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RADIATION SAFETY & CONTROL COMMITTEE

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1.0 RADIATION SAFETY AND CONTROL COMMITTEE:

- 1.1 The primary function of the Committee is to establish and enforce policy and safe practices in the use of radioactive isotope sealed sources in the field.
- 1.2 The Committee is composed of personnel with an extensive background in the theory and applications of radioactive isotopes and other forms of radiation producing devices.
- 1.3 The Corporate Committee consists of the Chief Welding Engineer, Manager of Welding and QA Services, Radiation Safety Officer, Assistant Radiation Safety Officers, Safety Director, and Manager of Inspection and Testing.

2.0 RESPONSIBILITIES OF COMMITTEE PERSONNEL:

2.1 Committee Personnel shall:

- 2.1.1 Read and become familiar with the requirements of these procedures and other applicable documents.
- 2.1.2 Be responsible for adherence by CBI personnel to the procedures in this safety manual.
- 2.2 The Chief Welding Engineer and the Manager of Welding and QA Services have management responsibility for the radiation safety program outlined in this manual.
- 2.3 The Radiation Safety Officer (RSO) reports directly to the Chief Welding Engineer or the Manager of Welding and QA Services and has the following responsibilities.
 - 2.3.1 Liaison officer with the NRC and State agencies on license matters.
 - 2.3.2 Maintain up-to-date operating and emergency procedures.
 - 2.3.3 Maintain control of licensed by-product material procurement, transfer within CBI and return to the exposure device manufacturer.
 - 2.3.4 Examine and determine competency of isotope radiography personnel.
 - 2.3.5 Conduct and/or supervise the Company forty (40) hour classroom Safety Training Program for Isotope Radiographers.
 - 2.3.6 Establish Leak Testing Program.



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- 2.3.7 Establish adequate storage facilities.
- 2.3.8 Establish and maintain the internal inspection system.
- 2.3.9 Establish a record keeping system to meet NRC and State regulations.
- 2.3.10 Review and assure maintenance of records required by NRC and State regulations.
- 2.3.11 Assume control and institute corrective action in emergency situations.
- 2.3.12 Investigate the cause of incidents and determine necessary preventive action.
- 2.3.13 Act in an advisory capacity to management and radiography personnel.
- 2.4 The Assistant Radiation Safety Officers (ARSO) are directly responsible to the RSO and will assume his duties in his absence, or when he is not available for any reason. They will serve as directed by the RSO and in addition will have the following responsibilities.
 - 2.4.1 Maintain personnel monitoring program.
 - 2.4.2 Maintain leak testing program.
 - 2.4.3 When necessary, perform source replacement operations.
 - 2.4.4 Review quarterly inventories and utilization logs.
 - 2.4.5 Assist in determining competency of isotope radiography personnel and six months review of these personnel.
 - 2.4.6 Assist in conducting the Company forty (40) hour classroom Safety Training Program for Isotope Radiographers.
- 2.5 The Safety Director is responsible for the CBI Accident Prevention Program. Construction Safety Supervisors, who have satisfactorily completed the forty (40) hour classroom Safety Training Program shall report jobsite visits to the Safety Director on the Radiation Safety Checklist (Form WL 238).



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2.6 The Manager of Inspection and Testing has the following responsibilities.

2.6.1 Maintain qualification records of Radiographers and Assistant Radiographers.

2.6.2 Maintain records of reports, surveys and calibration of instruments.

2.7 District Radiation Safety Officers and District Assistant Radiation Safety Officers have the following responsibilities.

2.7.1 Constant contact with the jobsites and frequent visits to the jobsites for inspection and supervision for compliance with this program.

2.7.2 Review and monitor jobsite and district office records.

2.7.3 Examine and qualify Assistant Radiographers.

2.7.4 Visit jobsites at least quarterly and send reports of visits to the RSO using the Safety/Training Meeting Report (Form WL 46).

3.0 RADIATION SAFETY AND CONTROL COMMITTEE PERSONNEL:

3.1 Corporate Committee

John B. Christofferson
Chief Welding Engineer

22 Palisades
Oak Brook, Illinois 60521
Phone: 312/279-0159

John B. Trout
Manager Welding & QA Services

6414 Hickorycrest Drive
Spring, Texas 77389
Phone: 713/376-7538

Charles N. Sherlock
Radiation Safety Officer and
Manager of Inspection & Testing

23910 Creekview
Spring, Texas 77389
Phone: 713/376-7691

Ronald W. Kruzic
Assistant Radiation
Safety Officer

3622 Rolling Forest Drive
Spring, Texas 77388
Phone: 713/288-4804

Hugh K. Howerton
Assistant Radiation
Safety Officer

London Operations
London, England

James R. Rhudy
Safety Director

11 Huntington Circle
Naperville, Illinois 60540
Phone: 312/355-9336



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3.2 District Radiation Safety Personnel

3.2.1 Kankakee District (Central)

| | |
|---|---|
| Gary F. McLish 2 Ravinia Court Bourbonnais, Ill. 60914 Phone: 815/939-7767 | W. R. Wagner 610 Oak Run Dr. Bourbonnais, Ill. 60914 Phone: 815/935-2053 |
|---|---|

Raymond H. Bryant
809 Sample
Marseilles, Ill. 61341
Phone: 815/795-4796

3.2.2 New Castle District (Eastern)

| | |
|--|--|
| Cecil G. May 34 Ferncliff Windy Hills Newark, Delaware 19711 Phone: 302/737-7955 | Stanley Ray Howard 550 So. DuPont Parkway #9G New Castle Delaware 19720 Phone: 302/328-4049 |
|--|--|

W. L. Reed
115 Woodshade Drive
Newark, Del. 19702
Phone: 302/737-9698

3.2.3 Birmingham District (Southeastern)

| | |
|--|--|
| J. H. Sisk 908 Rockingham Road Birmingham, Ala. 35235 Phone: 205/853-5578 | F. C. Berry 3754 Brookwood Rd. Birmingham, Ala. 35223 Phone: 205/967-3020 |
|--|--|

Tom Kendrick
4325 Windsong Lane
Trussville, Ala. 35173
Phone: 205/655-8568

3.2.4 Houston District (Southwestern)

| | |
|---|---|
| Thomas D. Warner 9406 Denbury Houston, Texas 77025 Phone: 713/661-0337 | James C. Jordon 10014 Hanka Houston, Texas 77080 Phone: 713/467-0908 |
|---|---|

Jesse Payne
17070 Cane Market Rd.
Walker, Louisiana 70785
Phone: 504/686-2148



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3.2.5 Fremont District (Western)

