

# APPLICATION FOR MATERIAL LICENSE

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

**APPLICATIONS FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH**

U.S. NUCLEAR REGULATORY COMMISSION  
 DIVISION OF FUEL CYCLE AND MATERIAL SAFETY, NMSS  
 WASHINGTON, DC 20555

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS. IF YOU ARE LOCATED IN:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION I  
 NUCLEAR MATERIALS SAFETY SECTION B  
 631 PARK AVENUE  
 KING OF PRUSSIA, PA 19406

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION II  
 NUCLEAR MATERIALS SAFETY SECTION  
 101 MARIETTA STREET, SUITE 2900  
 ATLANTA, GA 30323

**IF YOU ARE LOCATED IN:**

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION III  
 MATERIALS LICENSING SECTION  
 799 ROOSEVELT ROAD  
 GLEN ELLYN, IL 60127

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH, OR WYOMING, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION IV  
 MATERIAL RADIATION PROTECTION SECTION  
 611 RYAN PLAZA DRIVE, SUITE 1000  
 ARLINGTON, TX 76011

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON, AND U.S. TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION V  
 NUCLEAR MATERIALS SAFETY SECTION  
 1450 MARIA LANE, SUITE 210  
 WALNUT CREEK, CA 94596

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTION.

<p>1. THIS IS AN APPLICATION FOR (Check appropriate item)</p> <p><input type="checkbox"/> A. NEW LICENSE</p> <p><input type="checkbox"/> B. AMENDMENT TO LICENSE NUMBER</p> <p><input checked="" type="checkbox"/> C. RENEWAL OF LICENSE NUMBER <u>04-21032-01</u></p>	<p>2. NAME AND MAILING ADDRESS OF APPLICANT (Include Zip Code)</p> <p style="text-align: center;"><b>PLANT INSPECTION COMPANY</b>                  22903 Atherton Street                  Hayward, California 94541</p>
--	---

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED.

Licensed material shall be used at temporary jobsites of Plant Inspection Company anywhere in the United States where the Nuclear Regulatory Commission maintains jurisdiction for regulating the use of licensed material.

<p>4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION</p> <p><b>John McCormick</b></p>	<p>TELEPHONE NUMBER</p> <p><b>415-537-0500</b></p>
--	--

SUBMIT ITEMS 5 THROUGH 11 ON 8 1/2 x 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

<p>5. RADIOACTIVE MATERIAL</p> <p>a. Element and mass number, b. chemical and/or physical form, and c. maximum amount which will be possessed at any one time.</p>	<p>6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.</p>				
<p>7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE.</p>	<p>8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.</p>				
<p>9. FACILITIES AND EQUIPMENT.</p>	<p>10. RADIATION SAFETY PROGRAM. <b>Enclosed</b></p>				
<p>11. WASTE MANAGEMENT.</p>	<p>12. LICENSEE FEES (See 10 CFR 170 and Section 170.31)</p> <table style="width: 100%;"> <tr> <td style="width: 70%;">FEE CATEGORY</td> <td style="width: 30%;">AMOUNT</td> </tr> <tr> <td></td> <td style="text-align: right;"><b>ENCLOSED \$ 700.00</b></td> </tr> </table>	FEE CATEGORY	AMOUNT		<b>ENCLOSED \$ 700.00</b>
FEE CATEGORY	AMOUNT				
	<b>ENCLOSED \$ 700.00</b>				

13. CERTIFICATION. (Must be completed by applicant) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, AND 40 AND THAT ALL INFORMATION CONTAINED HEREIN, IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948, 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

SIGNATURE—CERTIFYING OFFICER	TYPED/PRINTED NAME	TITLE	DATE
	<b>Troy J. McCormick Jr.</b>	<b>Manager</b>	<b>4/27/87</b>

14. VOLUNTARY ECONOMIC DATA									
<p>a. ANNUAL RECEIPTS</p> <table style="width: 100%;"> <tr> <td style="width: 50%;"><input type="checkbox"/> &lt;\$750K</td> <td style="width: 50%;"><input type="checkbox"/> \$1M-3.5M</td> </tr> <tr> <td><input type="checkbox"/> \$750K-500K</td> <td><input type="checkbox"/> \$3.5M-7M</td> </tr> <tr> <td><input type="checkbox"/> \$500K-750K</td> <td><input type="checkbox"/> \$7M-10M</td> </tr> <tr> <td><input type="checkbox"/> \$750K-1M</td> <td><input type="checkbox"/> &gt;\$10M</td> </tr> </table>	<input type="checkbox"/> <\$750K	<input type="checkbox"/> \$1M-3.5M	<input type="checkbox"/> \$750K-500K	<input type="checkbox"/> \$3.5M-7M	<input type="checkbox"/> \$500K-750K	<input type="checkbox"/> \$7M-10M	<input type="checkbox"/> \$750K-1M	<input type="checkbox"/> >\$10M	<p>b. NUMBER OF EMPLOYEES (Total for entire facility excluding outside contractors)</p> <p>c. NUMBER OF BEDS</p>
<input type="checkbox"/> <\$750K	<input type="checkbox"/> \$1M-3.5M								
<input type="checkbox"/> \$750K-500K	<input type="checkbox"/> \$3.5M-7M								
<input type="checkbox"/> \$500K-750K	<input type="checkbox"/> \$7M-10M								
<input type="checkbox"/> \$750K-1M	<input type="checkbox"/> >\$10M								
<p>d. WOULD YOU BE WILLING TO FURNISH COST INFORMATION (Dollar and/or staff hours) ON THE ECONOMIC IMPACT OF CURRENT NRC REGULATIONS OR ANY FUTURE PROPOSED NRC REGULATIONS THAT MAY AFFECT YOU? (NRC regulations permit it to protect confidential commercial or financial—proprietary—information furnished to the agency in confidence)</p> <p style="text-align: right;"><input type="checkbox"/> YES      <input type="checkbox"/> NO</p>									

FOR NRC USE ONLY			
TYPE OF FEE	FEE LOG	FEE CATEGORY	COMMENTS
<b>Ren</b>	<b>May-1-V</b>	<b>30</b>	<b>9003070355 890427</b>
AMOUNT RECEIVED	CHECK NUMBER	REGS LIC30	APPROVED BY
<b>\$700</b>	<b>10971</b>	<b>04-21032-01</b>	<b>PDR</b>
			DATE
			<b>5/7/87</b>

70564

- Item # 3 Licensed material shall be used at temporary jobsites of Plant Inspection Company anywhere in the United States where the Nuclear Regulatory Commission maintains jurisdiction for regulating the use of licensed material.
- Item # 5 A. Iridium-192 B. Source Production and Equipment Company, Model G-1 or Industrial Nuclear Company Model 8 Sealed Sources.
- C. No single source to exceed 100 curies.
- A-1 Iridium-192 B-1 Gulf Nuclear Model RG-13 Sealed Sources.
- C-1 No single source to exceed 100 curies.
- Item # 6 A. For use in Gulf Nuclear Model 20V exposure devices for performing industrial radiography and in SPEC Model C-1 Source changers for storage and replacement of sources.
- B. For use in Gamma Century SA exposure devices for performing industrial radiography and in Gamma Industries Model C-10 or Industrial Nuclear Model 50 Source changers for storage and replacement of sources.
- Item # 7 1. John McCormick - General Manager
2. Clarence G. Bales - Radiation Safety Officer/Training Officer
- Item # 8 See copies of both Radiation Safety and Radiographic Testing Training Programs enclosed with this Renewal Application for License.
- Item # 9 Facilities and equipment include completely equipped portable darkrooms, truck mounted, for performing Radiographic Testing at various field locations.
- \* See Items #5 and #6 for controlled items in use.

Item # 10 Enclosed

Nuclear Regulatory Commission  
April 25, 1987  
Page 2

Item # 11 The disposal of Radioactive sources is performed by:

Industrial Nuclear Company  
2506 Davis Street  
San Leandro, California

Upon receipt of new sources the exposure devices are taken to Industrial Nuclear Company where the older sources are removed. Disposal is by I.N.C.



**PLANT INSPECTION COMPANY**

22903 ATHERTON ST. 537-0500  
HAYWARD, CA 94541

10971

11-35/1210

April 27 19 87

PAY TO THE ORDER OF Nuclear Regulatory Commission

\$ 700.00

Seven-hundred Dollars ----- DOLLARS

**Bank of America**  
Hayward Main Office 0640  
P.O. Box 480  
Hayward, CA 94543

FOR License Renewal

*John J. Mc Cormick*

⑈01097⑈ ⑆121000358⑆ 06403⑈04134⑈

PLANT INSPECTION COMPANY  
Operating and Emergency  
Procedure Manual

**PLANT INSPECTION CO.**  
**OPERATING AND EMERGENCY PROCEDURE MANUAL**

**INDEX**

- 1.0 Purpose and Scope
- 2.0 References
- 3.0 Definitions
- 4.0 Requirements for Reports
- 5.0 Personnel Monitoring Requirements
  - 5.1 Personnel Monitoring Equipment
  - 5.2 Permissible Dose Levels
- 6.0 Radiation Survey Instrument Requirements
- 7.0 Security of Sealed Sources
- 8.0 Transportation of Sealed Sources
- 9.0 Instructions for Restricting and Controlling Access to Radiographic Areas
- 10.0 Procedures for the Handling and Use of Licensed Sealed Sources, Radiographic Exposure Devices and Source Changers
- 11.0 Emergency Procedures
  - 11.1 For Sealed Sources Being Transported
  - 11.2 For Sealed Sources Being Used for Radiography
  - 11.3 For Lost or Stolen Devices Containing Sealed Sources
- 12.0 Leak Testing of Sealed Sources
- 13.0 Requirements for Daily Inspection of Radiographic Equipment
  - Appendix A - Instructions for Completing Radiation Reports
  - Appendix B - Radiation Safety Personnel
  - Appendix C - Radiation Level/Distance Charts
    - Chart A - Iridium 192; Chart B - Cobalt 60
  - Appendix D - Shipping of Radiographic Material
  - Appendix E - Procedure for Picking up, Receiving and Opening Packages
  - Appendix F - Requisition Form
  - Appendix G - Privacy Act Statement
  - Appendix H - Radioactive Shipping Labels
  - Appendix I - Agreement States
  - Appendix J - NRC-3 (Notice to Employees)
  
  - Appendix K - Airbill
  
  - Appendix L - Shipper's Certification ( Air Freight)
  
  - Appendix M - Bill of Lading

**OPERATING AND EMERGENCY PROCEDURE MANUAL  
(for the use of Byproduct material)**

**1.0 PURPOSE AND SCOPE**

- 1.1 The purpose of this manual is to establish mandatory procedures for Plant Inspection Co. personnel who handle or use byproduct materials for performing industrial radiography. The procedures implement the requirements of C.F.R. Title 10, Parts 19-20 and 34, and California Title 17, and thereby assure the safety of all personnel in the vicinity of radiation areas.
- 1.2 Plant Inspection employees shall have a copy of this manual in their possession when handling or using byproduct materials.
- 1.3 Every Plant Inspection employee must comply with these procedures. Failure to comply will be cause for immediate disciplinary action.

**2.0 REFERENCES:**

- 2.1 The following references form a part of this manual.
  - (a) Plant Inspection Co. Administrative Procedures Manual.
  - (b) Byproduct Material License No.
  - (c) California Byproduct Material License No. 3451-60

**3.0 DEFINITIONS**

For the purpose of these procedures, the following definitions apply:

- 3.1 "Radiography" means the examination of the structure of materials by nondestructive methods, utilizing sealed sources of byproduct materials.
- 3.2 "Radiographer" means any individual who performs or who, in attendance at the site where the sealed source or sources are being used, personally supervises radiographic operation and who is responsible to the licensee for assuring compliance with the requirements of N.R.C., California Title 17, regulations and the conditions of the license.
- 3.3 "Radiographer's Assistant" means any individual who, under the personal supervision of a radiographer, uses radiographic exposure devices, sealed sources or related handling tools, or radiation survey instruments in radiography.

- 3.4 "Radiographic exposure device" means any instrument containing a sealed source fastened or contained therein, in which the sealed source or shielding thereof may be moved, or otherwise changed, from a shielded to unshielded position for purposes of making a radiographic exposure.
- 3.5 "Sealed source" means any byproduct material that is encased in a capsule designed to prevent leakage or escape of the byproduct material.
- 3.6 "Storage container" means a device in which sealed sources are transported or stored.
- 3.7 "Radiation area" means any area, accessible to personnel, in which there exists radiation, originating in whole or in part within licensed material, at such levels that a major portion of the body could receive in any one hour a dose in excess of 5 millirem, or in any 5 consecutive days a dose in excess of 100 millirems. (See Par. 9.0 for posting requirements).
- 3.8 "High radiation area" means any area, accessible to personnel, in which there exists radiation originating in whole or in part within licensed material at such levels that a major portion of the body could receive in any one hour a dose in excess of 100 millirem. (See Par.9.0 for posting requirements).
- 3.9 "rem" is a measure of the dose of any ionizing radiation to body tissue in terms of its estimated biological effect relative to a dose of one roentgen (r) of x-rays. One r of x-rays equals one rem. One mr of x-rays equals one mrem (0.001 rem).

