71-5597

Distribution: w/encl
RHOdegaarden (2)
WHLake
HWLee
CRMarotta
Docket File NRC PDR
IE HQ
Region I
NMSS R/F
FCTC R/F

Return to
A Machlin
396-SS

OCT 12 1982

FCTC:RHO
71-5597

Department of Energy
ATTN: Mr. Reuben P. Prichard
MS E-201
Washington, DC 20545

Gentlemen:

This refers to your application dated July 31, 1978, as amended, requesting approval of the Model No. Tungsten Shielded Cask packaging.

In connection with our review, we need the information identified in the enclosure to this letter.

Please advise us when this information will be provided. The additional information requested by this letter should be submitted in the form of revised pages. If you have any questions regarding this matter, we would be pleased to meet with you and your staff.

Sincerely,
Original Signed by
R. H. Odegaarden

Charles E. MacDonald, Chief
Transportation Certification Branch
Division of Fuel Cycle and
Material Safety, NMSS

Enclosure: As stated

cc w/encl:
Department of Energy
Oak Ridge Operations Office
ATTN: Mr. R. J. Hart
P.O. Box E
Oak Ridge, TN 37830

OFFICE ▶	FCTC	FCTC	FCTC	FCTC	FCTC		
SURNAME ▶	RHO degaarden:alm	WHLake	HWLee	CRMarotta	CEMacDonald		
DATE ▶	10/06/82	10/06/82	10/06/82	10/06/82	10/12/82		

Department of Energy
Model No. Tungsten Shielded Cask Packaging
Docket No. 71-5597

Encl to ltr dtd: OCT 12 1982

DRAWINGS

Provide legible copies of Drawing Nos. M-11575-EM-001-E, Rev. 2; X3D-11575-002, Rev. 3; and X3D-11575-003, Rev. 3.

STRUCTURAL

1. Tie-downs

The requirements of 10 CFR §71.31(d) for the modified packaging with the personnel shield and base skid should be addressed.

2. 30-foot Top-end Drop

a. The dymanic compressive stress-strain curves (Fig. 1.1 of the SAR) should be re-evaluated. Since the cask has much larger compressibility than the small diameter solid test specimens, the compressive stress-strain curve used in the analysis is not applicable and may be unconservative.

b. Section 1.4.6.1 (p.22 of ORNL/ENG/TM-3) of the SAR assumes that the closure studs act as an impact limiter. This is a non-conservative practice. Demonstrate that failure of the closure stud threads and welds will not result from the drop test.

c. Show that under accident conditions that the 1-inch Schedule 40 pipe spacer (Fig. 0.1, p. 3, ORNL/ENG/TM-3/A1) will not be crushed with the potential to release the sealed source from the tungsten insert.

OFFICE ▶							
SURNAME ▶							
DATE ▶							

NRC FORM 318 (10-80) NRCM 0240

OFFICIAL RECORD COPY

3. 30-foot Top-Corner Drop

a. Justify the use of an ultimate shear stress of 61,000 psi for 304L stainless steel. The ultimate shear stress can be defined as Fu/ 3 (Fu = ultimate stress). The material properties should conform to those values specified by the ASME Code.

b. Explain how the impact force for maximum shear on the closure was derived (see page 30 of ORNL/ENG/TM-3). Note that the force acts perpendicular to the closure studs under the maximum acceleration of 2050 g's is: F_s = 381 x 2050 x sin 32° = 413,893 lb. This is larger than the maximum shear F_s = 332,600 lb. assumed in the analysis.

c. The analysis of the closure studs should be revised to take into account only the net area of the studs excluding the threads.

d. The analysis for the shear ring on the closure is not adequate. In view of the thin plate and the small bearing area, the shear ring does not have sufficient rigidity to fully develop the shear capacity as calculated. In addition, the weld capacity of the shear ring is much less than the plate shear capacity. The analysis should be revised to consider the above.

e. Provide an analysis of the closure taking into account the direct tensile stresses in the studs due to the moment produced by the payload impacting on the lid.

4. Puncture

Provide an analysis to show that puncture test on the closure lid (oblique drop) following the 30-foot drop will not shear the studs resulting in loss of the closure lid.

SHIELDING

For the alternate packaging design, with the tungsten insert, demonstrate the dose rate under normal conditions of transport is independent of package orientation, i.e., if the package is upside down, may the sealed source move from the bottom of the tungsten insert cavity to the top of the cavity with a significant change in dose rate?

MODEL NO.

Provide a unique Model No. for the alternate package design with the tungsten insert and protective cage.