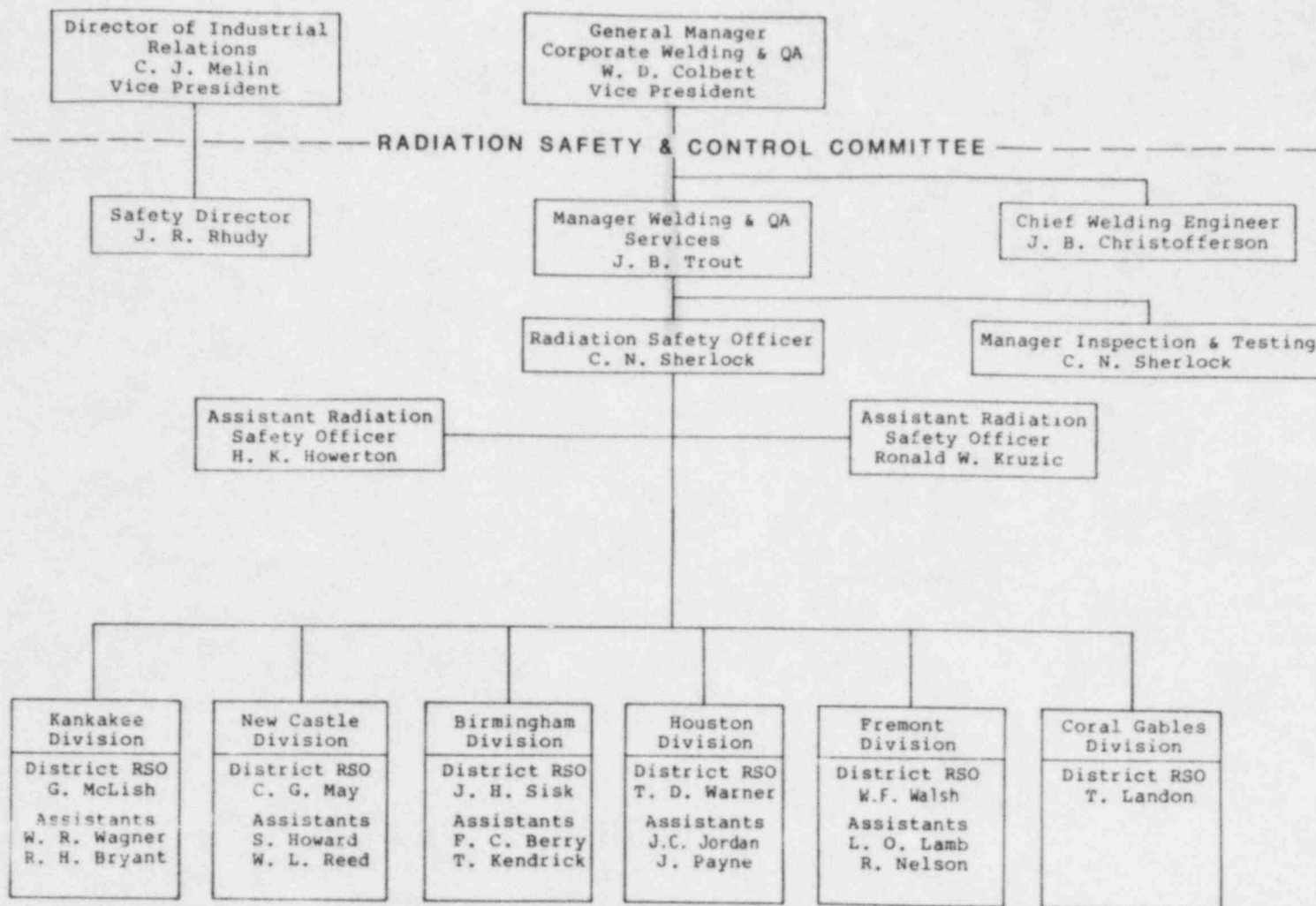
William F. Walsh
None at Present
Office: 415/657-1600

Larry O. Lamb
2404 Del Monte
Livermore, CA 94550
Phone: 415/447-4736

Richard E. Nelson
501 Kawella Circle
Union City, CA 94587
Phone: 415/487-1539

3.2.6 Coral Gables District (Virgin Islands, Puerto Rico, etc.)

Tom Landon
11350 S.W. 164th Street
Miami, Florida 33157
Phone: 305/255-3451





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4.0 RESUMES:

4.1 RESUME OF CHARLES N. SHERLOCK

EDUCATION AND BACKGROUND

Pennsylvania State University, January 1955
Bachelor of Science in Civil Engineering
Former LTJG USNR
Two Week Course on NDT Fundamentals at Ohio State University
from September 14-25, 1970
Various NDT related seminars
CBI Isotope Safety - Class #2 - October 1967

PROFESSIONAL LICENSES

Illinois #62-23538 and Pennsylvania #PE-010029E - in Civil Engineering
California #QU 1897 in Quality Engineering

SOCIETIES

Member of ASCE and ASTM and a Fellow of ASNT; Ad Hoc ASM Committee on NDE of weldments; ASNT Leak Testing Handbook Executive Review Committee; Chairman of Leak Testing Methods Division Committee of ASNT; Member of Visual Methods Committee of ASNT; Secretary Elect of ASNT Technical Council; Member of ASME Section V SGRT

EXPERIENCE

Inspection and Test Engineer responsible for company wide review of testing and inspection procedures, implementation of new procedures, manuals and equipment in all phases of nondestructive examination on such structures as nuclear reactors, nuclear containment vessels, space chambers, cryogenics, and low temperature vessels. 5 years

Manager of Inspection and Testing responsible for the Inspection and Testing group of the Corporate Welding Department. 14 years
Responsibilities include:

- Company wide NDE Training Program
- Preparation of new, and review of existing, company wide NDE procedures
- Assistance to the regions in the performance of leakage rate tests of nuclear structures
- Assistance to the regions in special NDE situations
- Provide input to the ASME Code Committees and ASNT Committees on NDE Code and training through membership and other CBI representatives on these organizations
- Member of Corporate Committee of CBI Radiation and Safety Control Committee - 10 years.
- Radiation Safety Officer - 1 year



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4.2 RESUME OF RONALD W. KRUZIC

Welding Engineer - Inspection & Testing Group
Houston Corporate Welding Office

FORMAL EDUCATION

University of Illinois (Urbana, Illinois)
Metallurgical Engineering
Bachelor of Science 1970
Master of Science 1971

RADIOGRAPHIC SCHOOL

CBI Isotope Safety Class #19 - December 1973

REGISTRATION

Registered Professional Engineer
State of Illinois (1975)

SOCIETIES

American Society of Nondestructive Testing (ASNT)
American Welding Society (AWS)

ASNT CERTIFICATIONS

NDT Level III Certification -
RT, MT, PT, UT, & LT #Q-1005

EXPERIENCE

Field/Shop Radiographic experience working with X-ray equipment, radioactive sources, training of personnel and personnel supervision. 11 Years.

Kankakee Construction District - Assistant Radiation Safety Officer. 3 Years.

Houston Corporate Welding - Corporate Assistant Radiation Safety Officer. 3 Years.



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4.3 RESUME OF HUGH K. HOWERTON

FORMAL EDUCATION

Graduate of Montgomery Blair High School - 1967
Silver Spring, Maryland

Attended: Washington University, St. Louis, Mo. - 1968 - 1 year
University of Maryland - 1969 - 1 year

RADIOGRAPHIC SCHOOLS

Chicago Bridge & Iron X-Ray Training Classes New Castle, Del.
December 1970, December 1971, February 1973
Chicago Bridge & Iron Isotope Safety Training Class #32
Houston, Texas - January 1978; #40 Dubai UAE, July 1979,
#52 Dubai UAE, November 1981, #55 Dubai UAE, April 1982,
#59 Juaymah, Saudi Arabia, February 1983.

