

71-6639

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MEMORANDUM FOR: The Files  
FROM: Richard H. Odegaarden, FCTC, NMSS  
SUBJECT: SUMMARY OF MEETING WITH DOE CONCERNING MODEL  
NO. MH-1A APPLICATION DATED FEBRUARY 19, 1985

Attendees

| <u>DOE</u>                  | <u>DOT</u>    | <u>BNL</u> | <u>Sandia</u> | <u>NRC</u>    |
|-----------------------------|---------------|------------|---------------|---------------|
| D. Leclaire                 | L. Santman    | J. Weeks   | W. Wowak      | R. Cunningham |
| C. Caves                    | R. Rawl       | P. Tichler |               | C. MacDonald  |
| R. Garrison                 | E. Economides |            |               | R. Odegaarden |
| C. Mauck                    |               |            |               | C. Chappell   |
| K. Elliott                  |               |            |               | H. Lee        |
| H. Crawford<br>(consultant) |               |            |               | J. Cook       |

Introduction

A meeting was held at Silver Spring, Maryland, on May 21, 1985, at the request of the Nuclear Regulatory Commission (NRC) to discuss preliminary findings of the NRC staff's structural review of the application for the Model No. MH-1A package.

Discussion

The enclosed comments on the structural analysis were discussed. DOE indicated that they would further assess our comments and take appropriate action in the interim.

Original Signed by  
CHARLES E. MACDONALD

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Richard H. Odegaarden  
Transportation Certification Branch  
Division of Fuel Cycle and  
Material Safety, NMSS

Enclosure: As stated

|         |                 |             |              |  |  |  |  |
|---------|-----------------|-------------|--------------|--|--|--|--|
| OFFICE  | FCTC            | FCTC        | FC           |  |  |  |  |
| SURNAME | ROdegaarden:alm | CEMacDonald | RECunningham |  |  |  |  |
| DATE    | 05/22/85        | 05/24/85    | 05/24/85     |  |  |  |  |

Agenda  
Meeting on Application for NRC Certification  
Model No. MH-1A Package  
Docket No. 71-6639  
May 21, 1985

The Problem

The premise upon which the application is based is that the package will retain all contents, including radioactive gases, following the accident condition tests in 10 CFR 71. Although this approach might not be the only way in which the package could be demonstrated to meet 10 CFR 71, the analysis in the application is intended to demonstrate that the package will remain leak-tight. The staff's preliminary finding is that the structural portion of the analysis contained in the application is defective and does not provide a basis to support the conclusions drawn in the application. Attached is a summary which identifies, in abbreviated form, our principal comments on the structural analysis.

The staff is aware that the Model No. MH-1A package is presently being used to ship DOE irradiated fuel under a DOE certification. The staff believes it is likely that the analytical basis of the DOE certification is similar to, if not the same as, the one contained in Docket No. 71-6639. Accordingly, the staff also believes it is obliged to draw to the attention of appropriate DOE and DOT officials its present conclusions about the structural analysis.

Purpose of Meeting

The staff is aware that our comments on the structural analysis could have a disruptive effect on the present DOE shipping campaign. Therefore, the purpose of this meeting is to review the issues with the engineers responsible for the structural analysis in the application to determine if there is additional information or clarifications which would cause the staff to change its present conclusions.

### Summary of Deficiencies in the Structural Evaluation

1. The application specifies criteria for allowable stresses but many of the calculated stresses exceed those criteria.
2. The application does not analyze the cask for various normal and accident conditions which could produce governing stress (e.g., 2-foot free drop, 30-foot oblique impact condition).
3. The application does not consider the combined effect of all the loads which act simultaneously on the containment vessel (e.g., impact and hot or cold ambient temperatures).
4. The buckling evaluation in the application is not adequate to show that the containment vessel would not buckle under 30-foot drop test conditions. The evaluation does not consider possible inelastic buckling even though stresses in the shell were calculated to be above yield. The application also does not consider the combined effect of all the loads which act simultaneously.
5. The application does not report the stresses in the closure bolts or in the drain/vent lines which pass through the lead shielding.
6. The application does not analyze the stresses in the bottom end plate of the cask or in the bottom plate of the containment vessel.
7. The application does not consider potential displacement of shielding due to "lead slump."
8. The puncture evaluation does not consider potential collapse of the top closure plate or the bottom end plate.
9. The analysis of structural interaction between the lead shielding and the containment vessel does not consider the lateral pressure exerted by the lead against the containment vessel under 30-foot drop or differential thermal expansion and contraction.
10. The finite element analysis and the stress calculations do not provide sufficient information for review. The assumptions and inputs such as element properties, loads, and loading distributions were not described in detail and justified.
11. Static properties were used to analyze the redwood impact limiters for drop orientations where the redwood is crushed perpendicular to the grain. Information in a Sandia Laboratories report indicates the dynamic properties could be substantially different. Selection of the static properties for the analysis should be justified.