71-9071

ANEFCO
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PDR
Return to 396SS

August 13, 1985

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U.S. NUCLEAR REGULATORY COMMISSION
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U.S. Nuclear Regulatory Commission
Transportation Certification Bransh
Division of Fuel Cycle and Material Supply
Washington D.C. 20555

Attention: Charles E. MacDonald, Mail Stop 396 SS

Subject : Amendment to COC 9071
Docket No. 71-9071

Gentlemen:

In response to your letter dated July 12, 1985, we have addressed your ten [two for] questions with regards to sections 10CFR 71.47 and 71.51(a)(2) and have included drawings of the shield assembly and shoring.

Very truly yours,

ANEFCO Inc.

John D. Murphy
President

JDM/ja

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FEE MGMT. BRANCH
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FEE EXEMPT 25657

addl info to 6/13/85 app.

DOCKET NO. 71-9071

CONTROL NO. 25657

DATE OF DOC. 08/13/85

DATE RCVD. 08/16/85

FCUF ____ PDR ✓

FCAF ____ LPDR ____

WM ____ I&E REF. ✓

WMUR ____ SAFEGUARDS ____

FCTC ✓ OTHER ____

DESCRIPTION:

response to your letter dated 07/12/85

08/16/85 INITIAL CEC

1. EXTERNAL RADIATION STANDARDS FOR ALL PACKAGES (10CFR 71.47)

In order to demonstrate that the package will not exceed the radiation levels of:

200 mr/hr accessable surfaces of the package

or

1000 mr/hr and conditions of 10CFR 71.47 a (1,2,3,(b),(c),(d)

The following hypothetical accident drop analysis is made relative to the insert as described.

HYPOTHETICAL ACCIDENT DROP

The maximum loading on the AP-101 Shield insert will be sustained during the hypothetical 30 foot drop.

The maximum loading will be on the bottom plate of the shield insert.

Assume that maximum "g" load on the bottom plate of the shield insert is equivalent to 49g as indicated in Section 1.7.1.1.2 of the SAR page 1-40, the stress on the welds can be calculated.

$$\text{Weight of lead} = [(11.5" \times 13.5" - (8.5" \times 10.5")]\ 165 =$$

$$10{,}890\ in^3 \times \frac{707\ lb}{1728\ in^3} = 4456\ lbs$$

¼" weld all around the base provides an area = .345" x 52" = 18.4 in^2

$$\text{Stress on weld} = \frac{Wg}{A} = \frac{4456\ (49)\ lbs}{18.4\ in^2} = 11{,}867\ psi$$

Allowable stress = 21,000 psi

$$\text{Safety factor} = \frac{21{,}000}{11{,}867} = 1.77$$

Therefore the shield insert will be able to resist the gravity load during a 30 foot drop. It will retain its integrity and provide the shielding following this presumed accident.

HYPOTHETICAL FIRE ACCIDENT

The maximum temperature in the inner shell during and following the 30 minute exposure to a 1475°F environment is shown in Section 2.5.2 of the SAR, page 2-11 to be less than 467°F. The shield insert will therefore be at a lower temperature than the melting point of lead, 621.5°F. Thus, the lead will retain

its solid form and continue to provide uninterrupted sheilding for the cask contents.

2. RELEASE OF RADIOACTIVE MATERIALS (Contents) [10CFR 71.51(2)]

For purposes of this analysis, it is assumed that there would be a one inch hole effective area in the cask seal lid, and the air volume within the cask would change three complete changes **to** air per unit of time and the velocity factor would be integrated to infinity.

The potential source of airborne contamination would be from the corrosion products adhering to the surface of the non fuel bearing components in the form of a film and loose particulate.

It should be noted that the materials which are placed in the cask are at all times in canisters for ultimate disposal. There is, therefore, no possibility of leakage to the atmosphere. However, the assumption here is based on a system without canister and demonstrates that the airborne contamination levels are not in excess of a total amount of A_2 in one week for mixed corrosion and fission products (0.4 Ci).

The pick up of activity by transport has been demonstrated by Hestord, and Veselkin and Shakh as a constant of the first order. The constants for the following listed materials are the following:

Stainless Steel:

Co-60	7×10^{-2}
Fe-59	6×10^{-2}

Zircaloy:

Co-60	9×10^{-3}
	in fractions per second

Thus using the cask cavity volume of 1732.5 liters, we multiply the three air changes per hour or 5197.5 liters of air.