Gamma Industries October 1979 Radiation Health Physics Program

SOCIETIES

American Society for Nondestructive Testing (ASNT) 1976

EXPERIENCE

Fourteen (14) years experience in the field of radiography with CBI including:

5 years on field construction projects working as a Quality Assurance Technician performing X-ray work, monitoring radiation safety, grading film.

3 years as a Welding and Quality Assurance Supervisor, performing radiography, (isotope and X-ray), monitoring radiation safety, collection of radiography records, audit of records, film grading and setting up gamma ray and X-ray radiography exposures.

3 years in the Inspection and Testing group of the Houston Corporate Welding Department reviewing isotope sealed source records (worldwide), audits of radiography records, instruction of radiography and isotope safety classes, Assistant Radiation Protection Officer.

3 years in the Saudi Arabia Construction Welding Department training Assistant Radiographers, assisting in conducting isotope radiation safety training classes in Dubai UAE and Saudi Arabia, responsible for radiography records, monitoring radiation safety on all field locations.



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1.0 INTRODUCTION:

1.1 The company is licensed to receive, ship and transport only sealed sources, exposure devices and source changers designated on its NRC license.

3 1.2 Radiographers shall perform the duties outlined in this section.

3 1.3 Radioactive sealed source and depleted uranium shielding materials are classified as "Hazardous Materials" and have special shipping requirements.

3 1.4 A shipping package for radioactive materials is designed in accordance with Department of Transportation (DOT) packaging requirements. It is designed to prevent loss or dispersal of the contents and to retain the efficiency of its radiation shielding under accident conditions during transport.

A shipping package may be the exposure device or the source changer itself. It may also be a drum or an overpack when it is required by DOT for certain exposure device models which are inadequate by themselves for transport. A container placed around an exposure device or source changer for protection against transport abuse, is not classified as a shipping package when it is not a DOT requirement. Though certain labeling is required, it is only a container, not a shipping package.

1.5 As part of the CBI 10 CFR Part 71 QA Program, all shipping packages being prepared for transport shall meet the requirements outlined in 4.0 of this section.

3 1.6 There are no special shipping requirements for empty exposure devices and source changers that contain only lead for shielding material. They are exempt from the requirements in this section and are only required to be tagged "EMPTY".

2.0 SHIPPING PACKAGES:

3 2.1 All radioactive sealed sources used by CBI are classified "Special form" and are shipped in Type A or Type B shipping packages.

3 2.1.1 Type A shipping packages are those that can or have passed a series of tests and contain sealed sources with a specified maximum activity for a specific isotope.



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- 3 2.1.2 Type B shipping packages are those that have passed all Type A requirements and hypothetical accident conditions; and contain sealed sources with a maximum activity of five thousand (5000) curies.

- 3 2.2 The following Type A shipping packages are shipped under transport status "DOT 7A".

2.2.1 Model 616 exposure device loaded with a maximum of 20 curies.

2.2.2 Model 773 exposure device.

2.2.3 Model 801 Drum loaded with a Model 571 exposure device.

- 3 2.3 The following Type B shipping packages are shipped under transport status "DOT-55" (valid until July 1, 1985).

2.3.1 Model 488 source changer

2.3.2 Model 520 exposure device loaded with a maximum of 300 curies.

- 3 2.4 The following are NRC certified Type B shipping packages manufactured by Technical Operations.

Exposure Devices

| | |
|-----------|---------------|
| Model 660 | USA/9033/B(u) |
| Model 672 | USA-DOT-8-70 |
| Model 676 | USA/9029/B(u) |
| Model 680 | USA/9035/B(u) |
| Model 900 | USA/9141/B(u) |
| Model 920 | USA/9143/B(u) |

Transport Status

Source Changers

| | |
|-----------|---------------|
| Model 650 | USA/9032/B(u) |
| Model 770 | USA/9148/B(u) |
| Model 771 | USA/9107/B(u) |
| Model 850 | USA/9147/B(u) |

Overpacks

| | |
|--|---------------|
| Model 715 Drum Loaded with a Model 616 Exposure Device | USA/9039/B(u) |
| 20WC Overpack loaded with a Model 520 Exposure Device | USA/5800/B |

3.0 SHIPPING PACKAGE - RECEIVING REQUIREMENTS:

3.1 Upon receipt of a shipping package, survey to determine the radiation levels external to the package. Perform this survey:

3.1.1 As soon as practicable after receipt, but no later than three (3) hours.

or

3.1.2 If received at company facilities after normal working hours, no later than eighteen (18) hours.

3 3.2 When the radiation levels of a shipping package are in excess of 200 milliroentgens per hour at any exterior surface or 10 milliroentgens per hour at one meter (3.3 feet) from any exterior surface, immediately notify the District RSO or ARSO. The District RSO or ARSO shall notify the RSO or ARSO to determine the action to take. The NRC or other regulatory agencies and the final delivering carrier shall be notified as applicable. See Section 12.

3 3.3 When a shipping package is an overpack or when the shipping package is received in an outer shipping container, open that overpack or outer shipping container only in a Restricted Area.

3 3.4 Survey the exposure device immediately upon receipt if it is also the shipping package or upon removal from an overpack or an outer shipping container.

3.4.1 Technical Operations Model 571, 616, 660, 773, 900 and 920 exposure devices which all measure 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 measured at a distance six (6) inches away from any exterior surface.

3.4.2 Technical Operations Model 520, 672, 676 and 680 exposure devices which all measure four (4) inches or more from the sealed source storage position to any exterior surface of the device, shall have no radiation level in excess of 200 milliroentgens per hour at any exterior surface and ten (10) milliroentgens per hour measured at a distance of one meter (3.3 feet) from any exterior surface.



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- 3.5 If any exposure device readings are noted in excess of those specified in 3.4.1 or 3.4.2, immediately notify the District RSO or ARSO for instructions. The District RSO or ARSO shall notify the RSO or ARSO to determine the action to take.
- 3.6 Examine the exposure device or source changer for any signs of damage and to assure that all seal wires, locks, plugs, etc., as provided by the manufacturer, are in place.
- 3.7 After all required inspections and surveys, place the exposure device or source changer in storage, if not used immediately. Fill out form WL 189.

4.0 SHIPPING PACKAGE - INSPECTION AND PREPARATION:

- 4.1 Check the exposure device or source changer to assure that all shipping plugs, seal wires, locks, etc. are in place.

- 3 4.2 Check the shipping package for the following required markings. Relabel any missing or illegible markings.

- 4.2.1 USNRC Certification number or DOT Specification number.

- 4.2.1.1 USNRC Certification:

"USA/____/B(u)"

- 4.2.1.2 DOT Specification:

"DOT 7A" or "DOT 55"

- 4.2.2 Proper shipping name and identification number:

"Radioactive Material, special form, n.o.s., UN2974"

- 4.2.3 Type of shipping package in letters 1/2 inch (12mm) high:

"TYPE A" or "TYPE B"

- 3 4.3 If the shipping package is empty (doesn't contain a sealed source), do the following.