#### 4.0 REQUIREMENTS FOR REPORTS

- 4.1 Radiation Report - This form is shown in Appendix A. It serves as a record of the location of an exposure device containing a sealed source, as a utilization log and as a record of physical radiation surveys, dosimeter readings, and daily inspection of the radiographic equipment which must be made when a source is transported or used. It is to be signed by the radiographer in the space provided to certify that he has performed the required daily inspection of the radiographic equipment. It must be completed by the radiographer each day the source is assigned to him.
- 4.2 The radiation report shall be forwarded to the Main office. A copy shall be retained by the radiographer so that a record of his activities are available for inspection at the job site. (retention of a copy by the radiographer is only required on out-of-town jobs specified by the R.S.O.



## 5.0 PERSONNEL MONITORING REQUIREMENTS

### 5.1 Personnel Monitoring Equipment

- 5.1.1 Radiographers and radiographer's assistants shall wear a film badge and a pocket dosimeter at all times when working with ionizing radiation or transporting byproduct materials. The pocket dosimeter must be capable of measuring doses from zero to at least 200 milli-roentgens.
- 5.1.2 A film badge shall be assigned to, and worn by, only one person as it is the legal media for making the determination of an over exposure. Used film badges must be returned to the Main office immediately upon receipt of a replacement badge for the next badge period.
- 5.1.3 Badges not being worn shall be stored in a radiation free area.
- 5.1.4 Pocket dosimeters shall be recharged at the beginning of each work shift and periodic readings taken throughout the work shift. Such checking will give immediate indication of radiation exposure and work procedures shall be corrected if excessive exposure is noted. At the end of each work shift final readings will be taken and recorded.
- 5.1.5 Any individual whose pocket dosimeter goes off scale (over 200 mr), while using a source of radiation, shall immediately stop productive work, recharge his dosimeter and make a complete radiation survey of the area, making certain that no additional radiation exposure is received.
- (a) If the source of radiation is in the shielded position, immediately notify the Radiation Safety Officer, Assistant Radiation Safety Officer, Monitor or an Assistant Monitor about the condition of the dosimeter.
- (b) If the source is in the exposed position, make certain the area is restricted and access is controlled to prevent a radiation hazard and notify the main office about the condition of the source and your dosimeter. The individual's film badge shall be processed immediately. He shall not work in areas where he can receive additional exposure until the results reported show that his total exposure is not in excess of all allowable limits.

### 5.2 Permissible Dose Levels

- 5.2.1 An individual may receive a dose to the whole body of 3 rems per calendar quarter provided that:

- (a) The dose to the whole body, when added to the accumulated occupational dose to the whole body shall not exceed 5 (N-18) rems when "N" equals the individual's age in years at his last birthday.
- (b) Plant Inspection has on file his accumulated occupational dose to the whole body on a clear and legible record containing all the necessary information specified in Part 20, 20.102, Title 10, Code of Federal Regulations, and California Title 17.

5.2.2 An individual may receive a dose to the whole body of only 1.250 rems per calendar quarter when the requirements of Paragraph 5.2.1 above cannot be met.

5.2.3 Even though the above doses are permitted, any dose is excessive if it could have been reduced by developing safer working procedures. Furthermore, Plant Inspection considers continued doses over 100 mr per week as excessive and the individual will be notified of the amount of the exposure using Plant Inspection "High Exposure Report" and an explanation for the high exposure will be required.

If continued excessive doses are caused by careless and negligent working procedures, disciplinary action will be taken.

5.2.4 An individual who receives a dose in excess of 3 rems per calendar quarter or 1.250 rems per calendar quarter, when applicable, will be notified of the amount of the exposure using Plant Inspection "Over-Exposure Report". The notice will be made in duplicate form and will contain the statement required in 10-CFR Part 19.13, Code of Federal Regulations, and California Title 17. The individual must acknowledge receipt of the report by signing and returning one copy to the main office, and shall submit a written explanation of the circumstances causing the over-exposure.

## 6.0 RADIATION SURVEY INSTRUMENT REQUIREMENTS

6.1 A calibrated and operable radiation survey instrument having a range such that two miliroentgens per hour through one roentgen per hour can be measured shall be available and used to make physical radiation surveys. Specific procedures for making radiation surveys will be found under each appropriate section hereafter in this document.

6.2 Each radiation survey instrument shall be calibrated at intervals not to exceed three months and after each repair. Records shall be maintained of calibrations. The calibration date shall be with each instrument.

- 6.3 If a radiation survey instrument becomes inoperative or is beyond its required date of recalibration, the radiographer shall suspend all activities using sealed sources until it is replaced with a properly calibrated and operable instrument.
- 6.4 Radiation survey instruments transported in company vehicles should be carried in the driver's compartment.
- 6.5 Operating instructions for approved instruments are as follows:

(a) Victoreen Instruments - Models 492

1. Turn on/off switch to zero position.
2. Allow minimum 30 seconds warm up time.
3. Turn on/off switch to X-100 position.
4. Check radiation area with switch in this position. (On/off switch can be turned to lower radiation recording level once it has been ascertained a lower level exists).

Recording scale 0 to 10 MR/HR

1. When on/off switch is set on X-1 read scale direct. This will register MR/HR.
2. When on/off switch is set on X-10 read scale direct and multiply by 10, this will give you MR/HR.
3. When on/off switch is set on x-100 read scale direct and multiply by 100, this will give you MR/HR.

(b) Industrial Nuclear - Model 1

1. Turn on/off switch to X-100 scale.
2. Allow minimum 30 seconds warm up time.
3. Place Battery Switch in A position and press battery check button. Note condition on meter.
4. Place Battery Switch in B position and press battery check button. Note condition on meter.
5. The Model 1 has dual batteries, steps 3 and 4 of above indicate the condition of each set. Place Battery Switch in position that showed the best battery condition. Never use an instrument that shows poor battery condition in both positions.

Recording scale reads 0 to 10 MR/HR

1. When on/off switch is set on X-1 read scale direct. This will register MR/HR.
2. When on/off switch is set on X-10 read scale direct and multiply by 10, this will give you MR/HR.

3. When on/off switch is set on X-100 read scale direct and multiply by 100, this will give you MR/HR.

## 7.0 SECURITY OF SEALED SOURCES

- 7.1 Each radiographic exposure device shall be provided with a lock designed to prevent unauthorized or accidental removal or exposure of a sealed source and shall be kept locked at all times except when in use and under the direct surveillance of a radiographer or radiographer's assistant.
- 7.2 Each radiographic exposure device shall be stored in a container or place (such as a room, area, or truck) which is provided with locks and such other safeguards as may be needed to protect against unauthorized or accidental removal.
- 7.3 A physical radiation survey shall be made at the outside surfaces of the storage container or place, and the radiation levels at the surface shall not exceed 2 mr per hour.
- 7.4 A sign bearing the radiation caution symbol (magenta on yellow background) with the words "CAUTION - RADIOACTIVE MATERIAL" must be posted on the outside of the container or place.
- 7.5 Sealed sources, not assigned to job sites, will not remain in a vehicle overnight. Sources must be secured in storage areas designated for each Plant Inspection Field office location.

## 8.0 TRANSPORTATION OF SEALED SOURCES

- 8.1 Whenever a radiographic exposure device containing a sealed source is transported, it must be secured in a storage compartment of the transporting vehicle to prevent shifting or loss. The device and the compartment must be locked to prevent unauthorized entry and the compartment must be posted with a sign bearing the radiation caution symbol (Magenta on yellow background) with the words "CAUTION - RADIOACTIVE MATERIAL."
- 8.2 A physical radiation survey shall be made of the storage compartment and the levels of radiation shall not exceed the levels referenced in Paragraph 7.3. The radiation level at the driver's location shall not exceed two (2) mr per hour. A record of the survey shall be made on the Radiation Report (See Appendix A).
- 8.3 The transporting vehicle must be posted in accordance with Department of Transportation regulations, with radiation warning signs stating "RADIOACTIVE." The signs shall be posted on all four (4) side of the vehicle.

8.4 Emergency procedures to be followed in the event of a road accident are detailed in Paragraph 11.1.

9.0 INSTRUCTIONS FOR RESTRICTING AND CONTROLLING ACCESS TO RADIOGRAPHIC AREAS

9.1 Each Radiographic Area must be barricaded or roped off and posted with a minimum of four signs, one at each 90 degrees at the perimeter (2mr/hr) reading "CAUTION - RADIATION AREA." The perimeter of the high radiation area shall be conspicuously posted with "CAUTION - HIGH RADIATION AREA" signs. These areas are defined in Par. 3.7 and 3.8. The approximate perimeter of the radiographic area can be determined by referencing the Radiation Level/Distance Charts ( see Appendix C). A radiation survey shall be made to adjust the boundaries of the radiation area as soon as the source has been exposed. The total quantity of radiation in any one hour shall not exceed 2 mr at the barrier. The radiographer and/or assistant radiographer shall keep the area under constant surveillance to protect against unauthorized entry, except where areas are equipped with control devices, locks or alarm systems to protect against unauthorized or accidental entry.

9.1.1 The radiographer must complete a radiation report (see Appendix A) each time a temporary radiographic area is erected.

9.2 For cross-country pipeline inspection, wherein the work progress in a forward direction constantly changes with each radiograph, the radiographer shall:

- (a) Make a survey to determine the perimeter of the 2 mr/hr area.
- (b) Post "CAUTION - RADIATION AREA" signs at the 2 mr/hr perimeter. One sign to be placed to the rear and one sign forward of the weld being radiographed.
- (c) Determine that no obstruction exists which will prevent or interfere with a constant surveillance in all directions.
- (d) Maintain constant surveillance during each exposure.

9.2.1 The radiographer must complete a radiation report (see Appendix A) each shift radiography is performed under the above conditions of constantly changing pipeline locations.

- 9.3 The procedures specified in Paragraph 9.1 shall be followed when exchanging sealed sources between a radiography exposure device and source changer.
- 9.4 If any unauthorized person enters the radiation area the source will be retracted and no exposures made until the area is cleared.

10.0 PROCEDURES FOR HANDLING AND USE OF LICENSED SEALED SOURCES AND RADIOGRAPHIC EXPOSURE DEVICES

- 10.1 General - All sealed sources used for industrial radiography by Plant Inspection Co. are housed in remote operated, shielded camera type devices. The handling of byproduct materials using "open air" or "fish pole" techniques is prohibited. Any available natural shielding and /or a collimator shall be used when practicable.
- 10.2 When performing radiography, a physical radiation survey must be made at 3 points on the exposure device (rear, front and top) as follows:
- (a) After each radiographic exposure to determine that the sealed source has been returned to its shielded position, in addition to the above 3 point survey, the guide tube must be surveyed after each exposure.
  - (b) Prior to securing the radiographic exposure device, to determine that the sealed source is in its shielded position. The highest reading of this survey must be recorded on the radiation report ( See Appendix A).
- 10.2.1 In no case should the levels of radiation for the above surveys exceed the following limits:
- (a) Radiographic exposure devices measuring less than four (4) inches from the sealed source storage position to any exterior surface of the device shall have no radiation level in excess of 50 milliroentgens per hour at six (6) inches from any exterior surface of the device.
  - (b) Radiographic exposure devices measuring a minimum of four (4) inches from the sealed source storage position to any exterior surface of the device, and all storage containers for sealed sources or for radiographic exposure devices, shall have no radiation level in excess of 200 milliroentgens per hour at any exterior surface, and ten (10) milliroentgens per hour at one meter from any exterior surface.

10.3 Each licensed radiographic exposure device is described on the following pages along with specific operation procedures:

THESE PROCEDURES ARE TO BE FOLLOWED FOR MAKING A COMPLETE EXPOSURE CYCLE. RADIOGRAPHIC PROCESSES REQUIRING MORE THAN ONE EXPOSURE ARE TO FOLLOW THE PROCEDURES TO POINT XXX. EXPOSURE, SURVEYS ARE RETRACTING OPERATIONS ARE TO BE REPEATED AS REQUIRED AND THE PROCEDURE CONTINUED AT THE END OF THE LAST EXPOSURE.

10.3.1 GAMMA INDUSTRIES CAMERAS

These procedures are to be followed for making a complete exposure cycle. Radiographic processes requiring more than one exposure are to follow the procedures to point XXX. Exposure, surveys and retracting operations are to be repeated as required and the procedure continued at the end of the last exposure.