The source strength (γ/cm^2 - sec) is:

$$Sv - 1.24 \times 3.7 \times 10^{10} \times N/V$$

N = Number of curies
v = volume

$$Sv = \frac{1.24 \times 3.7 \times 10^{10} \times 10^4}{5519.5 \times 10^3}$$

$$Sv = 0.9 \times 10^5/hr$$

$$Sv = 0.9 \times 10^5/60 \times 60$$

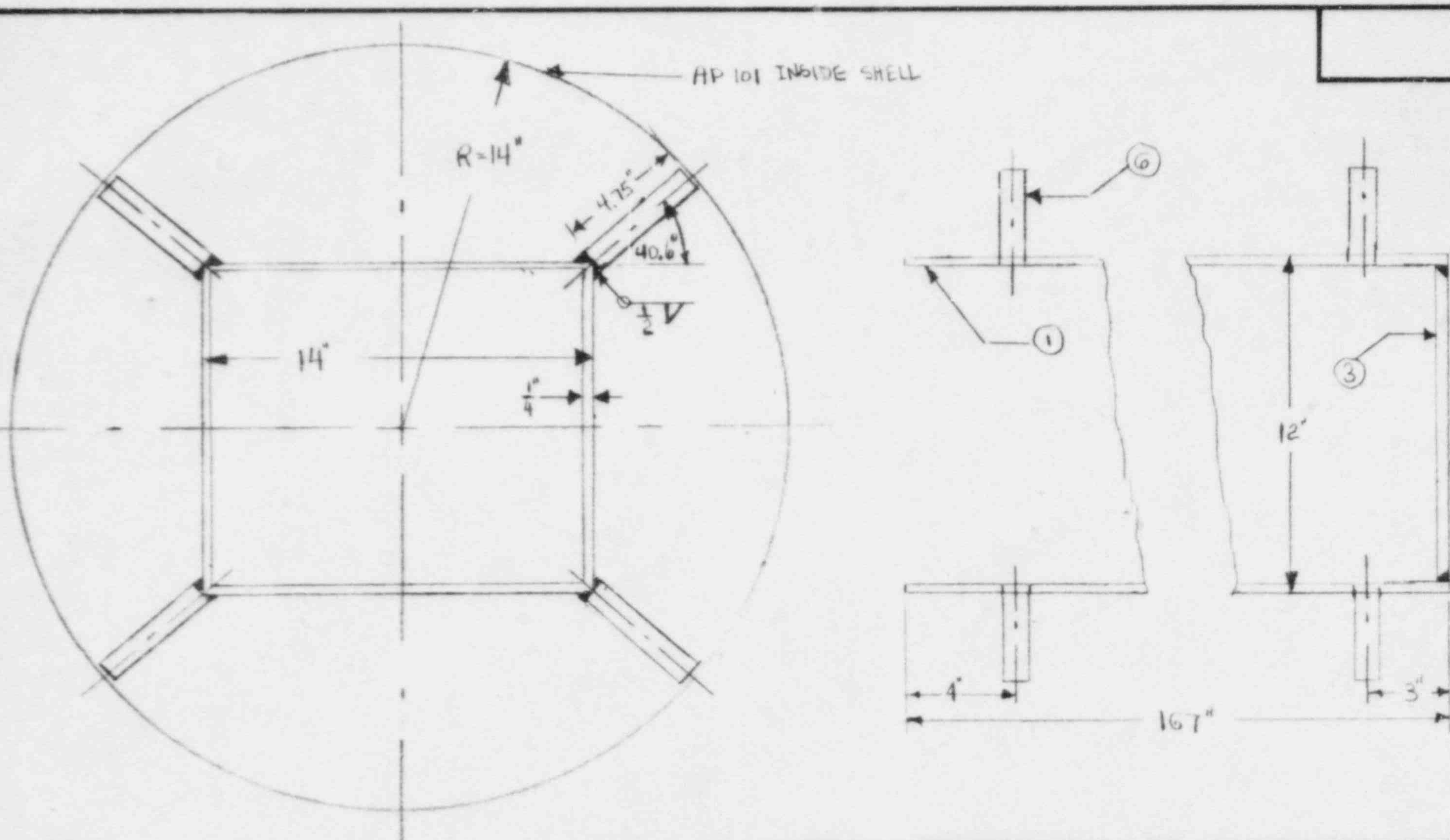
$$Sv = 0.25 \times 10^3/ min .$$

$$Sv = 0.417\ \gamma/cm^2 - sec$$

$$\text{or } 0.8 \times 10^{-12}\ Ci/sec \times 3600 \times 24 \times 7\ \frac{sec}{week}$$

$$= 4.85 \times 10^{-7}\ Ci/week$$

The release of 4.85×10^{-7} Ci/week is far below the A_2 value of 0.4 Ci listed in Appendix A of 10 CFR 71 for Mixtures of Radionuclides, including radioactive decay chains.



