

# GENERAL ELECTRIC

NUCLEAR ENERGY  
DIVISION

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ATOMIC POWER EQUIPMENT  
DEPARTMENT

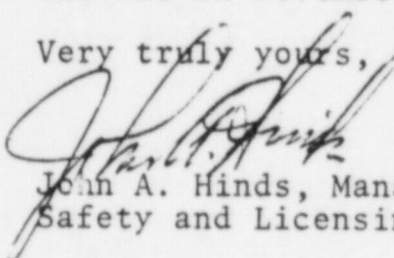
18 December 1972

Mr. Donald J. Skovholt  
Assistant Director for  
Reactor Operations  
1717 H Street N. W.  
U. S. Atomic Energy Commission  
Washington, D. C. 20545

Dear Mr. Skovholt:

Enclosed is a copy of the detailed outline for a report on the torus suction header. This is being forwarded in accordance with the commitment made at our meeting with the AEC on November 2, 1972.

Very truly yours,

  
John A. Hinds, Manager  
Safety and Licensing

mgm  
attachment

8705050249 870428  
PDR FOIA  
THOMAS87-40 PDR

## DETAILED OUTLINE DRAFT

### TORUS - SUCTION HEADER BEHAVIOR

#### ABSTRACT

#### I. INTRODUCTION

- A. Background
- B. Problem Definition
- C. Scope
- D. Test Program

#### II. SUMMARY AND CONCLUSIONS

#### III. DESCRIPTION OF CONTAINMENT SYSTEM AND SUCTION HEADER

- A. Over-all Geometry of Torus
- B. Relief Valve Discharge Orientation
- C. Suction Header and Attachments

#### IV. RELIEF VALVE DISCHARGE PHENOMENA

- A. Phenomena Description
  - 1. Qualitative Discussion
  - 2. Parameters Considered
- B. Theoretical Modeling Approach
  - 1. Discharge Piping Transient
  - 2. Pool Dynamics
- C. Quad Cities Test Results
  - 1. Discharge Pipe Transient
  - 2. Pool Response
    - a. Single Valve Discharge
    - b. Multiple Valve Discharge
- D. Application of Theoretical Modeling to Quad Cities
  - 1. Relief Valve Piping Arrangement
  - 2. Torus Arrangement
  - 3. Analytical Comparison to Test Data

V. TORUS - SUCTION HEADER STRUCTURE

A. Static Modeling Approach

1. Analytical Model (Torus Section)
2. Loading Criteria
3. Analysis
4. Stresses and Deformations
5. Correlation with Test Results
6. Suction Header Loading and Stresses
7. Comparison with Allowable Limits

B. Dynamic Modeling Approach

1. Analytical Model (Torus Section)
2. Loading Function
3. Analysis
4. Stresses and Deformations
5. Correlation with Test Results
6. Suction Header Loading and Stresses
7. Comparison with Static Model Results

C. Analytical Conclusions

VI. GENERIC APPLICATIONS

A. Statement of Application

B. Pressure Loads

1. Applicability of Quad Cities Tests
2. Application Approach
  - a. Analytical
  - b. Modified Empirical

C. Structural Comparison

APPENDIX A. QUAD CITIES TEST PROGRAM

A. Purpose of Test

B. Instrumentation

1. Primary Sensors
  - a. Type
  - b. Location
2. Signal Conditioning
  - a. Type
  - b. Location

3. Signal Recording

a. Type

b. Location

C. Test Sequence and Conduct of Test

D. Typical Recorded Values