(a) GAMMA INDUSTRIES MODEL "GAMMA CENTURY" CAPACITY - 100 CURIES IRIIDIUM 192

This is a special light weight unit using depleted uranium for shielding material.

This unit consists of three parts (storage safe, control cables, and guide tube).

Size	5½" diameter, 8" High
Weight:	32 pounds
Guide Tube:	Up to 23 ft. long
Control Cable:	25 ft. long

All exposure devices must be inspected at the beginning of each day that it is used. The radiographer making the inspection will sign the radiation report in the space provided, certifying the inspection was performed.

INSPECTION PROCEDURES ARE FOUND IN SECTION 13.0

Operation:            SURVEY CAMERA

1. Remove the protector cap from the lock box thereby exposing the pigtail connector.
2. Crank the control cable to a length of approximately six inches and connect to the pigtail.
3. Crank the control cable in so that male connection thread can be screwed into lock box.
4. Screw control cable into lock box.
5. Remove safety plug from protruding nipple approximately one inch from top of unit and connect the guide tube.
6. Place free end of guide tube in desired position trying to keep it in a straight line without kinks.
7. Stretch control cable away from exposure device in as straight a line as possible.
8. Unlock exposure device.
9. Crank source out as smoothly as possible. When you feel that source is approaching end of guide tube, slow turning speed so that pigtail does not bang end of guide tube.
10. Survey to determine that radiation levels do not exceed 2 mr/hr at the boundaries or perimeter of the radiographic area.
11. At end of exposure, retract source into the exposure device by reversing the cranking action.
12. Survey camera and guide tube carefully to be sure that source has returned to safe position.
13. Depress plunger lock.  
(WARNING - THIS EXPOSURE DEVICE CAN BE LOCKED IN UNSAFE POSITION)  
XXX
14. Disconnect source tube and insert Safety Plug.
15. Disconnect control cables and replace protector cap.

The location of the source (storage safe, guide tube, or exposure position) must always be determined by using a survey meter before, during and after each exposure.



### 10.3.2 Gulf Nuclear Cameras

These procedures are to be followed for making a complete exposure cycle. Radiographic processes requiring more than one exposure are to follow the procedures to point XXX. Exposure, surveys and retracting operations are to be repeated as required and the procedure continued at the end of the last exposure.

#### (a) Gulf Nuclear Model 20V - Capacity 100 Curies - Iridium 192

This unit consists of three main components: (1) a head in which the source is stored, (2) a flexible guide tube, and (3) a control box and mechanical source positioner.

Size:	9 3/8" x 6" x 4 3/4"
Weight:	37 pounds
Guide Tube:	Up to 23 ft. long
Control Cables:	25 ft. long

All exposure devices must be inspected at the beginning of each day that it is used. The radiographer making the inspection will sign the radiation report in the space provided, certifying the inspection was performed. INSPECTION PROCEDURES ARE FOUND IN SECTION 13.0.

#### Operation:      SURVEY CAMERA

1. Remove the protector cap from the lock box thereby exposing the pigtail connector.
2. Crank the control cable to a length of approximately six inches.
3. Connect control cable to source pigtail.
4. Crank control cable in so that male connecting thread can be screwed into lock box.
5. Screw control cable into lock box.
6. Remove safety plug from the out connection approximately inches from top of unit and connect the guide tube.
7. Place free end of guide tube in desired position trying to keep it in a straight line without kinks.
8. Stretch control cable away from exposure device in as straight a line as possible.
9. Unlock exposure device.

10. Crank source out as smoothly as possible. When you feel that source is approaching end of guide tube, slow turning speed so that pigtail does not bang into the end of guide tube.
11. Survey to determine that radiation levels do not exceed 2 mr/hr at the boundaries or perimeter of the radiographic area.
12. At the end of exposure, retract source into the exposure device by reversing the crank action.
13. Survey camera and guide tube carefully to be sure that source has returned to a safe position.
14. Depress plunger lock.

(WARNING: THIS EXPOSURE DEVICE CAN BE LOCKED IN UNSAFE POSITION)

15. Disconnect source tube and insert safety plug.

or

Cause a constant survey to be performed at the camera until the source is re-exposed.

XXX

16. Disconnect control cables and replace protector cap.

The location of the source (storage safe, guide tube or exposure position) must always be determined by using a survey meter before, during and after each exposure.

### 10.3.3

#### Technical Operations Came as

These procedures are to be followed for making a complete exposure cycle. Radiographic processes requiring more than one exposure are to follow the procedures to point XXX. Exposure, surveys and retracting operations are to be repeated as required and the procedure continued at the end of the last exposure.

#### (b) Technical Operations Model 660,668 Capacity 100 Curies Iridium 192

This unit consists of three main components (1) a head-in which the source is stored, (2) a flexible guide tube, and (3) a control box and mechanical source positioner.

Size: 5" x 10"  
Weight: 44 pounds  
Guide Tube: Up to 23 ft. long  
Control Cable: 25 ft. long

All exposure devices must be inspected at the beginning of each day that it is used. The radiographer making the inspection will sign the radiation report in the space provided, certifying the inspection was performed.

INSPECTION PROCEDURES ARE FOUND IN SECTION 13.0

Operation: SURVEY CAMERA

1. Unlock plunger and rotate locking ring to the connect position.
2. Remove the protector cap from the lock box thereby exposing the pigtail connector.
3. Crank the control cable to a length of approximately six inches.
4. Connect control cable to source pigtail.
5. Crank control cable in so that control head fits into holes provided in the camera body.
6. Rotate locking ring to the lock position and depress lock plunger.
7. Remove safety plug from the out connection approximately four inches from top of unit and connect the guide tube.
8. Place free end of guide tube in desired position trying to keep it in a straight line without kinks.
9. Stretch control cable away from exposure device in as straight a line as possible.
10. Unlock plunger and rotate lock ring to the operate position.
11. Crank source out as smoothly as possible. When you feel that source is approaching end of guide tube, slow turning speed so that pigtail does not bang into the end of guide tube.

12. Survey to determine that radiation levels do not exceed 2 mr/hr at the boundaries or perimeter of the radiographic area.
13. At the end of exposure, retract source into the exposure device by reversing the cranking position.
14. Survey camera and guide tube carefully to be sure that source has returned to a safe position.
15. Rotate lock ring to the lock position and depress plunger.  
( WARNING - THIS EXPOSURE DEVICE CAN BE LOCKED IN UNSAFE POSITION)  
XXX
16. Disconnect source tube and insert safety plug.
17. Disconnect control cables and replace protector cap.

The location of the source (storage safe, guide tube or exposure position) must always be determined by using a survey meter before, during and after each exposure.

#### 10.4 SOURCE CHANGERS

Only employees who have received instructions in source changers will be allowed to make source changes.

##### 10.4.1 Gamma Industries Changers

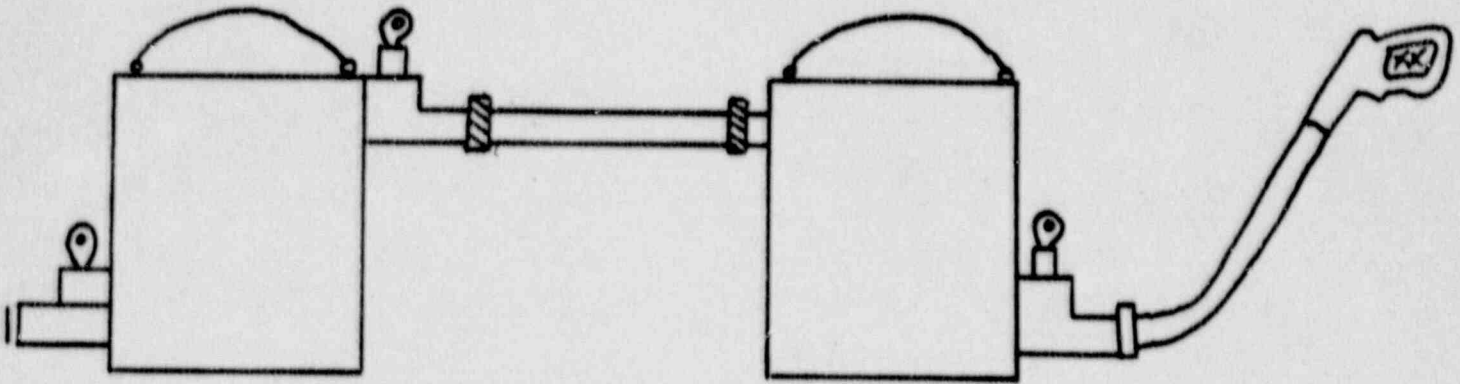
###### Models 10

The container has two lock boxes - one on each side. The upper lock box is labeled "NEW SOURCE" and the upper tube contains the new source. The lower lock box and tube contain a safety plug when shipped to you. The lower tube will be used to return the decayed source to Gamma Industries.

ALWAYS HAVE A PROPERLY OPERATING SURVEY METER AT HAND WHEN CHANGING SOURCES!!

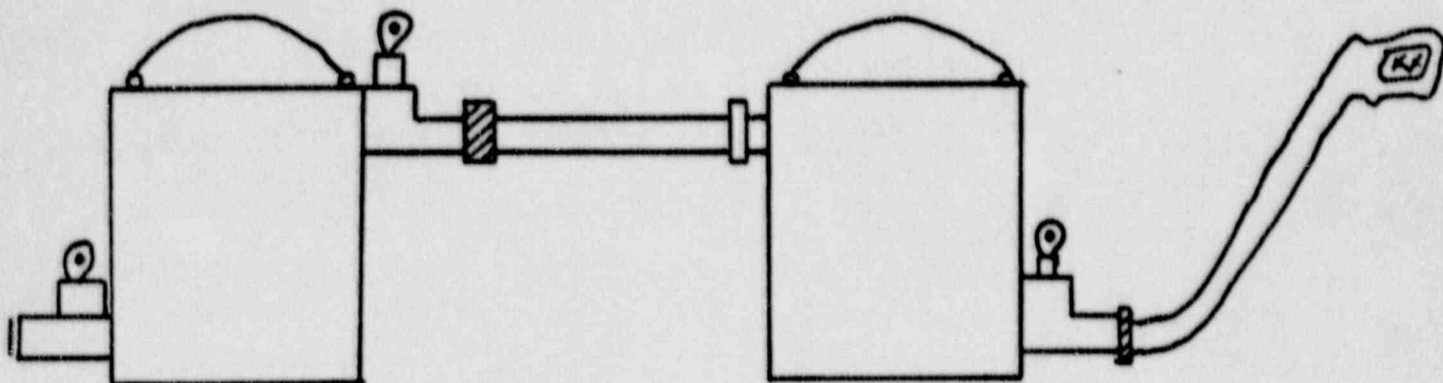
1. Survey the shipping container with meter. The radiation intensity should not exceed 10 mr/hr at 1 meter from any surface of the C-10.
2. Open the lower lock of the C-10 shipping container.  
Remove the safety plug.

3. Connect one end of short exchange tube (provided in the shipping barrel) to the lower lock box of the C-10 shipping container. Attach the other end of the short exchange tube to your camera.



4. Crank your old source into the C-10 shipping container until it reaches a definite stop.
5. Survey to assure that the old source has reached a safe position.
6. Lock the lower lock of the C-10 shipping container onto the old pigtail locking ball. You must be aware that the source could be removed from the open end of the lock box if the lower lock is not locked.
7. Remove the short exchange tube from the C-10 shipping container. Disconnect the control cable from the old pigtail. (Attempt to move the pigtail into and out of the C-10 shipping container to assure the lock is depressed upon the pigtail locking ball. If the pigtail can be moved, then open the lower lock, carefully move the pigtail and lock the lock upon the pigtail locking ball. This will assure that the old source will remain properly locked and shielded during the return shipment.)
8. Remove the source protector cap from the upper lock box and attach the source protector cap over the old source pigtail in the lower lock box.
9. Attach the control cable to the new pigtail which is in the upper lock box.

10. Attach short exchange tube to the C-10 shipping container upper lock box.



11. Unlock the upper lock from the new source.
12. Standing as far away as possible, crank the new source from the C-10 shipping container into your camera.
13. Survey.
14. Lock your camera lock.
15. Remove the short exchange tube from your camera. Remove the short exchange tube from the C-10 shipping container.
16. Insert the safety plug into the upper tube of the C-10 shipping container. Lock the upper lock of the C-10 shipping container.
17. Survey.
18. Place the C-10 into the barrel in the same orientation which it was received. Place the short exchange tube into the barrel. Place the top on the barrel and secure with the locking ring.
19. Insert a safety seal into the barrel locking ring.
20. Survey. (The radiation intensity should not exceed 200 mr/hr at any barrel surface or 10 mr/hr at 1 meter from any barrel surface).

