

## OPERATING PROCEDURES

I. HISTORY AND RATIONALE

At one time in the United States, the treatment of choice for certain cancers was by means of a teletherapy machine. The teletherapy machines administered doses of radiation, using radioactive isotope sources (i.e. Cobalt-60, Cesium-137). Treatment time was determined by the size of the cancer and the strength of the radioactive nuclide used to deliver the dose to the cancer. As all radioactive sources decrease in strength, in time it becomes necessary to replace them with new, stronger sources. Manufacturing of the sources was performed by such firms as General Electric, AECL, Neutron Products and others. The radioactive nuclides are enclosed and sealed in a sealed source capsule and positioned in a "source drawer". The three types of source drawers are International, Square Drawer, and Round Drawers. All teletherapy machines use one of the three type drawers. After loading the sealed source capsule into the source drawer, the manufacturer loads them into the Model 5979 and ships them to the institution where ALPHA-OMEGA SERVICES, Inc. personnel affect the exchange. The old source and drawer would then be sent back to the manufacturer for disposal or storage.

The Model 5979 was designed to combine a transfer cask and a shipping container in one unit. The inner cask of Model 5979 was designed as a transfer device able to mate with any manufacturer's teletherapy machine (i.e. Picker, Seimens, AECL, etc.) The inner cask of the Model 5979 was also designed to allow removal of an old source and source drawer into the container, then by rotating the inner unit, insert a new source and source drawer back into the teletherapy head. This allowed the exchanges to be made with a minimum of exposure to the personnel performing the transfer. The additional shielding provided by the cask, as well as the

shielding provided by the source drawer, further reduces potential exposure during transportation.

The current preference for cancer treatment, in the United States, is to use higher voltage linear accelerators or electron beam, which does not require radioactive sources. There is still a market in other countries that cannot afford the high priced new units, but can still render effective treatment with the teletherapy units.

ALPHA-OMEGA SERVICES, INC.

MODEL #5979

OPERATING PROCEDURES

II. RECEIVING / SHIPPING

A. MOVING THE 5979

1. The 5979 is to be moved only by a forklift, using the built-in bottom skid, due to weight of the unit.
  - a) Do not move the unit without checking to be assured the protective jacket is bolted down.
  - b) Do not move the unit by using the lifting eyes on protective jacket.
    1. Eyes should be covered to prevent use for lifting.
    2. Eyes should be used only when removing the protective jacket.

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II. RECEIVING / SHIPPING

B. RADIOACTIVE MATERIAL LOADING / UNLOADING

1. Loading or unloading a radioactive material is to be performed at General Electric, Vallecitos, CA or other licensed facilities by their personnel.
2. ALPHA-OMEGA SERVICES, INC. personnel will effect any transfers at the jobsites.

ALPHA-OMEGA SERVICES, INC.  
MODEL 5979  
OPERATING PROCEDURES

II. RECEIVING / SHIPPING

C. RECEIVING THE 5979 AT A.O.S.

1. Make visual inspection of container.
2. If not containing radioactive material,
  - a) perform wipe survey
    1. Enter in Container Wipe Survey Log
  - b) perform A.O.S. Maintenance Inspection
3. If containing radioactive material,
  - a) move to radioactive storage area
  - b) using a meter, survey the container
    1. in advent of unusually high reading, notify R.S.O.
    2. check against labels on containers
    3. check against maximum contents allowable
      - a) 15000 Ci Cobalt-60 or 3000 Ci Cesium-137
  - c) make a wipe survey
    1. enter in Container Wipe Survey Log

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MODEL 5979

OPERATING PROCEDURES

II. RECEIVING / SHIPPING

D. DISASSEMBLY / ASSEMBLY OF MODEL 5979

1. Protective Jacket

- a) Remove bolts from base of jacket (36)
- b) Uncover lifting eyes to facilitate lifting (1500 pounds)