- 4.3.1 Tape over the words "Special Form" in the proper shipping name and print "LSA" on the tape.



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4.3.2 Tape over the identification number "UN2974" and print "UN2912" on the tape.

3 4.4 When a Model 715 Drum, Model 801 Drum or 20 WC overpack is the shipping package used:

4.4.1 Assure that pig hair, foam rubber or other packing material is in place to protect the fire insulation and prevent the enclosed exposure device from shifting during shipment.

4.4.2 Check the integrity of the fire resistant insulation shield.

4.4.3 Check for proper operation of the drum locking ring and bolting or fastener device.

4.5 Nonconforming or damaged shipping packages or parts shall be tagged or marked and the District Radiation Safety Personnel notified for instructions. DO NOT SHIP nonconforming or damaged shipping packages.

4.6 Attach a security seal to the shipping package:

4.6.1 At the shipping plug or source indicator knob for exposure devices.

3 4.6.2 At the bolt heads of the cover for source changers and overpacks.

4.6.3 At the locking ring bolt head for shipping drums.

3 4.7 When a shipping package is placed inside a crate, mark the outside of the crate as follows:

4.7.1 "Inside package complies with prescribed specifications"

4.7.2 Next list the required information of 4.2

or

If the package is empty, modify the information as required in 4.3.

3 4.8 Survey the shipping package to assure that the radiation level does not exceed 200 milliroentgens per hour at the external surfaces or 10 milliroentgens per hour at one meter (3.3 feet) from the surfaces.



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- 4.9 Each shipping package or crate must be labeled with the appropriate radioactive labels affixed to opposite sides of the shipping package or crate.

- 4.9.1 Use Radioactive White I Label if the radiation intensity is 0.5 MR/HR or less at the surface of the shipping package (not the crate, if used).



- 4.9.2 Use Radioactive Yellow II Label if the radiation intensity is 50 MR/HR or less at the surfaces of the shipping package and is 1 MR/HR or less at a distance of one meter (3.3 feet) from the surfaces (not the crate, if used).



- 4.9.3 Use Radioactive Yellow III Label if the radiation intensity is greater than 50 MR/HR at the surface of the shipping container or greater than 1 MR/HR at a distance of one meter (3.3 feet) from the surfaces (not the crate, if used).



- 4.10 Fill out the information on the shipping labels as follows.

4.10.1 Contents

- 4.10.1.1 Type of Radioisotope; ie Iridium 192, Cobalt 60, Cesium 137, or depleted Uranium.

4.10.2 Activity

- 4.10.2.1 For Iridium, Cobalt or Cesium, read the value from the decay chart.

- 4.10.2.2 For depleted Uranium use $\leq .005$ Ci.

- 4.10.3 Transport Index: For Yellow II or III Labels this is the radiation intensity measured at one meter (3.3 feet) from the surface of the shipping package (not the crate, if used).



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5.0 SHIPMENT VIA COMPANY VEHICLE:

- 3 5.1 Assure that the selected routes of travel are in accordance with all applicable regulations and, when required, that proper notice has been given to all regulatory agencies.
- 3 5.2 Fill out form WL 85 "Straight Bill of Lading" and document shipping information on form WL 189 "Radioactive Isotope Shipping/Receiving".
- 3 5.3 The original shipping papers shall accompany the shipment.
- 5.4 Place the shipping package or crate as far away as possible from the driver and/or other passenger(s).
- 3 5.5. Secure the shipping package or crate in the vehicle by use of cables or chains to prevent movement and unauthorized removal.
- 5.6 For radioactive Yellow III shipments, placard the vehicle on all four (4) sides (front, rear, and each side) with radioactive placards. See Figure 1.



Figure 1 Radioactive Placards



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5.7 Prior to operation of the vehicle perform a survey. The reading at the driver and passenger(s) location, or anywhere on the exterior surface of the vehicle, shall not exceed two (2) milliroentgens per hour. If the reading exceeds this value, provide additional shielding to reduce the reading to this value.

3 5.8 A Radiographer must accompany the shipment and in addition the Radiographer shall have:

5.8.1 Film Badge

5.8.2 Dosimeter

5.8.3 Survey Meter

5.8.4 Radiation Area Signs

5.8.5 CBI Isotope Safety Manual (Current Revision)

5.8.6 Rope(s)

3 5.9 When operating the vehicle, the shipping papers shall be within immediate reach of the operator while restrained by the lap belt.

3 5.10 Place the shipping papers on the driver seat and lock the vehicle or other compartments of the vehicle when unattended.

6.0 SHIPMENT VIA COMMON CARRIER - GROUND TRANSPORTATION:

3 6.1 Fill out form WL 85 "Straight Bill of Lading" and document shipping information on form WL 189 "Radioactive Isotope Shipping/Receiving".

6.2 The original shipping papers shall accompany the shipment.

6.3 Consign shipments only to common carriers qualified to handle such shipments.

6.4 Make notification of shipment ahead of time so that proper receiving arrangements can be made.

6.5 For shipments requiring Radioactive Yellow III Labels, provide the carrier with radioactive placards.

7.0 SHIPMENT VIA COMMON CARRIER - AIR TRANSPORTATION:

3 7.1 Fill out a "Shipper's Declaration for Dangerous Goods" form and document shipping information on form WL 189 "Radioactive Isotope Shipping/Receiving". If no "Shipper's Declaration for Dangerous Goods" form is available and the shipping package is being taken to the air carrier, fill out a "Straight Bill of Lading" form WL 85 to cover the ground transportation of the shipping package to the air carrier.



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- 3 7.2 The original shipping papers shall accompany the shipment.
- 7.3 Apply two (2) , "Danger Do Not Load in Passenger Aircraft" labels to the shipping package or crate, if used. See Figure 2.



Figure 2 Air Transportation Label



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DOCUMENTATION AND RECORD RETENTION

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1.0 RESPONSIBILITY:

1.1 Radiographers:

- 1.1.1 Maintain up-to-date records at the site.
- 1.1.2 Submit all required weekly and quarterly reports to the district office.
- 1.1.3 At the end of site radiographic work, send all required site records to the district office.

1.2 District Office:

- 1.2.1 Store all required records and forward copies to the RSO at the Houston Corporate Welding office.

1.3 Corporate Office:

- 1.3.1 Store all required records.

2.0 REQUIRED RECORDS:

- 2.1 The Table on page 7 lists the required report forms, when to complete and when copies are to be sent to the district office.

3.0 FORMS:

3.1 NRC-4 Occupational External Radiation Exposure History (Form WL 41):

- 3.1.1 Completed and signed by the individual when starting radiographic work with CBI.
- 3.1.2 Send original to district office.
- 3.1.3 Retain copy in jobsite file.

3.2 NRC-5 Current Occupational External Radiation Exposure (Form WL 40) or A Film Badge Service Company Quarterly Report (If it Contains all the Required NRC-5 Information):

- 3 3.2.1 Complete Form WL40 at the end of quarter in which the individual was doing radiographic work or use a film badge service company quarterly report.
- 3 3.2.2 Send original of Form WL40 to district office, if used.