10.4.2 Gulf Nuclear Source Changers Models U-110 and U-110A

The container has two lock boxes - one on each side. One side contains the new source, and the other will be used to return the decayed source to Gulf Nuclear.

The following procedure must always be followed in the source changing operation:

**ALWAYS HAVE A PROPERLY OPERATING SURVEY METER AT HAND WHEN CHANGING SOURCES:**

1. Survey the shipping container with meter. The radiation intensity should not exceed 10 mr/hr at 1 meter from any surface of the U-110.
2. Remove the exchanger from the drum.
3. Set up radiography camera for normal operation with changer tube attached. Attach end of tube to empty side of source changer.
4. Standing as far away as possible from camera and source changer, crank spent source into source changer. Lock source in place. Remove key.
5. Previous operation should be monitored very carefully. Check camera, changer tube and source changer to see that radiation levels are all within safety limits.
6. Unscrew coupling connecting change tube to source changer. Connector of spent source should protrude about 1/2" from port ( Radiation levels should be monitored during this operation with a meter placed near the exchanger. You must be aware that the source could be removed from the open end of the camera if the lock box is not locked).
7. Disconnect the source from the drive cable.
8. Remove safety cap from new source and install on the spent source.

INSTRUCTION FOR INSTALLING NEW SOURCE IN RADIOGRAPHY CAMERA

9. Position radiography camera with drive cable protruding about 1/2" beyond end of changer tube. Avoid kinks. Tube should be laid out as straight as possible.
10. Connect new source to drive cable.

11. Screw coupling at end of changer tube onto source changer. Unlock exchanger.
12. Standing as far away as possible from camera and source changer, pick up reel and crank source quickly into camera. Lock camera. After transfer, operator should immediately monitor camera, changer tube and source changer to double-check that operation has been completed safely.
13. After monitoring has demonstrated everything is in order, the changer tube should be unscrewed from source changer and camera.
14. Remove metal source identification plate from source changer and fasten to camera.
15. Replace changer and changer tube in the drum. Prepare drum for return shipment to Gulf Nuclear, Inc.

#### 10.4.3 Technical Operations Changers

Models 414, 650 and 488

##### ALWAYS HAVE A PROPERLY OPERATING SURVEY METER AT HAND WHEN CHANGING SOURCES

1. Survey container with meter. Surface reading should not exceed 200 mr/hr.
2. After setting up the projector as for an exposure, omitting the terminal source tube, place source changer nearby and remove the cover by cutting the seals and unscrewing the 4 bolts.
3. Unscrew and remove the cap (and hold down rod) from the empty channel. Open the coupler assembly to make a positive visual check before continuing.
4. Screw on the source tube from your projector and crank the old source all the way into the empty channel. NOTE: Check this operation with your radiation monitor. At the completion of this step the rate of radiation from the source changer should not be significantly higher than originally.
5. Open the coupler assembly and disengage the connectors with the spring release tool, separating the drive cable from the source cable.



6. Unscrew the source tube, replace the cap (and hold down rod) and tape the coupler assembly shut to complete this operation. Mark or tag the channel containing the old source to avoid a possible mix-up.

#### Installing the New Source in Your Projector

7. Unscrew cap (and hold down rod) from source channel containing the new source.
8. Screw on the source tube from your projector.
9. Open the coupler assembly and snap the drive cable connector into the female source cable connector. Check for a positive connection and close the coupler assembly.
10. Return to the projector control unit and retract the source into the source shield and monitor Projector, Guide tube and changer.
11. Unscrew the source tube, screw on your terminal source tube, and replace the cap (and hold down rod) on the now empty source channel. Close, bolt, and seal the source changer.
12. Prepare changer for shipment to Technical Operations as detailed in Paragraph 10.4

#### 10.4.4 Industrial Nuclear Changer Model 50

##### ALWAYS HAVE A PROPERLY OPERATING SURVEY METER AT HAND WHEN CHANGING SOURCES

1. Survey new source shipping drum. Record both surface MR/hr and 36" MR/hr. Note: If surface dose rate exceeds 200 Mr/hr., place container in a safe area and contact the supplier.
2. Remove the source shipping container from drum.
3. Attach one end of the transfer tube to the camera in the usual manner. Remove green dust cap from changer.  
  
Remove adaptor plug from dust cap, attach it to source

changer lock body. Connect the other end of the exposure tube to the adaptor plug on the empty side of the source changer. Position the equipment in such a manner as to permit free travel of the source assembly in the tube.

4. Position the drive crank the maximum distance from the camera.
5. Unlock the empty side of the source changer. This will be indicated by the fully extended red indicator on the lock body.
6. Quickly crank the source out of the camera and into the source changer. Survey the changer to verify the insertion of the source.
7. Secure the source changer lock. Red indicator fully retracted. Test pigtail to verify source is securely held by closed lock. This may be done by attempting to retract the source after the lock has been closed.
8. Unscrew the adaptor coupling connecting the exposure tube and the source changer. Disconnect the source from the drive cable in accordance with the camera manufacturer's instructions.

#### Instructions for Installing New Source in Isotope Camera

9. Remove the red dust cap on the lock body with the new source tag.
10. Install the red dust cap on the lock body containing

the spent source. Remove the spent source nameplate from the camera. Wire seal the spent source nameplate to the dust cap and lock body.

11. Align the isotope camera and exposure tube with source changer. The exposure tube should be straight and free of kinks with the end of the drive cable protruding 1/2" from the end of the housing.
12. Connect the new source to the drive cable in accordance with the isotope camera manufacturer's instructions.
13. Connect the exposure tube and adaptor coupling to the source changer lock body.
14. Position the camera drive crank the maximum distance from the camera.
15. Unlock the safety feature securing the new source in the source changer -- indicated by fully extended red indicator.
16. Quickly crank the new source into the camera. Survey the camera to verify safe position of the source.
17. Lock the camera and replace the adaptor and green dust cap. Attach the new source identification plate to the isotope camera.

11.0 EMERGENCY PROCEDURES

11.1 For sealed sources being transported. In the event of a road accident involving the transporting vehicle, the radiographer must immediately conduct a radiation survey to determine if the sealed source is exposed. If the source is exposed, the following steps must be taken:

- (a) Restrict and post the area in accordance with Paragraph 9.1.
- (b) The radiographer or radiographer's assistant must remain at the scene of the restricted area and, as soon as possible, notify the Radiation Safety Officer or Assistant (see Appendix B) and the local civil authorities.

11.1.1 In the event the radiation survey instrument is damaged, the established restricted area shall be maintained. No one shall be allowed in the area until the sealed source has been secured using an operable radiation survey instrument.

11.1.2 In the event the radiographer is injured and is unable to physically perform the required surveys, and area restrictions, he should assist the civil authorities by direction and by presenting them with a copy of this manual.

11.2 For sealed sources being used for radiography. In the event of an accident to the device containing a sealed source, immediately take the following steps:

- (a) Try to retract the source into the exposure device, following the standard operating procedures.
- (b) Make a radiation survey to ascertain that the source has been returned to the shielded position, and lock the device.
- (c) Do not use the device until you have made an inspection of the device to make certain that it is operating properly. If it does not operate properly, report the malfunction to the Radiation Safety Officer or Assistant immediately (See Appendix B). Do not continue using the device unless instructed to do so by the Radiation Safety Officer or Assistant.
- (d) In the event the source cannot be returned to the device:
  1. Restrict and post the area in accordance with Paragraph 9.1 MAINTAIN CONSTANT SURVEILLANCE.
  2. Contact the Radiation Safety Officer or Assistant immediately (See Appendix B). Do not attempt a recovery of the source until you have been instructed to do so.

11.3 For lost or stolen devices containing sealed sources

In the event a device has been stolen or lost, immediately take the following steps:

- (a) Notify the local civil authorities.
- (b) Notify the Radiation Safety Officer or Assistant (See Appendix B). He will advise the N.R.C. through the proper channels. ( State of California when applicable.)

12.0 LEAK TESTING SEALED SOURCES

12.1 Requirements

Leak testing shall be conducted at intervals not to exceed six months, or more often if reasonable cause exists, by a procedure capable of detecting the presence of .005 microcuries of contamination of the exposure device, storage container, or sealed source.

Leak tests of radioactive sources not returned to the manufacturer shall be conducted in the following manner.

Only employees that have received instructions in leak testing shall be allowed to perform the test.

12.2 Procedures Radiographic Devices

The test shall be conducted in the following manner.

- 12.2.1 Use survey meter to be sure the source is fully retracted into the safe shielded position.
- 12.2.2 Remove the shipping plug from the face of the shield.
- 12.2.3 Wet the swab with photo flow solution, shake off the excess and insert the swab in the hole of the shield. Wipe the interior of the hole thoroughly by rotating the swab holder.
- 12.2.4 Withdraw the swab and place in the plastic envelope.
- 12.2.5 The swab should now be monitored by the survey meter set on its most sensitive range. Place the meter in a low background area and move the swab in its plastic envelope to the meter - not the meter to the swab.
- 12.2.6 If there is no indication on the meter above background, put the plastic envelope with the swab in the mailer supplied and mail to the division office.

- 12.2.7 Repeat the procedures outlined above with the second swab. DO NOT MOISTEN the second swab.

Note: Be sure to fill out and return the identification sheet.

- 12.2.8 If there is an indication on the meter above background, it shall be considered as evidence of possible contamination. The individual making the test shall replace the shipping plug and lock the device. The device shall be returned to the storage area or place. Care should be taken to avoid any unnecessary contact with the equipment.

The Radiation Safety Officer shall be notified immediately, and no further handling of the equipment is allowed until the equipment has been proven safe.

### 12.3 EVALUATION OF SWAB

The swab will be evaluated by the Radiation Detection Company, Sunnyvale, California.

- 12.4 Records - Records of leak test results shall be kept in units of microcuries and maintained for inspection at main and division offices.

### 13.0 REQUIREMENT FOR DAILY INSPECTION OF RADIOGRAPHIC EQUIPMENT

- 13.1 All exposure devices must be inspected at the beginning of each day that it is used. The radiographer making the inspection will sign the radiation report in the space provided, certifying the inspection was performed.

- 13.2 Daily inspections are to be made by using the applicable checklist as follows:

1. Survey for excessive radiation levels.
2. Remove protector cap from lock box to expose the pigtail connector and wipe the connector clean.
  - (a) Inspect the connector for true elbow, straightness, excessive wear and cracks.
  - (b) Inspect the flexible cable at the connector for straightness.
  - (c) Inspect inlet for thread damage.

3. Inspect lock plunger for ease of operation. If not operating freely, clean and lubricate.

DEPRESS PLUNGER LOCK BEFORE ANY FURTHER INSPECTIONS

4. Check all labels for legibility.
5. Inspect for shifting of shield inside device.
6. Inspect carriage, wheels, lifting lugs and handles on units, so equipped.
7. Inspect crank assembly for excessive wear or any damage that may impair its operation.
8. Inspect conduit for excessive wear or any damage that may prevent free movement of the cable.
9. Crank drive cable out about 12 inches, inspect cable for flexibility and inspect connector for excessive wear or damage.
10. Inspect cable conduit end fitting for thread damage.
11. Inspect source tube for any damage that may affect the free movement of the source through the tube.
12. Make sure source tube end cap is secure.
13. Inspect source tube quick disconnect coupler for good working action.
14. Remove safety cap from source outlet and inspect outlet nipple for damage.

The inside of the source tube and all connection parts should be free of any foreign material that may impair the operation of the device before the components are assembled for use.

13.2.3 TECHNICAL OPERATIONS DEVICES

For Models 660, 668 Exposure Devices

"WARNING - ALL MODELS EXPOSURE DEVICES CAN BE LOCKED IN AN UNSAFE POSITION"

1. Survey for excessive radiation levels.
2. Inspect control and indicator assembly for loose hardware and damage.

3. Inspect control cables for cuts, breaks and broken fittings.
4. For Models with detachable controls:
  - (a) Check connector (ball and socket) for proper operation.
  - (b) Inspect lock for ease of operation. If not operating freely, clean and lubricate.
  - (c) Check operation of control cable locking ring.
5. Inspect for shifting of shield inside the device.
6. Inspect carriage, wheels, lifting lugs and handles of units, so equipped.
7. Check all labels for legibility.
8. Inspect source tube for cuts and kinks.
9. Make sure source tube end cap is secured.
10. Inspect source tube connector fitting for thread damage.
11. Check lock and shipping plug.

The inside of the source tube and all connection parts should be free of any foreign material that may impair the operation of the device before the components are assembled for use.

