor Licensing

Enclosure:
Request for Additional Information

OFFICE	ORB#3	ORB#3				
SURNAME	JGuibert:kmf	GLear GL				
DATE	9/25/75	9/25/75				

Niagara Mohawk Power Corporation - -

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MARK I CONTAINMENT
STATUS REPORT
JULY 31, 1975

STRUCTURAL ENGINEERING QUESTIONS AND POSITIONS

1. On Page 1 of the report a statement is made that "the Mark I containments will maintain their function during the most probable course of the LOCA event or during S/R valve discharge".

   a. The expression "most probable course of LOCA event" should be defined and justification should be provided to substantiate the exclusion or reduction in magnitude, if any, of individual or combined LOCA effects if the "most probable course..." is less severe than the worst possible LOCA event.

   b. The bases for the exclusion of S/R valve discharge loads from the short term program have not been presented in this report.

      Provide a thorough discussion of S/R valve discharge loads and address the following points:

      1) the possibility of combining S/R valve loads with other pool dynamic loads,

      2) the possibility and structural consequences of the S/R valve discharge loads occurring near the end of a LOCA event after a rise in pool temperature,

      3) the negative pressure-resisting capability of various structures designed primarily for positive pool pressure, including the liner plate of concrete Mark I containments,

      4) the possibility of exciting the resonant frequency of the ovaling or breathing modes of the torus, or other dynamic modes of other structures within the pool,

      5) during the life of the plants the number of oscillations anticipated to occur above and below the elastic limit, with a supporting low cycle and high cycle fatigue analysis for affected structures, and (long term program item)

      6) the load-resisting capability of various structures when subjected to a LOCA near the end of the plant life after numerous cycles of S/R valve discharge loads (long term program item).

2. The results and conclusions presented in items "a", "b" and "c" at the top of Page 4 are not substantiated in the report. The mathematical models and methods of analysis for items "a" and "b" are briefly discussed in the letter from G. L. Gyorey to R. Maccary dated June 26, 1975. The structural capability of the ring header and vent pipes after failure of the column assembly has not been provided in either report. For all structural analyses referenced in the short term program provide the following:

   a. a description of the mathematical model used in the analysis including justification for the boundary conditions and a discussion of the computation of rotational and translational spring constants,

   b. a description of the methods of analysis employed, including reference to established computer codes, types of elements used, inclusion of shear deformations, and non-linearities,

   c. a justification for simplifying assumptions made in the analyses,

   d. the bases for input load data and material properties, and

   e. a presentation of results and conclusions which include

      1) location and magnitude of excessive stresses or deformations for critical elements, and

      2) the justification that such excessive stresses will not result in loss of function of the containment or other sfaety-related systems. Include the strain rate effects, the acceptable ductility ratios, the margins of safety, the degree of conservatism, physical tests, crack control, effects on leaktightness, ... etc.

3. A discussion of the five basic groupings of Mark I plants is presented on Page 5 and detailed in Table 1. Describe the bases for selecting the typical plant from each group for an in depth analyses.

4. Full scale hardware tests and strain rate material tests are referred to within the report. Describe the test procedure, detail simplifying assumptions, compare the material used for the test with that used in the plants, justify the use of static tests for dynamic and cyclic loading phenomenon, and compare the test results with static finite element analyses.

5. On Page 12 and 13, the fundamental frequency of the ring header assembly is specified as 20 HZ. Provide the details and procedures of analysis which lead to the establishment of this value. Can higher modes of the ring header assembly, its component parts or other structures within the torus be excited by pool dynamic loads?

6. For the downcomer lateral load analyses, specify the number of cycles expected to result in the inelastic behavior of any element of the downcomer-header assembly and justify the integrity of this assembly by performing a low cycle fatigue analysis.

7. Present diagrams which detail the distribution of the resultant downward and upward forces on the torus, presented on Page 17. In the analysis of torus supports the following should also be considered: seismic loads in combination with dead, live and pool dynamic loads; the integrity of lateral bracing, diagonals, etc.; column buckling; and the integrity of the stiffening ring and column connections.

8. "Acceptable strain limits" are referred to on Page 17. Define these limits and justify their use for both steel and reinforced concrete axial, shear and bending deformations.

9. The special considerations of subparagraph NE 3131.2 of Subsection NE of the ASME B & PV Code, Section III, restrict yielding to localized areas. Specify those pool dynamic loads which produce only such local yielding.

10. In the section entitled "Screening Analysis" on Page 18 several "insignificant" loads are listed. Specify whether or not any of these loads could occur in combination with the primary significant pool dynamic loads and, if so, what would be their percentage contribution.

11. On Page 18 a statement is made that "Vent headers can handle fallback loads even if lateral columns are assumed to buckle". Provide a description of the analysis which technically supports the above statement. Include a discussion of the buckling analysis of these columns. In addition, demonstrate that after the potential failure of these columns due to fallback loads, the remainder of the LOCA loads can still be resisted.

12. In support of the data presented on the screening analysis, provide justification and sketches for any element in which stresses exceed the elastic limit, in particular, the vacuum breakers and the relief valve line over the pool. Specify the safety and seismic classification of these elements and provide justification that the failure of the element would not cause loss of either the containment or the emergency core cooling system function.

13. On Page 20, a comparison of other plants to the reference plant assumed a parabolic pressure time pulse with a peak of 17 psi and a duration of 20 milliseconds. Justify these values in light of the apparent discrepancy with data presented on Page 13.

14. Provide justification for the use of a dynamic load factor of 1.3 and a dynamic allowable stress increase factor of 1.4 as presented in the comparison of other plants to the reference plant, pages 20 and 23.

15. Provide a discussion of the analysis of the vent pipe bellows assembly which demonstrates its integrity when subjected to large deformations perpendicular to its axis of primary expansion.