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- 3.2.3 Retain copy in jobsite file.
- 3.2.4 When an individual transfers to another location, provide a copy of the latest NRC-5, or equivalent, report to the individual.
- 3.3 Assistant Radiographer Qualification (Form WL 188)
 - 3.3.1 Completed and signed by the District RSO or ARSO.
 - 3.3.2 Send original to district office.
 - 3.3.3 Retain copy in jobsite file.
 - 3.3.4 Provide a copy to the individual.
- 3.4 Radiographer "Certificate of Award" (Form WL 231)
 - 3.4.1 Completed and signed by the Chief Welding Engineer and the RSO or ARSO.
 - 3.4.2 Provide the original to the individual.
 - 3.4.3 Retain a copy for the district office individual's personnel file.
- 3.5 Radioactive Isotope Shipping/Receiving Report (Form WL 189)
 - 3.5.1 Completed and signed by the Radiographer whenever sealed sources are shipped or received.
 - 3.5.2 Send original to district office at end of week.
 - 3.5.3 Retain copy in jobsite file.
- 3.6 Physical Inventory, Leak Test and Maintenance (Form WL 44-Front)
 - 3.6.1 Make entries when:
 - 3.6.1.1 Sealed sources are received or shipped.
 - 3.6.1.2 Sealed sources are leak tested.
 - 3.6.1.3 Quarterly maintenance is performed.
 - 3.6.2 Completed and signed by the Radiographer at the end of each quarter.
 - 3.6.3 Send original to district office at the end of each quarter or the end of the job.
 - 3.6.4 Retain copy in jobsite file.



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3.7 Quarterly Meter Report (Form WL 44 Back)

3.7.1 Make entries when:

3.7.1.1 Survey meters are received or shipped.

3.7.1.2 Dosimeters are received or shipped.

3.7.2 Completed at end of quarter.

3.7.3 Send original to district office.

3.7.4 Retain copy in jobsite file.

3.8 Gamma Radiography Utilization Log (Form WL 134)

3.8.1 Completed and signed by the Radiographer for each sealed source each time it is removed from storage for radiographic, dosimeter calibration and source changing operations and for each week of non-use. For non-use periods, add the statement "Sealed source not used for the week of _____ to _____."

3.8.2 Send original to district office at end of week.

3.8.3 Retain copy in jobsite file.

3.9 Radiation Survey (Form WL 134 Back)

3.9.1 Completed and signed by the Radiographer for each sealed source each time it is removed from storage for radiographic, dosimeter calibration and source changing operations.

3.9.2 For repeat sketches, reference to previous sketches by date may be used up to four (4) weeks, after which a new sketch shall be required.

3.9.3 Send original to district office at end of week.

3.9.4 Retain copy in jobsite file.

3.10 Quarterly Dosimeter Report (Form WL 236)

3.10.1 Enter readings daily, totals weekly and completed and signed by the individual at the end of quarter.

3.10.2 Send original to district office.

3.10.3 Retain copy in jobsite file.

3.10.4 When an individual transfers to another location, provide a copy of the current report to the individual.



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3.11 Pocket Dosimeter Calibration Report (Form WL 287A)

3.11.1 Completed and signed by the Radiographer whenever dosimeters are calibrated.

3.11.1.1 Original to district office.

3.11.1.2 Retain copy in job site file.

3.12 Safety/Training Meeting Report (Form WL 46)

3.12.1 Meetings conducted and form completed and signed as follows:

3.12.1.1 At start of job by Radiographer-in-charge with entire crew.

3.12.1.2 Quarterly by District RSO or ARSO or by Corporate RSO or ARSO with Radiographers and Assistant Radiographers.

3.12.2 Send original to district office.

3.12.3 Retain copy in job site file.

3.13 Radiation Safety Checklist (Form WL 238)

3.13.1 Completed and signed by a Safety Supervisor whenever a construction job site is visited.

3.13.2 Send original to district office.

3.13.3 Send copy to Corporate Safety/RSO.

3.13.4 Retain copy in job site file.

▷ 3.14 Straight Bill of Lading - Short Form (Form WL 85)

3.14.1 Completed and signed by the Radiographer whenever a sealed source is shipped.

3.14.2 Send original with shipment.

3.14.3 Send copy to district office.

3.14.4 Retain copy in job site file.

3.15 Shippers' Declaration for Dangerous Goods (IATA)

3.15.1 Completed and signed by the Radiographer whenever a sealed source is shipped by Air Freight.



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3.15.2 Send original with shipment.

3.15.3 Send copy to district office.

4.0 TWO (2) YEAR RETENTION:

4.1 These records shall to be retained for two (2) years.

4.1.1 Source Records

4.1.1.1 Decay Chart (Tech/Ops).

4.1.1.2 Manufacturer's (Tech/Ops) Leak Test Report.

4.1.1.3 Physical Inventory, Leak Test and Maintenance (WL 44 (Front)).

4.1.1.4 Isotope Shipping/Receiving Report (WL 189).

3 4.1.1.5 Straight Bill of Lading (WL 85).

4.1.1.6 Shipper's Declaration for Dangerous Goods (IATA) (if applicable).

4.1.2 Personnel Records

4.1.2.1 Six (6) Month Isotope Quiz.

4.1.3 Survey Records

4.1.3.1 Utilization Log and Radiation Survey (WL 134 (Front) & WL 134 (Back)).

4.1.4 Meter Records

4.1.4.1 Quarterly Meter Report (WL 44 (Back)).

4.1.4.2 Vendor Survey Meter Calibration Reports.

4.1.4.3 Vendor Pocket Dosimeter Calibration Reports. (If CBI, WL287A)

4.1.5 Safety Records

4.1.5.1 Safety Training/Meeting Reports (WL 46).

4.1.5.2 Radiation Safety Check List (WL 238).



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5.0 FIVE (5) YEAR RETENTION:

5.1 These records shall be retained for five (5) years.

5.1.1 Transfer receipt from Manufacturer (Tech/Ops).

5.1.2 Isotope Radiographers examination.

6.0 INDEFINITE RETENTION:

6.1 These records shall be retained until the Nuclear Regulatory Commission (NRC) authorizes disposition.

6.1.1 NRC-4: Occupational External Radiation History (WL 41).

6.1.2 NRC-5: Current Occupational External Radiation Exposure (WL 40) or equivalent report containing the same information.