2. Inner Cask

- a) Wipe survey the inner cask
- b) Remove screws attaching cask to base (6)
- c) Use lifting eyes to lift from frame (3400 pounds)
- d) Install wheel support brackets (3)
- e) Install wheels (3)

3. End Covers

- a) Remove bolts from each end (6)
- b) Use steel bar to move end covers

4. Reassemble

- a) The reverse of above procedures

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MODEL 5979

OPERATING PROCEDURES

II. RECEIVING / SHIPPING

E. PREPARING 5979 FOR SHIPPING

1. Perform A.O.S. Maintenance Inspection
2. Using meter, survey the Model 5979
  - a) Enter data on Teletherapy Check Lists
    1. Also, prepare proper radioactive shipping label as per 49 CFR 172.403.
    - b) Verify that reading does not exceed 15000 Ci of Cobalt-60 or 3000 Ci of Cesium-137 as limits of Certificate of Compliance
    - c) Enter in Container Wipe Survey Log.
3. Prepare shipping documents
4. Affix Security Seals
5. Verify all labels are properly filled out and that notice "DO NOT OPEN WITHOUT A.O.S. PERSONNEL PRESENT" is visible and readable.
6. Check lifting eyes of protective jacket are covered.

ALPHA-OMEGA SERVICES, INC.

MODEL 5979

MAINTENANCE INSPECTION  
PROCEDURES

1. SCOPE

1.1 This document outlines the procedures to perform the maintenance check list of ALPHA-OMEGA SERVICES, INC. Model 5979.

2. AREAS TO BE INSPECTED

2.1 Container and Lifting Lugs

A. Exterior of container should be visually checked for general appearance and any unusual signs of wear or deformation.

1. paint

2. lifting lugs

B. Any discrepancy should be noted on check list

2.2 External Jacket Nuts and Bolts

A. External nuts and bolts are to be removed and visually and manually checked.

B. Any discrepancy should be noted on check list

C. Bolts or nuts with minor damage will have threads chased with appropriate tap. Any lubricant acceptable.

D. Non-conforming nuts and bolts to be replaced with HEX HD bolts 3/4NC  
10 x 2"

E. All nuts and bolts to be replaced at annual inspection.

2.3 External Jacket Cover

A. Container lid to be removed from base and visually checked for signs of unusual wear or deformation.

B. Any discrepancy should be noted on check list.

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MODEL 5979

MAINTENANCE INSPECTION  
PROCEDURES

2.4 Cask Screws

- A. Six (6) screws are to be removed and visually checked.
- B. Any discrepancy should be noted on check list.
- C. Non-conforming screws to be replaced with HEX HD screws 5/8 NC 11 x 1½".

2.5 Cask

- A. Cask should be visually checked for any signs of unusual wear or deformation.
- B. Any discrepancy should be noted on check list.

2.6 Cask Lifting Eyes

- A. Lifting eyes should be visually inspected for damage resulting from previous use.
- B. Any discrepancy should be noted on check list.

2.7 Cask Wheel Brackets/Screws

- A. Cask wheel brackets and screws should be visually and manually checked for any signs of unusual wear or deformation.
- B. Any discrepancy should be noted on check list.
- C. Twelve (12) bracket screws should be visually checked.
- D. Non-conforming screws to be replaced with 1/2 NC 13 HEX HD cap screws

2.8 Wheel Attachment Screws & Nuts

- A. Wheel attachment screws should be visually checked.
- B. Any discrepancy should be noted on check list
- C. Non-conforming screws to be replaced with HEX HD 1/2 NC 13 x 2" with nuts

ALPHA-OMEGA SERVICES, INC.

