

U.S. NUCLEAR REGULATORY COMMISSION
CERTIFICATE OF COMPLIANCE
For Radioactive Materials Packages

1.(a) Certificate Number 9085	1.(b) Revision No. 1	1.(c) Package Identification No. USA/9085/B()	1.(d) Pages No. 1	1.(e) Total No. Pgs. 2
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2. PREAMBLE

- 2.(a) This certificate is issued to satisfy Sections 173.393a, 173.394, 173.395, and 173.396 of the Department of Transportation Hazardous Materials Regulations (49 CFR 170.189 and 14 CFR 103) and Sections 146-19-10a and 146-19-100 of the Department of Transportation Dangerous Cargoes Regulations (46 CFR 146-149), as amended.
- 2.(b) The packaging and contents described in item 5 below, meets the safety standards set forth in Subpart C of Title 10, Code of Federal Regulations, Part 71, "Packaging of Radioactive Materials for Transport and Transportation of Radioactive Material Under Certain Conditions."
- 2.(c) This certificate does not relieve the consignor from compliance with any requirement of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into which the package will be transported.

3. This certificate is issued on the basis of a safety analysis report of the package design or application-

3.(a) Prepared by (Name and address): Teledyne Energy Systems 110 West Timonium Road Timonium, Maryland 21093	3.(b) Title and identification of report or application: Teledyne Energy Systems application dated March 3, 1977, as amended. 3.(c) Docket No. 71-9085
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4. CONDITIONS

This certificate is conditional upon the fulfilling of the requirements of Subpart D of 10 CFR 71, as applicable, and the conditions specified in item 5 below.

5. Description of Packaging and Authorized Contents, Model Number, Fissile Class, Other Conditions, and References:

(a) Packaging

- (1) Model No.: SENTINEL 8S
- (2) Description

POOR ORIGINAL

The packaging contains a thermoelectric generator with 55,000 Ci of strontium 90 titanate or strontium 90 fluoride. The dimensions are 32.2 inches in height by 37.53 inches in diameter. The package is welded to a 39.5 inch square, steel pallet, which is 4 inches high.

The contents are housed in a stainless steel or Hastelloy C-276 liner. The liner, with its pressed cap, is contained within a fuel capsule (5.5" x 3.735" OD). The capsule lid is threaded for strength and welded (minimum weld penetration of 0.055" is specified) to give a positive seal. The wall thickness of the capsule is a minimum of 0.3475 inches. The fuel capsule is constructed of Hastelloy C-276 (or Uniloy HC). The capsule is inserted into the tungsten biological shield (8.367" x 6.467" OD), and the shield plug is bolted into place using three steel bolts, equally spaced on a 5.093 inch bolt circle.

The tungsten shield is held in a horizontal position within the generator's aluminum housing by the sized Min-K-1301 thermal insulation. Min-K and load bearing Glasrock are used to support the shield base. A retaining ring is used to preload the Min-K and to dampen any vibrational loads.

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(2) Description (continued)

The finned 6061-T6 aluminum housing forms the outer protective shell of the generator. During shipment, the detachable fin extensions will be bolted to the fins. This increases the fin diameter from 22 inches to 26 inches, holding the generator securely in the shipping cask body (5.68" min. wall thickness, ASTM A-181 grade 2 forged steel). The interface between the overlapping fin surfaces is coated with a heat transfer compound (DOW Corning 340). The total system weight is approximately 7400 pounds.

(3) Drawings

The principal features of the package are shown in the drawings contained in the Teledyne Energy Systems application, dated March 3, 1977.

(b) Contents

(1) Type and form of material

- (i) Strontium 90 titanate doubly encapsulated in a stainless steel liner and Hastelloy or Uniloy HC capsule which meet the requirements of special form as defined in §71.4(o) of 10 CFR Part 71.
- (ii) Strontium fluoride ($^{90}\text{SrF}_2$) doubly encapsulated in a Hastelloy or Uniloy fuel capsule, with a Hastelloy C-276 liner which meets the requirements of special form as defined in §71.4(o) of 10 CFR Part 71.

