

EO 13526 3.5(c)



XVII.9e Dairy 13  
mark  
Cyto: VP Leo

UNITED STATES DELEGATION  
TO THE  
U.S. - USSR NUCLEAR TESTING COMMISSIONS  
Washington, D.C. 20451

November 5, 1991

~~SECRET/RESTRICTED DATA~~

TO: NSC - BRIG GEN Gordon  
 DOE - Dr. Alessi, Dr. Czajkowski  
 OSD - Dr. Barker, DAS Miller, Graham,  
 MAJ GEN Watson, Mr. Libby  
 JSC - MAJ GEN Lajoie, BRIG GEN Curtin  
 State - Dr. Timbie, DAS Walpole, Kauzlerich,  
 Mr. Einhorn  
 ACDA - A/D Gordon, Koch  
 IC [REDACTED]

CIA 3.5(c)  
OSD 3.5(c)

FROM: Ambassador Courtney *DK*

SUBJECT: Accident Resistant Containers (ARCs)

Sandia's Jerry Friedman and Glen Otey gave a briefing yesterday on ARCs for shipment of nuclear weapons and tritium bottles. Unclassified briefing slides are attached. Key points of interest were:

-- ARCs protect against high temperature and high-velocity mechanical impacts. High temperature from fires is usually the more demanding constraint.

-- The U.S. designs ARCs to withstand an impact of 100 feet/sec onto an IAEA unyielding target followed by a 60-minute, all-engulfing fire. Temperature on a container might reach 2,000 degrees Fahrenheit, but on the surface of a weapon it would be kept to 300-400 degrees.

-- A basic ARC can be built for about \$5000. It involves a form-fitting foam shell surrounding the weapon, all contained in a steel drum with fiber insulation on the sides. The polyurethane foam is moderate-technology and commercially available. The Soviets probably have it.

-- More expensive and heavier ARCs (e.g., \$10,000-50,000 or more apiece) may use redwood in place of foam and protect at higher velocities. We use these ARCs, for example, to ship W-70 Lance and W-79 8-inch artillery warheads. More expensive ARCs provide no more thermal protection than the basic model.

DECLASSIFIED IN PART  
Authority: EO 13526  
Chief, Records & Declass Div, WHS  
Date:

MAR 15 2006

~~SECRET/RESTRICTED DATA~~

13-1-3472

Department of Energy Declassification Review	
1st Review Date: 11/11/91	Classification (Circle Number(s))
2nd Review Date: 05/19/92	1. Classification Retained
Authority: 00 10	2. Classification Changed To:
Derived From:	3. Contains No DOE Classified Info
Declassify On:	4. Declassify When:
3rd Review Date: 11/14/93	5. Declassified
Notes:	6. Classified Info Reinstated
	7. Other (Specify)

-- In our experience accident frequencies for ground transport are two orders of magnitude greater than for air transport. In deciding on a mode of shipment, this must be counter-balanced by the possibly greater consequences of air accidents.

-- One useful augmentation of the basic ARC, if something like this is used by the Soviets, is to surround it by layers (or a blanket) of Kevlar to stop small arms fire. Since the Soviets use lots of guards with small arms during transport, protection against accidental small arms fire, as well as terrorist fire, may be valuable. Kevlar protection is not expensive.

-- Tritium bottles are sometimes removed weapons prior to shipment. A modern tritium ARC weighs 155 pounds and is made from a stainless steel sixteen-gallon drum.

[REDACTED]

Modern tritium ARCs cost about \$5,000 apiece, and can withstand a 30-foot drop (44 feet/sec) onto a punch. Our earlier tritium ARCs did not have a stainless steel containment vessel.

DOE 6.2(a)

DECLASSIFIED IN PART  
Authority: EO 13526  
Chief, Records & Declass Div, WHS  
Date:

OSD  
Section 6.2 (a)

MAR 15 2016

Office of the Secretary of Defense  
Chief, RDD, ESD, WHS  
Date: 15 Mar 2016 Authority: EO 13526 + 5 U.S.C § 552  
Declassify: \_\_\_\_\_ Deny in Full: \_\_\_\_\_  
Declassify in Part: X  
Reason: 3.5 (c) & 6.2(a)  
MDR: 13 -M-3472