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MAINTENANCE INSPECTION  
PROCEDURES

2.9 Cask End Cover/ Bolts

1. Bolts should be removed from end cover and visually inspected. Also, at this time, visually inspect end covers for use.
2. Any discrepancies should be noted on check list
3. Non-conforming bolts should be replaced with 5/8 NC 11 x 1

2.10 Interior Configuration

1. With end cover off, note the configuration of insert (sq.drawer, round drawer, etc.) and enter on check list

2.11 Cask Gasket Seal

1. Each seal gasket to be visually checked for defects and any deformation.
2. Any discrepancy should be noted on check list
3. Minimum gasket seal shall be greater than 0.001 atm-cc/sec

2.12 Identification & Labeling

1. Following identifiers are to be checked
  - A. A.O.S. metal placard and/or painted identification
  - B. All previous labels have been removed
  - C. Empty label or proper radioactive material label, if applicable
  - D. Gross weight
  - E. Model number and classification
  - F. Notice to be opened only by A.O.S. Personnel

3. FREQUENCY OF INSPECTION

3.1 Regular Inspections

- A. To be performed prior to each container shipment from A.O.S.
- B. To be performed when each container returned to A.O.S.
- C. To be performed whenever R.S.O. deems necessary

ALPHA-OMEGA SERVICES, INC.  
 MODEL 5979  
 MAINTENANCE INSPECTION CHECKLIST

DATE \_\_\_\_\_ REGULAR \_\_\_\_\_  
 MODEL NUMBER \_\_\_\_\_ ANNUAL \_\_\_\_\_  
 CONFIGURATION \_\_\_\_\_ INSPECTED BY \_\_\_\_\_

NOTE: IF ITEM IS IN COMPLIANCE, ENTER INITIALS - IF NON-CONFORMING, ENTER CHECK (✓)

INITIAL/CHECK	ITEM NUMBER	COMMENTS
	2.1 CONTAINER AND LIFTING LUGS	
	2.2 EXTERNAL JACKET NUTS & BOLTS	
	2.3 EXTERNAL JACKET COVER	
	2.4 CASK SCREWS	
	2.5 CASK	
	2.6 CASK LIFTING EYES	
	2.7 CASK WHEEL BRACKETS & SCREWS	
	2.8 WHEEL ATTACHMENT SCREWS & NUTS	
	2.9 CASK END COVERS	
	2.10 INNER CONFIGURATION	
	2.11 CASK GASKET SEALS	
	2.12 IDENTIFICATION AND LABELING	
	A. A.O.S. NAME	
	B. PREVIOUS LABELS REMOVED	
	C. EMPTY OR PROPER RADIOACTIVE LABEL	
	D. GROSS WEIGHT	
	E. MODEL NUMBER AND CLASS	
	F. OPEN BY A.O.S. ONLY	





DEPARTMENT OF TRANSPORTATION  
HAZARDOUS MATERIALS REGULATIONS E RD  
WASHINGTON, D.C. 20590

SPECIAL PERMIT NO. 5979

This special permit is issued pursuant to 46 CFR 146.05-4 of the U. S. Coast Guard (USCG) Dangerous Cargo Regulations and 49 CFR 170.15 of the Department of Transportation (DOT) Hazardous Materials Regulations, as amended, and on the basis of the November 19, 1968, petition by International Chemical & Nuclear Corporation (U. S. Nuclear Division), Eurbank, California, as amended January 17, 1969, February 14, 1969, and April 28, 1969.

1. Shipments of large quantities of radioactive materials, n.o.s., and in special form, are hereby authorized in the packaging as described in this special permit and as further provided for herein. This packaging, when constructed and assembled as prescribed herein, with the contents as authorized herein meets the standards prescribed in the DOT regulations, Sections 173.394(c)(2), 173.395(c)(2), and 173.398(c).
2. Each user of this permit, other than the petitioner named above, shall register his identity with this Board prior to his first use of the permit.
3. The authorized packaging consists of an inner container which is a right cylindrical, lead-filled steel weldment, enclosed within an outer protective thermal-impact enclosure of wood/steel construction. The inner container dimensions are approximately 20" diameter by 24" long, exclusive of the cask legs, weighing about 3200-3400 pounds. The outer protective enclosure consists of a steel framework (exoskeleton) of welded steel angles, with side panels of plate steel welded to the interior sides and top of the exoskeleton, forming a box-like cover. Five wooden panels, each consisting of a laminate of six layers of 3/4" exterior grade, douglas fir plywood, glued with a resorcinol-formaldehyde adhesive, are fitted within the steel exoskeleton cover. The cover assembly is thence bolted to a wood-steel base plate assembly (which also contains a plywood laminate layer as described above), to which the inner shielded container has been bolted in place. The dimensions of the overall package are approximately 36 1/2" by 49 by 44" high, weighing about 5400 pounds. The package is identified as the ICN Teletherapy Source Shipping Container, and is described in the Technical Evaluation Report submitted with the petition dated November 19, 1968, plus its Supplement No. 1 (undated). Additionally, the conditions as listed in the Appendix hereto are required in the fabrication and/or operation of the packaging described in this special permit.