#### 13.2.4 GULF NUCLEAR

##### FOR MODEL 20V

WARNING - THIS MODEL EXPOSURE DEVICE CAN BE LOCKED IN AN UNSAFE POSITION

1. Survey for excessive radiation levels.
2. Remove protector cap from lock box to expose the pigtail connector and wipe the connector clean.
  - (a) Inspect the connector for true elbow, straightness, excessive wear and cracks.
  - (b) Inspect the flexible cable at the connector for straightness.
  - (c) Inspect inlet for thread damage.
3. Inspect lock plunger for ease of operation. If not operating freely, clean and lubricate.



DEPRESS PLUNGER LOCK BEFORE MAKING FURTHER INSPECTIONS

4. Check all labels for legibility.
5. Inspect for shifting of shield inside the device.
6. Inspect crank assembly for excessive wear or any damage that may prevent free movement of the cable.
7. Inspect conduit for excessive wear or any damage that may prevent free movement of the cable.
8. Crank drive cable out about 12 inches, inspect cable for flexibility and inspect connector for wear or damage.
9. Inspect cable conduit end fittings for thread damage.
10. Inspect source tube for any damage that may effect the free movement of the source through the tube.
11. Make sure source tube end cap is secure.
12. Inspect source tube quick disconnect coupler for good working action.
13. Remove safety cap from source outlet and inspect outlet nipple for damage.

The inside of the source tube and all connection parts should be free of any foreign material that may impair the operation of the device before the components are assembled for use.

INSTRUCTIONS FOR COMPLETING RADIATION REPORTS

One of two forms can be used for Radiation Reports.

Form 100 or Form 100A. Form 100 is used for temporary job sites, (less than one week duration) or for overtime situations where a Form 100A has already been completed for that source.

Form 100A is used at permanent job site where radiography is carried out on a weekly basis.

General: One of these forms must be completed by the radiographer for each day a sealed source is in his possession. If more than one job is performed in a day, a separate report is required for each job except for cross-country pipeline inspection where only one report per shift is required (see Section 9.0). Examples of properly completed reports are at the end of this Appendix. Items 1 thru 9 MUST be completed before the first exposure is made.

1. Date: Show the date of which source is used, stored or is being transported.
2. Location: Show the town where work was performed or best available identification such as West Delta Block 182, Off-shore, etc.
3. Customer: Show our customers name.
4. Type of Source: Record the type of source used.
5. Activity of Source: Record the curie strength for the date of the report. For Form 100A record curie strength for first day of report.
6. Exposure Device: Record the model number or identification and the serial number of the exposure device.
7. Survey Instrument: Record the model number or identification, and serial number.
8. Isotope Equipment Inspection: Equipment is to be inspected in accordance with Section 13, of Plant Inspections Radiation Safety Operating and Emergency Procedures. Signature of the radiographer certifies that the inspection was performed and found to be acceptable for use.

APPENDIX "A"

8A Days When Isotope Equipment is Not Used: Enter not used or NA in the area provided for the signature.

9 Results of Physical Survey: Record the radiation readings at the boundaries of the radiographic area you establish. These readings must be such that a person standing at the boundaries would be far enough from the source so that the exposure (dose rate) is 2 mr/hr or less. If this is not possible, the exposure time in any one hour must be reduced accordingly.

For example: If the dose rate is 4 mr/hr only 30 minutes exposure per hour is allowed (see Section 9.0 of O&E. 2. Record the approximate distance from the source to the barricade.

9A Days, when isotope and equipment is not used, enter, not used or NA in the space provided for the survey.

10 Record of Physical Survey made to determine if the source is in shielded position prior to securing exposure device. Record the dose rate (mr/hr) applicable for the exposure device being used. The exposure device is to be locked as soon as it is determined that the source is in the shielded position. Control cables and source tubes are NOT to be removed or stored until the exposure device has been surveyed and locked.

Days, when isotope equipment is not used, enter not used or NA in the space provided for survey.

11 Total Exposure Time for This Date: Record the total exposure time that the source was used this date. Hours to minutes.

11A Days when isotope equipment is not used, enter none in this space.

12 Radiographer's and Radiographer's Assistant/s:  
Print your first and last name (do not use nicknames). If an assistant is not used, print none in the space.

Dosimeter Readings: Record at the end of each shift the total exposure received by the radiographer and assistant/s. When exposure is received from more than one source of radiation, total exposure for the shift is to be recorded.

APPENDIX "A" CON'T

13 Survey of Transporting Vehicle:

This must be recorded for any day that the source is used or transported. Form 100 only.

13A Days when isotope equipment is not used or transported, enter not used or NA in all spaces in vehicle survey.

14. Vehicle Limits Driver:

Not to exceed 2 mr/hr. Outside surface: Not to exceed 2 mr/hr  
Additional shielding must be added if levels exceed limits set. Use definite readings, do not use "less than" statements  
(Example - Less than 2 mr/hr.)

# PLANT INSPECTION CO.

22903 ATHERTON STREET • HAYWARD, CA 94541  
(415) 537-0500

# RADIOGRAPHY REPORT

Order No.

3

Site No.

2

Date

1

Report to

P. O. or Job No.

SERIAL NO. OR PIECE NO	Film No.	ACC	REJ.	Defect Code	REMARKS

### TECHNIQUE DATA

Inspection Specification \_\_\_\_\_  
 Acceptance Standard \_\_\_\_\_  
 RT Procedure No. \_\_\_\_\_  
 Radiation Source \_\_\_\_\_ Strength \_\_\_\_\_ KV/CI  
 Material Thickness \_\_\_\_\_ Type Material \_\_\_\_\_  
 No. of Film per Cassette \_\_\_\_\_ Penetrameter \_\_\_\_\_ Shim \_\_\_\_\_  
 Viewing: Single \_\_\_\_\_ Superimposed \_\_\_\_\_  
 Pb Screens Front \_\_\_\_\_ Center \_\_\_\_\_ Back \_\_\_\_\_  
 Exposure Time \_\_\_\_\_ Dev. Time \_\_\_\_\_  
 Physical Source Size \_\_\_\_\_ Effective Focal Spot \_\_\_\_\_  
 SFD \_\_\_\_\_ Source to Object \_\_\_\_\_

### WORK SUMMARY

Film Size and Quantity						No. of Views
14" x 17"	4 1/2" x 17"	7" x 17"	4 1/2" x 8 1/2"	4 1/2" x 8 1/2"	70 MM in FT	
Time In		A.M. P.M.		Time Out		A.M. P.M.
Travel Time				Total Hrs.		
Lunch Time				Mileage		

### UTILIZATION LOG AND EXPOSURE DATA

#### DOSIMETER READINGS

Radiographer: No. 1. 12 IN \_\_\_\_\_ OUT \_\_\_\_\_  
 No. 2. 12 IN \_\_\_\_\_ OUT \_\_\_\_\_  
 1. Source locked in storage position? 10  
 2. Radiation level at surface of device 10 mr/hr  
 3. Radiation level 6" from surface of device 10 mr/hr

### 8 DAILY INSPECTION

CAMERA	Acc	Rej	CRANKS	Acc	Rej	TUBES	Acc	Rej
Safety Plug			Smooth Op.			Fittings		
Locks			Connector			Threads		
Labels			Wear			Wear		
Fittings			Hardware			Proper Fit		
Connector			Dirt			Dirt		

### 13 VEHICLE SURVEY

LIC. NO.	FRONT	SIDE 1	BACK	SIDE 2
To:	<u>14</u> mr/hr	mr/hr	mr/hr	mr/hr
From:	mr/hr	mr/hr	mr/hr	mr/hr

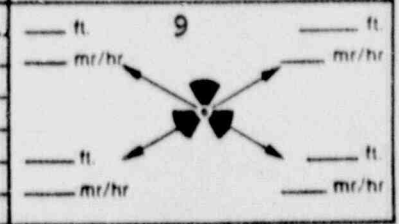
### DEFECT CODE

P - Porosity      SI - Slag Inclusions      TI - Tungsten Inclusion  
 C - Crack      BT - Burn Through      CV - Root Concavity  
 F - Incomplete Fusion      DT - Drop Through      CX - Root Convexity  
 SL - Slag Lines      UC - Undercut      OX - Oxidation

### UTILIZATION LOG

Camera Make 6  
 Camera Model 6 SN 6  
 Survey Meter Model 7  
 Survey Meter SN 7  
 Shielding Type THK  
 No. of Exposures 11  
 Isotope 4:5

### SURVEY REPORT



\_\_\_\_\_ LEVEL \_\_\_\_\_  
 1. \_\_\_\_\_  
 2. \_\_\_\_\_  
 3. \_\_\_\_\_  
 4. \_\_\_\_\_  
 5. \_\_\_\_\_  
 6. \_\_\_\_\_  
 7. \_\_\_\_\_  
 8. \_\_\_\_\_  
 9. \_\_\_\_\_  
 10. \_\_\_\_\_  
 11. \_\_\_\_\_  
 12. \_\_\_\_\_  
 13. \_\_\_\_\_  
 14. \_\_\_\_\_  
 15. \_\_\_\_\_  
 16. \_\_\_\_\_  
 17. \_\_\_\_\_  
 18. \_\_\_\_\_  
 19. \_\_\_\_\_  
 20. \_\_\_\_\_  
 21. \_\_\_\_\_  
 22. \_\_\_\_\_  
 23. \_\_\_\_\_  
 24. \_\_\_\_\_  
 25. \_\_\_\_\_  
 26. \_\_\_\_\_  
 27. \_\_\_\_\_  
 28. \_\_\_\_\_  
 29. \_\_\_\_\_  
 30. \_\_\_\_\_  
 31. \_\_\_\_\_  
 32. \_\_\_\_\_  
 33. \_\_\_\_\_  
 34. \_\_\_\_\_  
 35. \_\_\_\_\_  
 36. \_\_\_\_\_  
 37. \_\_\_\_\_  
 38. \_\_\_\_\_  
 39. \_\_\_\_\_  
 40. \_\_\_\_\_  
 41. \_\_\_\_\_  
 42. \_\_\_\_\_  
 43. \_\_\_\_\_  
 44. \_\_\_\_\_  
 45. \_\_\_\_\_  
 46. \_\_\_\_\_  
 47. \_\_\_\_\_  
 48. \_\_\_\_\_  
 49. \_\_\_\_\_  
 50. \_\_\_\_\_  
 51. \_\_\_\_\_  
 52. \_\_\_\_\_  
 53. \_\_\_\_\_  
 54. \_\_\_\_\_  
 55. \_\_\_\_\_  
 56. \_\_\_\_\_  
 57. \_\_\_\_\_  
 58. \_\_\_\_\_  
 59. \_\_\_\_\_  
 60. \_\_\_\_\_



PLANT INSPECTION'S RADIATION SAFETY PERSONNEL

<u>NAME AND TITLE</u>	<u>ASSIGNED LOCATION</u>	<u>BUSINESS PHONE</u>	<u>HOME PHONE</u>
R.L. Smith	RADIATION SAFETY OFFICER	HAYWARD, CALIF.	537-0500 (415) 935-5185
T.J. McCormick Jr.	ASSN'T RADIATION SAFETY OFFICER	" "	537-0500 (415)
J. Sheridan	RADIATION SAFETY MONITOR	BAKERSFIELD/ SANTA MARIA, CALIF.	
B. Martin	ASSN'T RADIATION SAFETY MONITOR		
M.B. GUARDUNO	RADIATION SAFETY MONITOR	ST CROIX, V.I.	
E. Vallery	RADIATION SAFETY MONITOR	S.F. BAY AREA, CALIF.	