6.1.3 Quarterly Dosimeter Reports (WL 236).

6.1.4 Assistant Radiographer Certification (WL 188).

6.1.5 Radiographer Certificate of Award (WL 231).



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| OPERATION(S) | SRC-4 (WL 41) | ASSISTANT RADIOGRAPHER QUALIFICATION (WL 189) | CERTIFICATE OF AWARD (WL 211) | SAFETY/TRAINING MEETING REPORT (WL 46) | RADIATION ISOTOPE SHIPPING/ RECEIVING REPORT (WL 189) | PHYSICAL INVENTORY, LEAK TEST AND MAINTENANCE (WL 44 FRONT) | QUARTERLY METER REPORT (WL 44 BACK) | POCKET DOSIMETER CALIBRATION REPORT (WL 281A) | GAMMA RADIOGRAPHY UTILIZATION LOG (WL 134) | RADIATION SURVEY REPORT (WL 216) | NR-5 (WL 40) or Equivalent form | STRAIGHT BILL OF LADING | SHIPPER'S DECLARATION FOR DANGEROUS GOODS (IATA) | RADIATION SAFETY CHECK LIST (WL 218) |
|--|---------------|--|----------------------------------|---|--|--|--|--|---|-------------------------------------|------------------------------------|----------------------------|---|---|
| NEW PERSONNEL: ASSISTANT RADIOGRAPHER | 1 | 1 | | | | | | | | | | | | |
| NEW PERSONNEL: RADIOGRAPHER | | | 1 | | | | | | | | | | | |
| SAFETY MEETING: START-OF-JOB QUARTERLY | | | | 2 | | | | | | | | | | |
| RECEIPT OF SHIPPING CONTAINER(S) | | | | | 2 | 3 | | | | 3 | | | | |
| SHIPPING OF SHIPPING CONTAINER(S) | | | | | 2 | 3 | | | | 3 | | 2 | 2 | |
| RECEIPT OF SURVEY METERS AND/OR DOSIMETERS | | | | | | | 3 | | | | | | | |
| USE OF EXPOSURE DEVICES: RADIOGRAPHY CALIBRATION | | | | | | | | 2 | 2 | 3 | | | | |
| SEALED SOURCE CHANGING | | | | | | 3 | | 2 | 2 | 2 | 3 | | | |
| QUARTERLY MAINTENANCE | | | | | 3 | | | | | 3 | | | | |
| CONSTRUCTION SAFETY SUPERVISOR JOB-SITE VISIT | | | | | | | | | | | | | | 2 |
| WEEKLY FILM BADGE REPORT FROM PROCESSOR | | | | | | | | | | | 3 | | | |

1. Forms to be filled out once for new personnel.
2. Forms to be filled out and sent to the District Office at end of week.
3. Forms to be kept up-to-date daily during course of the quarter* and sent to the District Office at the end of each quarter.

* Each quarter is 13 weeks long and there are four quarters in a year. The first quarter starts on the first Monday on or after January 1 and ends on a Sunday. Any fractional week at the beginning of a year is added to the last quarter of the previous year. Starting and ending dates for quarters shown on Film Badge Reports must agree with the above.



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Exposure NRC-5 WL 40 3 & 4

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Radiographer "Certificate of Award" WL 231 6

▶ Radioactive Isotope Shipping/Receiving Report WL 189 7 & 8

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NRC-4 OCCUPATIONAL EXTERNAL RADIATION EXPOSURE HISTORY

See Instructions on the Back

IDENTIFICATION

| | |
|--|--|
| 1. NAME (PRINT - LAST, FIRST AND MIDDLE INITIAL) <i>JONES, JIM A.</i> | 2. <input checked="" type="checkbox"/> Passport # <i>375-38-7802</i> <input type="checkbox"/> Soc. Sec. # <input type="checkbox"/> Company # (Check One) |
| 3. DATE OF BIRTH (MONTH, DAY, YEAR) <i>JAN 5, 1955</i> | 4. AGE IN FULL YEARS (IN) <i>25</i> |

OCCUPATIONAL EXPOSURE - PREVIOUS HISTORY

| 5. PREVIOUS EMPLOYMENTS INVOLVING RADIATION EXPOSURE - LIST NAME AND ADDRESS OF EMPLOYER | 6. DATES OF EMPLOYMENT (FROM-TO) | 7. PERIODS OF EXPOSURE | 8. WHOLE BODY (REM) | 9. RECORD OR CALCULATED (INSERT ONE) |
|--|---|-------------------------|---------------------|--------------------------------------|
| <i>MIDWEST X-RAY</i> | <i>1/5/79 TO 1/3/80</i> | <i>1/5/79 TO 1/3/80</i> | <i>.500</i> | <i>RECORD</i> |
| SAMPLE | | | | |
| | | | | |
| 10. REMARKS | 11. ACCUMULATED OCCUPATIONAL DOSE - TOTAL | | <i>.500</i> | |

13. CALCULATIONS - PERMISSIBLE DOSE WHOLE BODY:

- (A) PERMISSIBLE ACCUMULATED DOSE - 5 (N-18) = *35.000* REM
(B) TOTAL EXPOSURE TO DATE (FROM ITEM 11) = *500* REM
(C) UNUSED PART OF PERMISSIBLE ACCUMULATED DOSE (A-B) = *34.500* REM

12. CERTIFICATION: I CERTIFY THAT THE EXPOSURE HISTORY LISTED IN COLUMNS 5, 6, AND 7 IS CORRECT AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

Jim A Jones *1/8/80*
EMPLOYEE'S SIGNATURE DATE
CHICAGO BRIDGE & IRON Co.
14. NAME OF LICENSEE

WL 41(FRONT)



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INSTRUCTIONS FOR PREPARATION OF NRC FORM 4

This form or a clear and legible record containing all the information required on this form must be prepared by each licensee of the Nuclear Regulatory Commission who, pursuant to Section 20.101, proposes to expose an individual to a radiation dose in excess of the amounts specified in Paragraph 20.101(a) of the regulations in Part 20. Standards for Protection Against Radiation, 10 CFR. The requirement for completion of this form is contained in Section 20.102 of that regulation. The information contained in this form is used for estimating the external accumulated occupational dose of the individual for whom the form is completed. A separate Form NRC-4 shall be completed for each individual to be exposed to a radiation dose in excess of the limits specified in Paragraph 20.101(a) of Part 20 of the Commission's regulations. * Listed below by item are instructions and additional information directly pertinent to completing this form:

Identification

- Item 1. Self-explanatory.
- Item 2. Self-explanatory except that, if individual has no social security number, passport number or company number, the word "none" shall be inserted.
- Item 3. Self-explanatory.
- Item 4. Enter the age in full years. This is called "N" when used in calculating the Permissible Dose. N is equal to the number of years of age of the individual on his last birthday.

Occupational Exposure

- Item 5. List the name and address of each previous employer and the address of employment. Start with the most recent employer and work back.

Include only those periods of employment since the eighteenth birthday involving occupational exposure to radiation. For periods of self-employment, insert the word "self-employed."
- Item 6. Give the dates of each employment listed in Item 5.
- Item 7. List periods during which occupational exposure to radiation occurred.
- Item 8. List the dose recorded for each period of exposure from the records of previous occupa-

tional exposure of the individual as calculated under Section 20.102. Dose is to be given in rem.

"Dose to the whole body" shall be deemed to include any dose to the whole body, gonads, active blood-forming organs, head and trunk, or lens of eye.

- Item 9. After each entry in Item 8 indicate in Item 9 whether dose is obtained from records or calculated in accordance with Section 20.102.

- Item 10. Self-explanatory.

Total Accumulated Occupational Dose (Whole Body)

- Item 11. The total for the whole body is obtained by summation of all values in Item 8.

Certification

- Item 12. Upon completion of the report, the employee must certify that the information in Columns 5, 6, and 7 is accurate and complete to the best of his knowledge. The date is the date of his signature.