The packaging design is based upon the ambient conditions prescribed in Marginal C-2.4.3. of the Regulations for the Safe Transport of Radioactive Materials, 1967 Edition, International Atomic Energy Regulation (IAEA).

5. The authorized contents of each package consists of not more than 15,000 curies of cobalt-60 in the form of encapsulated sources or irradiation capsules in normal form. The irradiation capsules must be further contained within DOT Specification 2R, or equivalent, primary inner containment. The encapsulated sources meet the definition of "special form" as prescribed in §173.389(g) of the DOT regulations and Marginal A-2.15 of the IAEA Regulations.

6. The authorized packaging meets the criteria of the International Atomic Energy Agency for Type B packaging for large quantity radioactive materials. Specifically, the packaging meets the criteria of Marginal C-6.2.3.1 of the IAEA Regulations for unilateral approval.

7. Prior to each shipment authorized by this permit, the shipper shall notify the consignee and, for export shipments, the competent authority of any country into or through which the package will pass, of the dates of shipment and expected arrival. The shipper shall notify each consignee of any special loading/unloading instructions prior to his first shipment.

8. The outside of each package must be plainly and durably marked "USA DOT SP 5979" and "TYPE B", in connection with and in addition to the other markings and labels proscribed by the DOT regulations. Each shipping paper issued in connection with shipments made under this permit must bear the notation "DOT SPECIAL PERMIT NO. 5979", in connection with the commodity description thereon.

9. Each package must have its gross weight plainly and durably marked on the outside of the package.

10. Shipments are authorized by vessel and motor vehicle.

11. No special operational transport controls are necessary during carriage except as specified herein, and no special arrangements have been made under Marginal C-6.5 of the IAEA Regulations.

12. For shipments by water, the shipper or agent shall notify the USCG Captain of the Port in the port area through which the shipment is to be made, of the name of the vessel on which the shipment is to be made, and of the time, date, and place of loading. When the initial notification is given in a port area, it must be accompanied by a copy of this permit, addressed to the attention of that Captain of the Port.

13. The shipper is required to furnish an experience report to this Board before expiration of the permit and when any amendment is requested. This report must include the approximate number of packages shipped, and the number of packages involved in any loss of contents. The modes of transportation used for these shipments must also be shown.

14. Any incident involving loss of contents of the package must be reported to this Board at the earliest feasible moment following the incident.

15. The permit does not relieve the shipper or carrier from compliance with any requirement of either the DOT regulations, including 46 CFR Parts 146 to 149 of the USCG Regulations, except as specifically provided for herein, or the regulations of any foreign government into or through which the package will be carried.

16. This permit expires May 31, 1971.

Issued at Washington, D.C.:

*E. G. Grundy, Capt.*  
For the Commandant  
U. S. Coast Guard

May 7, 1969  
(Date)

*D. W. M. Fiste*  
For the Administrator  
Federal Highway Administration

May 5, 1969  
(Date)

Address all inquiries to: Secretary, Hazardous Materials Regulations Board, U.S. Department of Transportation, Washington, D.C. 20590. Attention: Special Permits.

Dist: a, b, d, h, i