**RADIATION LEVEL/DISTANCE CHART A**  
**Iridium - 192 (unshielded)**

5 curies

feet	mr/hr
1.0	29500
16.0	100
*35.0	24.1
76.8	5
121.5	2

10 curies

feet	mr/hr
1.0	59000
24.3	100
*35.0	48.2
108.6	5
171.6	2

15 curies

feet	mr/hr
1.0	88500
29.7	100
*35.0	72.2
133.0	5
210.4	2

20 curies

feet	mr/hr
1.0	118000
34.4	100
*35.0	96.3
153.6	5
242.9	2

25 curies

feet	mr/hr
1.0	147500
*35.0	120.4
38.4	100
171.7	5
271.6	2

30 curies

feet	mR/hr
1.0	17700
*35.0	144.5
38.4	100
188.1	5
297.5	2

35 curies

feet	mR/hr
1.0	206500
*35.0	168.6
45.4	100
203.2	5
321.3	2

40 curies

feet	mR/hr
1.0	236000
*35.0	192.6
48.6	100
217.2	5
343.5	2

45 curies

feet	mR/hr
1.0	265500
*35.0	216.7
51.5	100
230.4	5
364.3	2

50 curies

feet	mR/hr
1.0	295000
*35.0	240.8
54.3	100
242.8	5
384.0	2

55 curies

feet	mR/hr
1.0	324500
*35.0	264.7
57.0	100
254.7	5
402.8	2

60 curies

feet	mR/hr
1.0	354000
*35.0	289.0
59.5	100
266.1	5
420.7	2

65 curies

feet	mR/hr
1.0	383500
*35.0	313.1
61.9	100
276.9	5
437.9	2

70 curies

feet	mR/hr
1.0	413000
*35.0	337.1
64.3	100
287.4	5
454.4	2

75 curies

feet	mR/hr
1.0	442500
*35.0	361.2
66.5	100
297.5	5
470.4	2

80 curies

feet	mR/hr
1.0	472000
*35.0	385.3
68.7	100
307.2	5
485.8	2

85 curies

feet	mR/hr
1.0	501500
*35.0	409.4
70.8	100
316.7	5
500.7	2

90 curies

feet	mR/hr
1.0	531000
*35.0	433.5
72.8	100
325.9	5
515.3	2

95 curies

feet	mR/hr
1.0	560500
*35.0	457.5
74.9	100
334.8	5
529.4	2

100 curies

feet	mR/hr
1.0	590000
*35.0	481.6
76.8	100
343.5	5
543.1	2

105 curies

feet	mR/hr
1.0	619500
*35.0	505.7
78.7	100
352.0	5
556.5	2

110 curies

feet	mR/hr
1.0	649000
*35.0	529.8
80.6	100
360.3	5
569.6	2

115 curies

feet	mR/hr
1.0	678500
*35.0	553.9
82.4	100
368.4	5
582.4	2

120 curies

feet	mR/hr
1.0	708000
*35.0	557.9
84.1	100
376.3	5
595.0	2

Average cranking distance (control box to free end of guide tube)



APPENDIX "C"

**RADIATION LEVEL/DISTANCE CHART "B"**  
**Cobalt - 60 (unshielded)**

5 curies		10 curies		20 curies		30 curies	
feet	mR/hr	feet	mR/hr	feet	mR/hr	feet	mR/hr
1.0	72000	1.0	144000	1.0	288000	1.0	432000
26.8	100	37.9	100	*40.0	180	*40.0	270
*40.0	45	*40.0	90	53.7	100	65.7	100
20.0	5	159.7	5	240.0	5	293.9	5
89.9	2	268.3	2	379.5	2	464.7	2

40 curies		50 curies		60 curies		70 curies	
feet	mR/hr	feet	mR/hr	feet	mR/hr	feet	mR/hr
1.0	576000	1.0	720000	1.0	864000	1.0	1008000
*40.0	360	*40.0	450	*40.0	540	*40.0	630
75.9	100	84.5	100	92.9	100	100.4	100
339.4	5	379.4	5	415.7	5	449.1	5
577.6	2	600.0	2	657.3	2	709.9	2

80 curies		90 curies		100 curies		110 curies	
feet	mR/hr	feet	mR/hr	feet	mR/hr	feet	mR/hr
1.0	1152000	1.0	1296000	1.0	1440000	1.0	1584000
10.0	720	*40.0	810	*40.0	900	*40.0	990
107.3	100	113.8	100	120.0	100	125.8	100
180.0	5	509.1	5	536.6	5	562.8	5
158.9	2	805.0	2	848.5	2	890.7	2

\* AVERAGE CRANKING DISTANCE (control box to free end of guide tube)

SHIPPING OF RADIOACTIVE MATERIAL

1. No Plant Inspection employee will offer a package of radioactive material to a carrier for transportation unless the following requirements are met.
2. Only shipping containers authorized by Plant Inspection's license are to be used.
  - (a) Properly packaged exposure devices are classified as shipping containers.
3. The step-by-step instructions issued by the manufacturer of the container are followed in detail and in the sequence presented.
4. The source is securely locked in the fully shielded position as confirmed by carefully performed and recorded radiation surveys.
  - (a) The outside of each radioactive materials package must incorporate a feature such as a seal or lock which is not readily breakable and which, while intact, will be evidence that the package has not been illicitly opened.
  - (b) The survey of the shipping container and survey meter information will be recorded on Plant Inspection's requisition form.
  - (c) A visual inspection shall be made of the shipping container for damage that could cause a radiation hazard.
5. No package with radiation levels in excess of 200 milliroentgens per hour at the package surface, or 10 milliroentgens per hour at three feet, shall be released for shipment.
6. Package labeling and accompanying shipping papers shall be properly completed.
  - (a) Two appropriate radioactive materials warning labels must be affixed to opposite sides of the package. These labels and application are shown on Appendix "K" of Plant Inspection's Radiation Safety Operating and Emergency Procedures Manual.

APPENDIX "D" cont.

(b) The warning label shall indicate:

- (1) Contents (Iridium 192, Cobalt 60, etc.)
- (2) Number of curies
- (3) Transport index number (Transport index number is equal to the radiation level in millirem per hour at three feet from the package).

(c) Remove all old shipping labels and apply a new label and apply a new label that indicates:

- (1) Shipper (Company name, address and phone number).
- (2) Consignee (Company name, address, phone number and the name of the individual to be notified upon delivery).

RADIOACTIVE MATERIAL IS GENERALLY LIMITED TO TWO (2) MODES OF TRANSPORTATION MOTOR FREIGHT AND AIR FREIGHT. ALL RADIOACTIVE MATERIAL USED BY PLANT INSPECTION IS INDUSTRIAL TYPE AND CANNOT BE SHIPPED BY PASSENGER CARRYING AIRCRAFT.

(d) Air freight shipments require two (2) documents:

- (1) Air bill (See Appendix "K" for example and instructions).
- (2) Shippers Certification ( See Appendix "L" for example and instructions).

(e) Motor freight shipments require one (1) document:

- (1) Bill of Lading ( See Appendix "M" for example and instructions).

APPENDIX "E"

PROCEDURE FOR PICKING UP, RECEIVING AND OPENING PACKAGES

When ordering radioactive material to be delivered, give detailed instructions to the shipper, covering mode of transportation, delivery instructions, and name of individual who will be notified at time of delivery.

When ordering radioactive material that will be picked up at carrier's terminal, give detailed instructions to the shipper, covering mode of transportation, person to be notified, and a phone number where that person can be contacted.

When notified of the arrival of a shipment of radioactive material (that is to be picked up), the person notified shall notify either the RSO, Assistant RSO or a licensed Radiography. This individual shall see that the shipment is picked up at the earliest practical opportunity.

When a shipment of radioactive material is shipped directly to a facility and received by office personnel, that person shall notify either the RSO, Assistant RSO or a licensed Radiographer. The package shall be placed in a secure area, as far away from working personnel as possible, until a survey can be made by a Qualified Individual.

Survey the shipping container as soon as practical after receipt, but no later than three hours if received during working hours, or eighteen hours if received after normal working hours.

If readings are found that exceed the requirements -- 200 mr at any surface or 10 mr at three feet -- immediately notify by telephone and telegraph the final delivering carrier, the appropriate N.R.C. regional office, and Radiation Safety Officer.  
(State of California when applicable)

The procedures specified in Paragraph 9.1 of Plant Inspection's Radiation Safety Operating and Emergency Procedures Manual shall be followed when opening packages of radioactive material.

The above information shall be recorded on Plant Inspection's Requisition Form (Appendix "F").

Appendix "P"

REQUISITION

Division \_\_\_\_\_ Ordered By \_\_\_\_\_

Type of Isotope : IR 192      co 60      No. Curies Ordered \_\_\_\_\_

Ordered From \_\_\_\_\_ Shipped VIA \_\_\_\_\_

RECEIVING

Date \_\_\_\_\_ Time \_\_\_\_\_ AM/PM      Received By \_\_\_\_\_

Curies Received \_\_\_\_\_      Serial No. \_\_\_\_\_

In Shipping Container Model No. \_\_\_\_\_      Shipping Container Serial No. \_\_\_\_\_

Survey: Date \_\_\_\_\_ Time \_\_\_\_\_ AM/PM

Reading At Surface \_\_\_\_\_ MR/HR      Reading at 3 feet \_\_\_\_\_ MR/HR

Survey Meter Model No. \_\_\_\_\_      Serial No. \_\_\_\_\_      Calibration Date \_\_\_\_\_

TRANSFERS

Date \_\_\_\_\_ Source No. \_\_\_\_\_      Curie Strength \_\_\_\_\_

Transferred from SHP/CON No. \_\_\_\_\_      To Camera Model \_\_\_\_\_      Serial # \_\_\_\_\_

Camera at 6 inches \_\_\_\_\_ MR/HR      Camera at 1 meter \_\_\_\_\_ MR/HR

SHP/CON at contact \_\_\_\_\_ MR/HR      SHP/CON at 1 meter \_\_\_\_\_ MR/HR

Survey Meter Model No. \_\_\_\_\_      Serial No. \_\_\_\_\_      Calibration Date \_\_\_\_\_

Transfer and Survey By \_\_\_\_\_

Date \_\_\_\_\_ Source No. \_\_\_\_\_      Curie Strength \_\_\_\_\_

Transferred from Camera Model Number \_\_\_\_\_      Serial Number \_\_\_\_\_

To Camera Model Number \_\_\_\_\_      Serial Number \_\_\_\_\_

Reading at 6 inches \_\_\_\_\_ MR/HR      Reading at 1 meter \_\_\_\_\_ MR/HR

Survey Meter Model No. \_\_\_\_\_      Serial No. \_\_\_\_\_      Calibration Date \_\_\_\_\_

Transfer and Survey By \_\_\_\_\_

Source No. \_\_\_\_\_      Transferred to Shipping Cont. No. \_\_\_\_\_

For Disposal to \_\_\_\_\_

Survey of Shipping Container \_\_\_\_\_      Surface \_\_\_\_\_      MR/HR      3 feet \_\_\_\_\_      MR/HR

Transfer and Survey By \_\_\_\_\_      Date \_\_\_\_\_

REQUISITION

Division \_\_\_\_\_ Ordered By \_\_\_\_\_

Type of Isotope: IR 192 co 60 No. Curies Ordered \_\_\_\_\_

Ordered From \_\_\_\_\_ Shipped VIA \_\_\_\_\_

RECEIVING

Date \_\_\_\_\_ Time \_\_\_\_\_ AM/PM Received By \_\_\_\_\_

Curies Received \_\_\_\_\_ Serial No. \_\_\_\_\_

In Shipping Container Model No. \_\_\_\_\_ Shipping Container Serial No. \_\_\_\_\_

Survey: Date \_\_\_\_\_ Time \_\_\_\_\_ AM/PM

Reading At Surface \_\_\_\_\_ MR/HR Reading at 3 feet \_\_\_\_\_ MR/HR

Survey Meter Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_ Calibration Date \_\_\_\_\_

TRANSFERS

Date \_\_\_\_\_ Source No. \_\_\_\_\_ Curie Strength \_\_\_\_\_

Transferred from SHP/CON No. \_\_\_\_\_ To Camera Model \_\_\_\_\_ Serial # \_\_\_\_\_

Camera at Surface \_\_\_\_\_ MR/HR Camera at 6 inches \_\_\_\_\_ MR/HR

SHP/CON at contact \_\_\_\_\_ MR/HR SHP/CON at 1 meter \_\_\_\_\_ MR/HR

Survey Meter Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_ Calibration Date \_\_\_\_\_

Transfer and Survey by \_\_\_\_\_

Date \_\_\_\_\_ Source No. \_\_\_\_\_ Curie Strength \_\_\_\_\_

Transferred from Camera Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_

To Camera Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_

Reading at Surface \_\_\_\_\_ MR/HR Reading at 6 inches \_\_\_\_\_ MR/HR

Survey Meter Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_ Calibration Date \_\_\_\_\_

Transfer and Survey By \_\_\_\_\_

Source No. \_\_\_\_\_ Transferred to Shipping Cont. No. \_\_\_\_\_

For Disposal to \_\_\_\_\_

Survey of Shipping Container \_\_\_\_\_ Surface \_\_\_\_\_ MR/HR 3 feet \_\_\_\_\_ MR/HR

Transfer and Survey By \_\_\_\_\_

Survey Meter Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_ Calibration Date \_\_\_\_\_