Calculations

- Item 13. The lifetime accumulated occupational dose for each individual and the permissible dose under Paragraph 20.101(b) are obtained by carrying out the following steps: The value "N" should be taken from Item 4. Subtract "5" from N and multiply the difference by 5 rem. (For example, John Smith, age 32; $N = 32$; $PAD = 5 (32-18) = 70$ rem.) Enter total exposure to date from Item 11. Subtract (b) from (a) and enter the difference under (c). The value in (c) represents the unused part of the permissible accumulated dose. This value "or permissible dose is to be carried forward to Form NRC-5, "Current Occupational External Radiation Exposure (Whole Body)."

- Item 14. Self-explanatory.

* This form requires the signature of the employee concerned.

PRIVACY ACT STATEMENT

Pursuant to 5 U.S.C. 552(a)(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(c) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2073, 2093, 2095, 2111, 2133, 2134, 2201(b), and 2201(c)). 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

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CBI

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NRC-5 CURRENT OCCUPATIONAL EXTERNAL RADIATION EXPOSURE

See instructions on Back

IDENTIFICATION

| | | | | | |
|--|--|--|-------------|--|-----------|
| 1. NAME (PRINT -- Last, first, and middle initial) <u>JONES, JIM A.</u> | | 2. <input type="checkbox"/> Passport # <input checked="" type="checkbox"/> Soc. Sec. # <u>375-38-7802</u> <input type="checkbox"/> Company # (Check One) | | | |
| 3. DATE OF BIRTH (Month, day, year) <u>JAN 5, 1955</u> | | 4. NAME OF LICENSEE <u>CHICAGO BRIDGE & IRON CO.</u> | | | |
| 5. DOSE RECORDED FOR (Specify: Whole body, skin or whole body, or hands and forearms, feet and ankles.) <u>WHOLE BODY</u> | 6. WHOLE BODY DOSE STATUS (rem) <u>48.950</u> | 7. METHOD OF MONITORING (e.g. Film Badge - FB; Pocket Chamber - PC; Calculations - Calc.) X OR GAMMA <u>FB</u> BETA _____ NEUTRONS _____ | | | |
| 8. PERIOD OF EXPOSURE (From - To) <u>7/4/83 TO 10/2/83</u> | DOSE FOR THE PERIOD (rem) | | | 13. RUNNING TOTAL FOR CALENDAR QUARTER (rem) | |
| | 9. X OR GAMMA | 10. BETA | 11. NEUTRON | | 12. TOTAL |
| | 0.065 | | | 0.065 | |

SAMPLE

LIFETIME ACCUMULATED DOSE

| | | | | |
|--|--|--|--|---|
| 14. PREVIOUS TOTAL (rem) <u>1.050</u> | 15. TOTAL QUARTERLY DOSE (rem) <u>10/2/83 0.065</u> | 16. TOTAL ACCUMULATED DOSE (rem) <u>1.115</u> | 17. PREM. ACC. DOSE IN 15 (rem) <u>50.000</u> | 18. UNLESS PART OF PREVIOUSLY ACCUMULATED DOSE (rem) <u>48.885</u> |
|--|--|--|--|---|

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WL 40(FRONT)

The preparation and safekeeping of this form or a clear and legible record containing all the information required on this form is required pursuant to Section 20.401 of "Standards for Protection Against Radiation," 10 CFR 20, as a current record of occupational radiation exposures. Such a record must be maintained for each individual for whom personnel monitoring is required under Section 20.202. Note that a separate Form NRC-5 is to be used for recording external exposure to (1) the whole body; (2) skin of whole body; (3) hands and forearms; or (4) feet and ankles, as provided by item 5 below.

Listed below by item are instructions and additional information directly pertinent to completing this form.

Identification

Item 1. Self-explanatory.

Item 2. Self-explanatory except that, if individual has no social security number, passport number or company number, the word "none" shall be inserted.

Item 3. Self-explanatory.

Item 4. Self-explanatory.

Occupational Exposure

Item 5. "Dose to the whole body" shall be deemed to include any dose to the whole body, gonads, active blood-forming organs, head and trunk, or lens of eye. Unless the lenses of the eyes are protected with eye shields, dose recorded as whole body dose should include the dose delivered as whole body dose should include the dose delivered through a tissue equivalent absorber having a thickness of 300 mg/cm² or less. When the lenses of the eyes are protected with eye shields having a tissue equivalent thickness of at least 700 mg/cm², dose recorded as whole body dose should include the dose delivered through a tissue equivalent absorber having a thickness of 1,000 mg/cm² or less.

Dose recorded as dose to the skin of the whole body, hands and forearms, or feet and ankles should include the dose delivered through a tissue equivalent absorber having a thickness of 7 mg/cm² or less. The dose to the skin of the whole body, hands and forearms, or feet and ankles should be recorded on separate forms unless the dose to those parts of the body has been included as dose to the whole body on a form maintained for recording whole body exposure.

Item 6. This item need be completed only when the sheet is used to record whole body exposures and the licensee is exposing the individual under the provisions of Paragraph 20.101(b) which allows up to 3 rems per quarter to the whole body. Enter in this item the unused part of permissible accumulated dose taken from previous records of exposure, i.e., item 18 of the preceding Form AEC-5 or NRC-5 or item 13 of Form AEC-4 or NRC-4 if the individual's exposure during employment with the licensee begins with this record.

Item 7. Indicate the method used for monitoring the individual's exposure to each type of radiation to which he is exposed in the course of his duties. Abbreviations may be used.

Item 8. Doses received over a period of less than a calendar quarter need not be separately entered on the form provided that the licensee maintains a current record of the doses received by the individual which have not as yet been entered on the form. The period of exposure should specify the day the measurement of that exposure was initiated and the day on which it was terminated. For example, if only quarterly doses are entered, the period of exposure for the first calendar quarter of 1962 might be taken as running from

Monday, January 1, 1962, through Friday, March 30, 1962 and would be indicated in this item as Jan. 1, 1962-Mar. 30, 1962. If weekly doses are entered, a film badge issued Monday morning, January 1, 1962, and picked up Friday January 5, 1962, would be indicated as Jan. 1, 1962-Jan. 5, 1962.

Items 9, 10 and 11. Self-explanatory. The values are to be given in rem. All measurements are to be interpreted in the best method known and in accordance with Paragraph 20.4(c). Where calculations are made to determine dose, a copy of such calculations is to be maintained in conjunction with this record. In any case where the dose for a calendar quarter is less than 10% of the value specified in Paragraph 20.101(a), the phrase "less than 10%" may be entered in lieu of a numerical value.

Item 12. Add the values under items 9, 10 and 11 for each period of exposure and record the total. In calculating the "Total" any entry "less than 10%" may be disregarded.

Item 13. The running total is to be maintained on the basis of calendar quarters. Paragraph 20.31a (4) defines calendar quarter. No entry need be made in this item if only calendar quarter radiation doses are recorded in items 9, 10, 11 and 12.

Lifetime Accumulated Dose (Whole Body)

NOTE: If the licensee chooses to keep the individual's exposure below that permitted in Paragraph 20.101(a), items 14 through 18 need not be completed. However, in that case the total whole body dose for each calendar quarter recorded in item 13 (or item 12 if quarterly doses are entered in item 12) should not exceed 1 1/4 rem.