BILL OF MATERIALS

① RECT. TUBE 14" × 12" × 1/2" × 167" ℓ

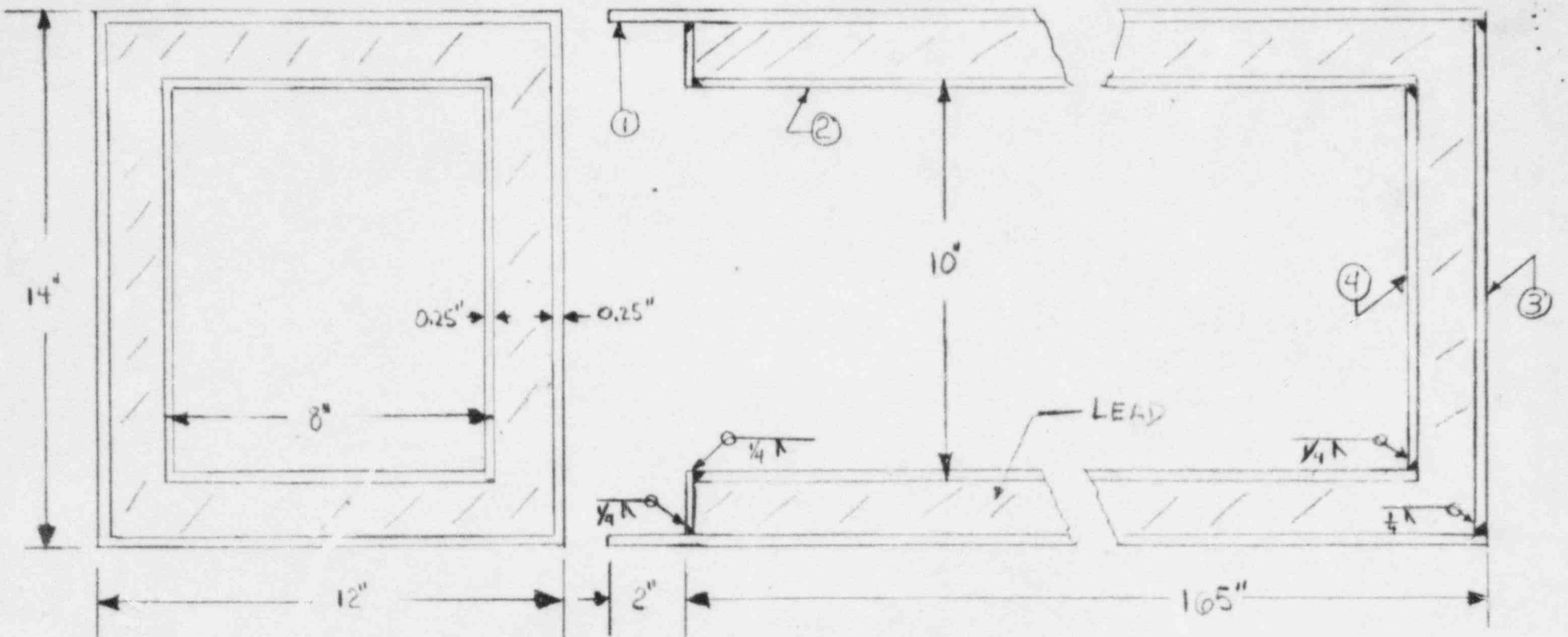
③ RECT. PLATE 13 1/2" × 11 1/2" × 1/4"

⑥ LCS BAR - 1" Φ × 4.75" ℓ - 8 REQ

Refer to SK401

SHORING FOR AP 101 INTERNAL SHIELD		
SCALE: 3/16" = 1"	APPROVED BY [signature]	DRAWN BY SZ
DATE: 8/12/85		
		DRAWING NUMBER SK 402

DIETZGEN MASTER FORM 198M+



BILL OF MATERIALS

1. RECT. TUB. 14" x 12" x 1/4" x 167" l
2. " " 10" x 8" x 1/4" x 163" l
3. RECT. PLATE 13.5" x 11.5" x 1/4
4. " " 9.5" x 7.5" x 1/4"
5. PLATE - O.D. 13.5" x 11.5", I.D. 9.5" x 7.5" x 1/4" t

TUBING FABRICATED AS STRUCTURAL ASTM-A500-GR B
PLATE - HOT ROLLED LOW CARBON

Refer to SK402

INTERNAL SHIELD FOR AP 101	
SCALE: 1/4" = 1" / DATE: 8/12/85	APPROVED BY [signature]
DRAWN BY SZ	
DRAWING NUMBER	SK401