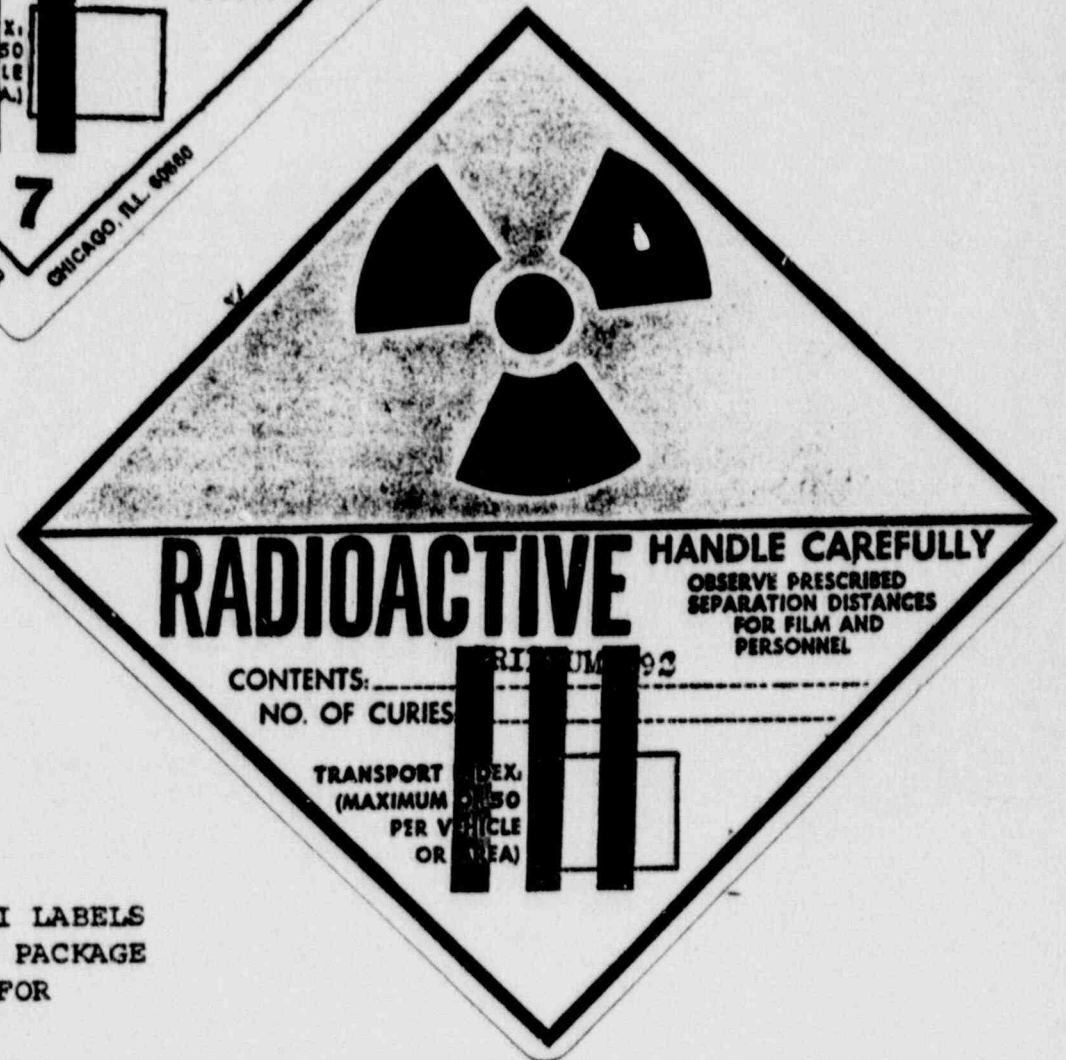
## PRIVACY ACT STATEMENT

Pursuant to 5 U.S.C. 552a(e) (3), enacted into law by section 3 of the Privacy Act of 1974 (Public Law 93-579), the following statement is furnished to individuals who supply information to the Nuclear Regulatory Commission on Form NRC-4. This information is maintained in a system of records designated as NRC 27 and described at 40 Federal Register 45344 (October 1, 1975).

1. **AUTHORITY** Sections 53, 63, 65, 81, 103, 104, 161(b), and 161(o) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2073, 2093, 2095, 2111, 2133, 2134, 2201(b), and 2201(o)). The authority for soliciting the social security number is 10 CFR Part 20.
2. **PRINCIPAL PURPOSE(S)** The information is used by the NRC in its evaluation of the risk of radiation exposure associated with the licensed activity and in exercising its statutory responsibility to monitor and regulate the safety and health practices of its licensees. The data permits a meaningful comparison of both current and long-term exposure experience among types of licensees and among licensees within each type. Data on your exposure to radiation is available to you upon request.
3. **ROUTINE USES** The information may be used to provide data to other Federal and State agencies involved in monitoring and/or evaluating radiation exposure received by individuals employed as radiation workers on a permanent or temporary basis and exposure received by monitored visitors. The information may also be disclosed to an appropriate Federal, State, or local agency in the event the information indicates a violation or potential violation of law and in the course of an administrative or judicial proceeding.
4. **WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT ON INDIVIDUAL OF NOT PROVIDING INFORMATION** It is voluntary that you furnish the requested information, including social security number; however, the licensee must have a completed Form NRC-4 on each individual whom the licensee proposes to expose to a radiation dose in excess of the amounts specified in 10 CFR 20.101(a). Failure to obtain the requested information before permitting such exposure may subject the licensee to enforcement action in accordance with 10 CFR 20.601. The social security number is used to assure that NRC has an accurate identifier not subject to the coincidence of similar names or birthdates among the large number of persons on whom data is maintained.
5. **SYSTEM MANAGER(S) AND ADDRESS** Director, Office of Management Information and Program Control  
U.S. Nuclear Regulatory Commission, Washington, D.C. 20555

RADIOACTIVE YELLOW II LABELS  
MUST BE AFFIXED TO TWO SIDES  
OF EACH PACKAGE MEASURING :  
MORE THAN 0.5 MR AT ANY  
SURFACE.

BUT NOT MORE THAN 50 MR AT  
ANY SURFACE AND NOT EXCEED-  
ING 1.0 MR AT THREE FEET  
FROM THE SURFACE.



RADIOACTIVE YELLOW III LABELS  
MUST BE USED FOR EACH PACKAGE  
EXCEEDING THE LIMITS FOR  
EITHER LABEL I OR II.



APPENDIX "I"

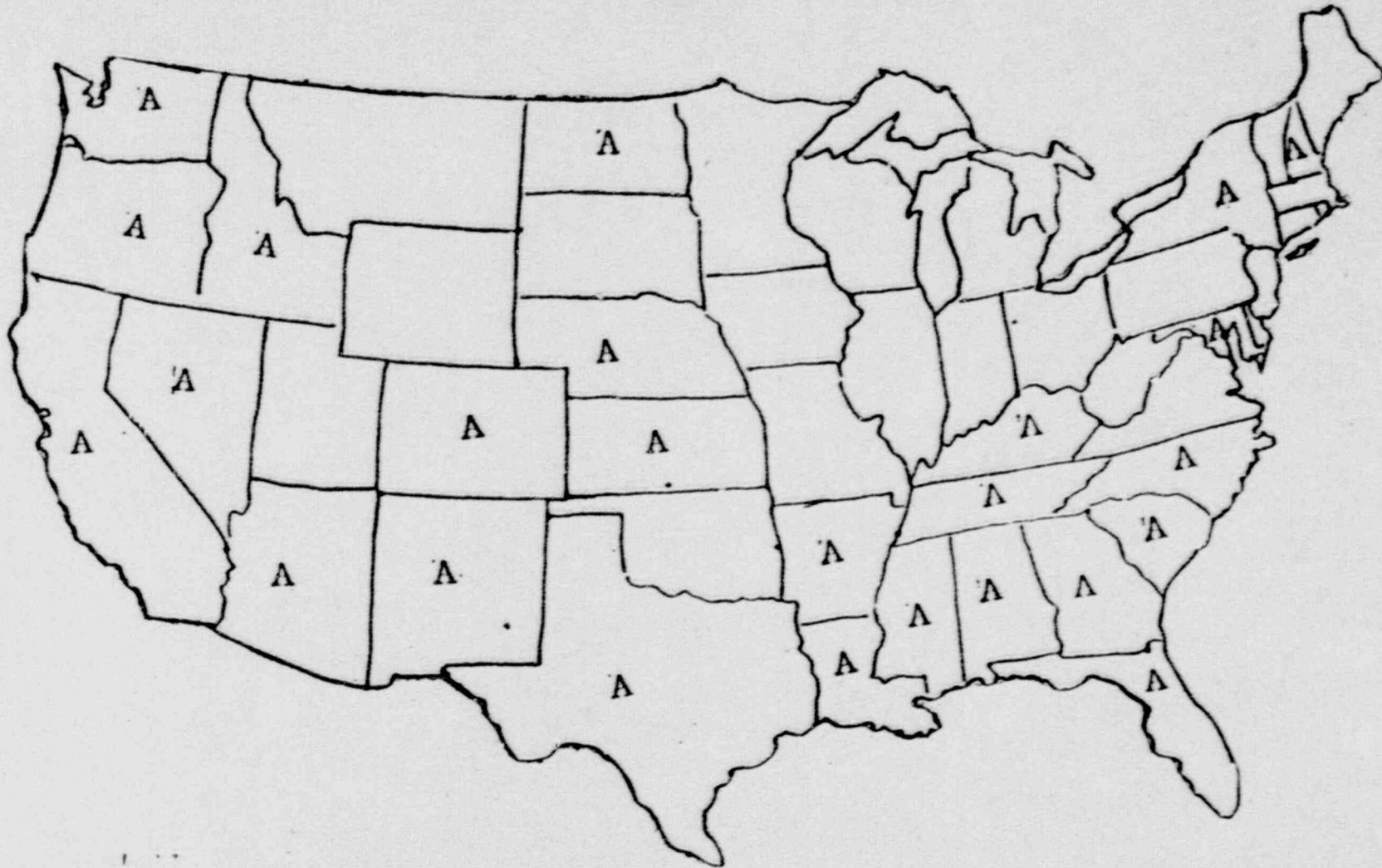
AGREEMENT STATES

	<u>STATE</u>	<u>RECIPROCITY</u>	<u>NOTIFICATION</u>
1.	Alabama	180 Days	3 Days
2.	Arizona	180 Days	3 Days
3.	Arkansas	20 Days	2 Days
4.	California	180 Days	3 Days
5.	Colorado	180 Days	5 Days
6.	Florida	180 Days	10 Days
7.	Georgia	45 Days (1)	3 Days
8.	Idaho	20 Days	3 Days
9.	Kansas	Unlimited	5 Days
10.	Kentucky	Unlimited	2 Days
11.	Louisiana	Unlimited	2 Days
12.	Maryland	180 Days	3 Days
13.	Mississippi	180 Days	3 Days
14.	Nebraska	180 Days	3 Days
15.	Nevada	180 Days	3 Days
16.	New Hampshire	Unlimited	2 Days
17.	New Mexico	180 Days	3 Days
18.	New York	180 Days	7 Days
19.	North Carolina	20 Days	5 Days
20.	North Dakota	180 Days	3 Days
21.	Oregon	180 Days	3 Days
22.	South Carolina	180 Days	3 Days
23.	Tennessee	180 Days	2 Days
24.	Texas	180 Days	2 Days
25.	Washington	180 Days	5 Days

NOTES:

- (1) Not to exceed 45 consecutive days or 180 days in any 365 day period.

AGREEMENT STATES



ALABAMA  
ARIZONA  
ARKANSAS  
CALIFORNIA  
COLORADO

FLORIDA  
GEORGIA  
IDAHO  
KANSAS  
KENTUCKY

LOUISIANA  
MARYLAND  
MISSISSIPPI  
NEBRASKA

NEVADA  
NEW HAMPSHIRE  
NEW MEXICO

NEW YORK  
NORTH CAROLINA  
OREGON  
SOUTH CAROLINA

TENNESSEE  
TEXAS  
WASHINGTON



486-3274

In Part 20 radiation hazards  
 from radioactive materials  
 from nuclear Regulatory  
 Commission

**YOUR EMPLOYER'S RESPONSIBILITY**

Your employer is required to—

1. Apply these NRC regulations and the condition of his NRC license to all work under the license
2. Post or otherwise make available to you a copy of the NRC regulations, licenses, and operating procedures which apply to work you are engaged in, and explain their provisions to you
3. Post Notices of Violation involving radiological working conditions, proposed imposition of civil penalties and orders.

**YOUR RESPONSIBILITY AS A WORKER**

You should familiarize yourself with those provisions of the NRC regulations, and the operating procedures which apply to the work you are engaged in. You should observe their provisions for your own protection and protection of your co-workers.

**WHAT IS COVERED BY THESE NRC REGULATIONS**

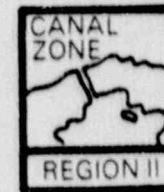
1. Limits on exposure to radiation and radioactive material in restricted and unrestricted areas;
2. Measures to be taken after accidental exposure;
3. Personnel monitoring, surveys and equipment;
4. Caution signs, labels, and safety interlock equipment;
5. Exposure records and reports;
6. Options for workers regarding NRC inspection; and
7. Related matters.