(2) Maximum quantity of material per package

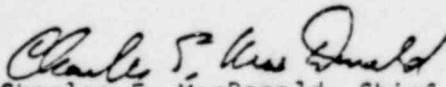
55,000 curies.

- 6. The package authorized by this certificate is hereby approved for use under the general license provisions of Paragraph 71.12(b) of 10 CFR Part 71.
- 7. Expiration date: April 30, 1982.

REFERENCE

Teledyne Energy Systems application dated March 3, 1977, as amended by Teledyne Energy Systems' letter dated March 17, 1978.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION


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

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Date: APR 07 1978

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PDR 71-9085

DEPARTMENT OF TRANSPORTATION
RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION
WASHINGTON, D.C. 20590

RECEIVED

IAEA CERTIFICATE OF COMPETENT AUTHORITY

NOV 2 1981
IN IC 44
Type B Radioactive Material Package Design

REFER TO:

U.S. NUCLEAR REGULATORY COMMISSION
REGULATORY SECTION
Certificate Number USA/9085/B()
(Revision 1)

This establishes that the packaging design described herein, when loaded with the authorized radioactive contents, has been certified by the National Competent Authority of the United States as meeting the regulatory requirements for Type B packaging for radioactive materials as prescribed in IAEA¹ Regulations and 49 CFR §§ 173.393b and 173.395(c)(2) of the USA² Regulations for the transport of radioactive materials.

I. Package Identification - Sentinel 8S.

II. Packaging Description - Packaging authorized by this certificate consists of a Tungsten shielded steel weldment measuring approximately 37½ inches in diameter by 32½ inches in height weighing about 7400 pounds.

III. Authorized Radioactive Contents - The authorized contents consist of not more than 55,000 curies of Strontium-90 as strontium titanate or strontium fluoride which is doubly encapsulated to meet the requirements for special form as set forth in 49 CFR § 173.389(g), and meets the capsule requirements set forth in U.S. Nuclear Regulatory Commission Certificate of Compliance No. 9085 (Appendix A).

IV. General Conditions -

a. Each user of this certificate must have in his possession a copy of this certificate.

b. Each user of this certificate, other than Teledyne Energy Systems, Timonium, Maryland, shall register his identity in writing to the Office of Hazardous Materials Regulation, Materials Transportation Bureau, U.S. Department of Transportation, Washington, D.C. 20590.

V. Marking and Labeling - The package must bear the marking USA/9085/B() as well as the other marking and labels prescribed by the USA Regulations.

VI. Expiration Date - This certificate, unless renewed, expires on April 30, 1982.

FEE EXEMPT

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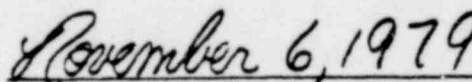
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This certificate is issued in accordance with the requirements of the IAEA and USA Regulations and in response to the April 20, 1977, petition by Teledyne Energy Systems, Timonium, Maryland, and in consideration of the associated information provided in U.S. Nuclear Regulatory Commission Certificate USA/9085/B() (Appendix A).

Certified by:



R. R. Rawl



(Date)

Designated U.S. Competent Authority for the
International Transportation of Radioactive Materials
Office of Hazardous Materials Regulation
Materials Transportation Bureau
U.S. Department of Transportation

¹"Safety Series No. 6, Regulations for the Safe Transport of Radioactive Materials, 1967 Edition" published by the International Atomic Energy Agency (IAEA), Vienna, Austria.

²Title 49, Code of Federal Regulations, Parts 100-199, USA.

Original issued in response to the April 20, 1977, petition by Teledyne Energy Systems, Timonium, Maryland.

Revision 1 issued to incorporate Revision 1 of USNRC Certificate Number 9085 and to extend expiration date.

1497 314