**REPORTS ON YOUR RADIATION EXPOSURE HISTORY**

1. The NRC regulations require that your employer give you a written report if you receive an

**POSTING**

Copies of this notice must be posted at every establishment where activities are conducted, to permit employees working in a restricted area to observe a copy of the employment.



**REGULATORY COMMISSION**

be contacted at the following addresses and telephone calls from employees who wish to register complaints or matters regarding compliance with Commission rules and

**Offices**

	TELEPHONE	
	DAYTIME	NIGHTS AND HOLIDAYS
USNRC	215 337-1150	215 337-1150
USNRC	404 221-4503	404 221-4503
USNRC	312 858-2660	312 858-2660
USNRC	817 334-2841	817 334-2841
USNRC Creek Plaza	415 486-3141	415 486-3141



PLEASE COMPLETE ALL INFORMATION IN THE 5 BLOCKS OUTLINED IN ORANGE  
SEE BACK OF FORM SET FOR COMPLETE PREPARATION INSTRUCTIONS

AIRBILL NUMBER

226826003



YOUR FEDERAL EXPRESS ACCOUNT NUMBER		DATE
TO (Your Name)		TO (Recipient's Name)
COMPANY		DEPARTMENT/FLOOR NO
PLANT INSPECTION CO.		GULF NUCLEAR INC.
STREET ADDRESS		STREET ADDRESS (P.O. BOX NUMBERS ARE NOT DELIVERABLE)
22903 ATHERTON STREET		202 MEDICAL CENTER BLVD
HAYWARD, CALIFORNIA		WEBSTER TX

BILL NO. 226826003	ZIP ACCURATE ZIP CODE REQUIRED FOR CORRECT INVOICING 9 4 1 5 4 0	IN TENDERING THIS SHIPMENT, SHIPPER AGREES THAT F.E.C. SHALL NOT BE LIABLE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING FROM CARRIAGE HEREOF. F.E.C. DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO THIS SHIPMENT. THIS IS A NON-NEGOTIABLE AIRBILL SUBJECT TO CONDITIONS OF CONTRACT SET FORTH ON REVERSE OF SHIPPER'S COPY. UNLESS YOU DECLARE A HIGHER VALUE, THE LIABILITY OF FEDERAL EXPRESS CORPORATION IS LIMITED TO \$100.00.	ZIP ACCURATE ZIP CODE REQUIRED FOR OVERNIGHT DELIVERY 8 7 5 9 8
--------------------	---	--	--

REFERENCE NUMBERS (FIRST 12 CHARACTERS WILL ALSO APPEAR ON INVOICE)

3

Bill Shipper  Bill Recipient's F.E. Acct  Bill 3rd Party F.E.C. Acct  Bill Credit Card

Cash in Advance Account Number/Credit Card Number

SERVICES CHECK ONLY ONE BOX	DELIVERY AND SPECIAL HANDLING CHECK SERVICES REQUIRED	PIECES	WEIGHT	DECLARED VALUE	OS	FEDERAL EXPRESS USE
<b>PRIORITY ONE (P-1)</b> <input checked="" type="checkbox"/> OVERNIGHT PACKAGES (6 to 7 LBS.) <input type="checkbox"/> COURIER PAK (7 to 15 LBS.) <input type="checkbox"/> OVERNIGHT ENVELOPE (6 to 7 LBS.) <input type="checkbox"/> OVERNIGHT BOX (6 to 15 LBS.) <input type="checkbox"/> OVERNIGHT TUBE (6 to 15 LBS.) <b>STANDARD AIR</b> <input type="checkbox"/> DELIVERY 2ND BUSINESS DAY FOLLOWING PICK UP	<input type="checkbox"/> HOLD FOR PICK UP AT FOLLOWING FEDERAL EXPRESS LOCATION SHOWN IN SERVICE GUIDE <input checked="" type="checkbox"/> DELIVER <input type="checkbox"/> SATURDAY SERVICE DELIVERY (See Service Guide for restrictions on delivery) <input checked="" type="checkbox"/> RESTRICTED ARTICLES SERVICE (P-1 and Standard Air Packages only, with charge) <input type="checkbox"/> DELI (Express Specialty Service requires extra charge option) <input type="checkbox"/> BRT (Bulky Return to Origin) <input type="checkbox"/> OTHER SPECIAL SERVICE	1	55	\$1500.00		FREIGHT CHARGES DECLARED VALUE CHARGE ADVANCE ORIGIN ADVANCE DESTINATION OTHER TOTAL CHARGES
RECEIVED AT SHIPPER'S DOOR <input type="checkbox"/> REGULAR STOP <input type="checkbox"/> ON-CALL STOP <input type="checkbox"/> F.E.C. LOC.		TOTAL	TOTAL	TOTAL		
		1	55	\$1500.00		
Federal Express Corporation Employee No. DATE/TIME For Federal Express Use						PART # 2041734049 REVISION DATE 5-15-80 PRINTED USA



ORIGIN ACCOUNTING COPY

APPENDIX "L"

SHIPPERS CERTIFICATION FOR RADIOACTIVE MATERIAL  
CARGO-ONLY AIRCRAFT

ATTENTION: Air shipments require two (2) Danger-Peligro Labels

The individual who completes and signs a shippers certification has certified the consignment is fully and accurately described by proper shipping name and classified, packed, marked, labelled and in proper condition for carriage by air.



- Instructions -

1. Mark, cargo-only aircraft
2. Indicate proper shipping name just as shown.
3. Radionuclide - Iridium 192 or Cobalt 60. DO NOT ABBREVIATE.  
indicate - NON-FISSILE.
4. Group - (as shown)
5. Form - (as shown)
6. Activity - Use the word CURIES and indicate amount.
7. Number of packages covered by this document.
8. Category - Indicate Yellow II or Yellow III.
9. Transport Index - m/nr at three feet.
10. Type - Type B
11. The serial number of the source should be shown as indicated.
12. Special Handling information (CARGO-ONLY AIRCRAFT).
13. Name and address of shipper.
14. Name and title of person signing certificatio. ( a phone contact is advisable).
15. Date.

Distribution:            2 Copies handed to carrier  
                             1 copy - Main Office

PACKAGES OVER 110 LBS MUST HAVE THE WEIGHT MARKED ON THE OUTSIDE OF THE  
PACKAGE

**SHIPPER'S CERTIFICATION FOR RADIOACTIVE MATERIALS**

**APPENDIX L**

**SAMPLE ONLY**

Two completed and signed copies of this certification shall be handed to the carrier.  
(Use block letters)

**WARNING:** Failure to comply in all respects with the IATA Restricted Articles Regulations may be a breach of the applicable law, subject to legal penalties. This Certification shall in no circumstance be signed by an IATA Cargo Agent, consolidator or a forwarder.

This consignment is within the limitations prescribed for: (mark one)

both passenger and cargo aircraft      (1)  only cargo aircraft

NATURE AND QUANTITY OF CONTENT				PACKAGE			
(3) RADIONUCLIDE	(4) GROUP	(5) FORM	(6) ACTIVITY	(7) Number of Packages	(8) CATEGORY	(9) TRANSPORT INDEX	(10) TYPE
NAME OR SYMBOL OF PRINCIPAL RADIOACTIVE CONTENT	GROUP NUMBER OF GROUPS I TO VII	CHEMICAL FORM AND PHYSICAL STATE (GAS, LIQUID/SOLID), OR SPECIAL FORM, OR SPECIAL ENCAPSULATION	NUMBER OF CURIES, OR MILLI-CURIES		I - WHITE II - YELLOW III - YELLOW LABEL	FOR YELLOW LABEL CATEGORIES ONLY	INDUSTRIAL OF TYPE A, OR TYPE B
Radioactive Material N.O.S. Cargo-only Aircraft	111	Solid Metal  Special Form	101  (11)	1  Source Ser. #12567	Yellow 111	2.0	Type B

**ADDITIONAL INFORMATION REQUIRED FOR FISSILE MATERIALS ONLY**

EXEMPTED FROM THE ADDITIONAL REQUIREMENTS FOR FISSILE MATERIALS SPECIFIED IN 7.1, OF PART 2 OF THE IATA RESTRICTED ARTICLES REGULATIONS NAMES, PLUS QUANTITY IN GRAMS, OR CONCENTRATION OR ENRICHMENT IN U235:

NOT EXEMPTED:    FISSILE CLASS I        FISSILE CLASS II        FISSILE CLASS III   

Additional certificates obtained by the Shipper when necessary:

Special Form Encapsulation Certificate(s)        Certificate(s) for Large Radioactive Source      
 Type "B" Packaging Certificate(s)        Government Approvals/Permits      
 Certificate(s) for Fissile Material   

**Special Handling Information**

(12) CARGO ONLY AIRCRAFT

I hereby certify that the contents of this consignment are fully and accurately described above by Proper Shipping Name and are classified, packed, marked, labelled and in proper condition for carriage by air according to the current Edition of the IATA Restricted Articles Regulations and all applicable carrier and governmental regulations. I acknowledge that I may be liable for damages resulting from any misstatement or omission and I further agree that any air carrier involved in the shipment of this consignment may rely upon this Certification.

Name and full address of Shipper	Name and title of person signing Certification
Plant INSpection Company (13)	Paul L. Smith (14)
22903 Atherton St.	RADIATION SAFETY OFFICER
Hayward, Ca. 94541	(415) 537-0500
Date	Signature of the Shipper (see WARNING above)
(15) 10-29-81	

Air Waybill No.*	Airport of Departure*	Airport of Destination*
------------------	-----------------------	-------------------------

\*This box is optional for completion by issuing carrier

APPENDIX "M"

BILL OF LADING

A Bill of Lading other than the one shown on page      may be used if it contains spaces for the same information and has the certification statement as shown.

1. Enter the name of the carrier
2. Date
3. Consignee
4. Shipper
5. Enter number of units and container type. Examples  
(1 box) (1 drum)
6. Indicate HM ( HAZARDOUS MATERIAL)
7. Description and Classification
  - (a) Radioactive Material, Special Form, N.O.S.
  - (b) Type "B" Package
  - (c) Number of curries and material (Iridium 192 or Cobalt 60)
  - (d) Indicate "Bar" label applied to package, Yellow II or Yellow III
  - (e) Non-Fissile
  - (f) Transport index number of package
  - (g) Package I.D. number. This number can be found on most new type "B" packages. The 500 SU changer is USA/9006/B; the Model 500 Camera is USA/9007/B. Most other cameras are not type "B" unless they are packed in a Type "B" overpack (drum). The overpack will have the package I.D. number on the outside. Overpacks are available from AII, Tech/Ops and Gamma Industries for their respective cameras. If you are in doubt as to the correct packaging (or description) of any device, contact the manufacturer or the Radiation Safety office for instructions.

PACKAGES OVER 110 LBS. MUST HAVE THE WEIGHT MARKED ON THE OUTSIDE OF THE PACKAGE.

**UNIFORM STRAIGHT BILL OF LADING**

**Original—Not Negotiable**

Shipper's No. \_\_\_\_\_

Company Agent's No. \_\_\_\_\_

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading.

\_\_\_\_\_ 19\_\_\_\_ from \_\_\_\_\_

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery or said destination, if on its own road or its own water line, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained, including the conditions on back hereof which are hereby agreed to by the shipper and accepted for himself and his assigns.

(Mail or street address of consignee—For purposes of notification only)

Consigned to \_\_\_\_\_

Destination \_\_\_\_\_ State of \_\_\_\_\_ County of \_\_\_\_\_

Route \_\_\_\_\_

Delivering Carrier \_\_\_\_\_ Car Initial \_\_\_\_\_ Car No. \_\_\_\_\_

No. Packages	Description of Articles, Special Marks, and Exceptions	*Weight (Sub. to Car.)	Class or Rate	Check Column	
					Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.  (Signature of Consignor)  If charges are to be prepaid, write or stamp here, "To be Prepaid."          Received \$ _____ to apply in prepayment of the charges on the property described hereon.   Agent or Cashier  Per _____ (The signature here acknowledges only the amount prepaid.)  Charges Advanced:  \$ _____

If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether is "carrier's or shipper's weight."  
 NOTE—Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be of exceeding \_\_\_\_\_ per \_\_\_\_\_  
 \*The fibre boxes used for this shipment conform to the specifications set forth in the box maker's certificate thereon, and all other requirements of Uniform Freight Classification.  
 Shipper's imprint in lieu of stamp; not a part of bill of lading approved by the Interstate Commerce Commission.

\_\_\_\_\_ Shipper, Per **1** \_\_\_\_\_ Agent, Per \_\_\_\_\_

Permanent post-office address of shipper.

FD-696 (REVISED) ©

(This Bill of Lading is to be signed by the shipper and agent of the carrier issuing same)