If an individual is exposed under the provisions of Paragraph 20.101(b), complete items 14 through 18 at the end of each calendar quarter and when the sheet is filled. Values in item 13, when in the middle of a calendar quarter, and values in item 18, must be brought forward to next sheet for each individual.

Item 14. Enter the previous total accumulated dose from previous dose records for the individual (e.g., from item 16 of Form AEC-5 or NRC-5 or item 11 of Form AEC-4 or NRC-4). The total occupational radiation dose received by the individual must be entered in this item, including any occupational dose received from sources of radiation not licensed by the Commission, if the individual was exposed to sources of radiation not licensed by the Commission during any calendar quarter after completing Form AEC-4 or NRC-4 and personnel monitoring equipment was not worn by the individual. It should be assumed that the individual received a dose of 1 1/4 rems during each such calendar quarter.

Item 15. Enter the total calendar quarter dose from item 13 (or from item 12 if quarterly doses are entered in item 12) and the date designating the end of the calendar quarter in which the dose was received (e.g., March 30, 1962).

Item 16. Add item 14 and item 15 and enter that sum.

Item 17. Obtain the Permissible Accumulated Dose (PAD) in rem for the WHOLE BODY. "N" is equal to the number of years of age of the individual on his last birthday. Subtract 18 from N and multiply the difference by 5 rem (e.g., John Smith, age 32; $N = 32$, $PAD = 5(32 - 18) = 70$ rem).

Item 18. Determine the unused part of the PAD by subtracting item 16 from item 17. The unused part of the PAD is that portion of the Lifetime Accumulated Dose for the individual remaining at the end of the period covered by this sheet.

PRIVACY ACT STATEMENT

Pursuant to 5 U.S.C. 552(a)(1) 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-5. This information is maintained in a system of records designated as NRC-27 and described as 40 Federal Register 41444 (Oct. 1, 1975).

- AUTHORITY:** Sections 53, 55, 56, 81, 103, 104, 161(a), and 161(c) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2073, 2083, 2085, 2111, 2133, 2134, 2201(b), and 2201(c)). The authority for assigning the social security number is 10 CFR Part 20.
- 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 permit 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 your request.
- 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 workers. 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 any administrative or judicial proceeding.
- 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 complete Form NRC-5 on each individual for whom personnel monitoring is required under 10 CFR 20.202. Failure to do so may subject the licensee to enforcement action in accordance with 10 CFR 20.801. The social security number is used to assure that NRC has an accurate identifier not subject to the coincidence of similar names or surnames among the large number of persons in whom data is maintained.
- SYSTEM MANAGER(S) AND ADDRESS:** Director, Office of Management Information and Program Control, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

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ASSISTANT RADIOGRAPHER QUALIFICATION

Name ROBERTS, SAM W ☐ Passport # 345-31-7804
(PRINT - Last, first and middle initial) ☒ Soc. Sec. # 345-31-7804
☐ Company # (Check One)

Participant Number 752

This Assistant Radiographer has:

- 1) Been instructed and given a copy of the operating and emergency procedures.
- 2) Successfully passed an oral/written examination.
- 3) Demonstrated operational competency.

Examination: Date 7/15/83 Score 94 %

This qualification is for: Isotope ☒ X-Ray ☐

District RSO or ARSO Dave L Smith
Signature

Date 7/15/83



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NUCLEAR REGULATORY COMMISSION
RADIOGRAPHER'S LICENSE COURSE

Certificate of Award To

JIM JONES

In Recognition of the Successful Completion of a Concentrated
Program of in-company study, organized and directed by
Chicago Bridge and Iron Company

John P. Screens

Harry A. Cassette

WL 231 MAY 77

WL 231



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RADIOACTIVE ISOTOPE SHIPPING/ RECEIVING REPORT

Contract No. 24561
Location HOUSTON, TEXAS

CHECK ONE:

☐ SHIPPING TO: _____
Location (City, State), Contract _____
☒ RECEIVING FROM: BURLINGTON, MASS (TECH/OPS)
Location (City, State), Contract _____

Survey Meter: Serial No. 734 Calibration Date 8/4/83
Survey Meter Readings of Shipping Package: Surface: 10 MR/HR 1M/3.3' 2.5 MR/HR
When receiving an exposure device, take a survey meter reading 6" from the surface of the device 40 MR/HR
Radioisotope I-192 Activity in curies 205 Leak test date 8/5/83 Due date 2/5/84
Exposure device: Model No. 616 Sealed source: Model No. A-58101-B
Serial No. 55 Serial No. 2691
Shipping Drum/Overpack: Model No. 715
(When Applicable) Serial No. 109

MANDATORY CHECK LIST

Film badge and dosimeter worn by person shipping or receiving ☒
Labels (and markings when applicable) placed as required ☒
Security seal wires installed ☒
Decay chart and, if applicable, current leak test report enclosed ☒
MAINTENANCE, LEAK TEST AND PHYSICAL INVENTORY OF SEALED SOURCES REPORT form WL 44 filled out ☒

Shipping Only:

District RSO or ARSO aware of shipment ☐
Proper shipping form filled out (WL 85 or IATA) ☐
Carrier aware that shipment is to NRC/DOT(IATA) regulations ☐
Shipping Package inspected to CBI 10 CFR PART 71 Q.A. Program ☐
Placards used as required ☐

REMARKS: (Explain items not checked)

RADIOGRAPHER Jim A. Jones DATE: 8/7/83
SIGNATURE

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EXPOSURE DEVICE
MODEL

520

571

616

660

672

676

680

773

900

920

PACKAGING INSTRUCTIONS

Ship as is. No Crate or other
container is required. Alternate
is to ship in a 20WC overpack.

Ship only in the 801 shipping drum.

Ship only in the 715 shipping drum.

SHIP AS IS. NO CRATE OR OTHER CONTAINER
IS REQUIRED. ALTERNATE IS TO SHIP IN A SLAT
CRATE OR SOLID CRATE. WITH SOLID CRATE,
TRANSFER DOT INFORMATION FROM EXPOSURE
DEVICE TO THE OUTSIDE OF THE CRATE.

SOURCE CHANGER
MODEL

488

650

770

771

850

SHIP AS IS. NO CRATE OR OTHER CONTAINER
IS REQUIRED. ALTERNATE IS TO SHIP IN A SLAT
CRATE OR SOLID CRATE. WITH SOLID CRATE,
TRANSFER DOT INFORMATION FROM SOURCE
CHANGER TO THE OUTSIDE OF THE CRATE.

SAMPLE

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WL 189(BACK)



ISOTOPE RADIATION SAFETY MANUAL

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PAGE 9PHYSICAL INVENTORY, LEAK TEST
AND MAINTENANCELocation HOUSTON, TEXAS Contract No. 24561QUARTER ☐ 1st ☐ 2nd ☒ 3rd ☐ 4th YEAR 83

| UNIT NO. | RADIO ISOTOPE | RECEIVING | | EXPOSURE DEVICE | | SEALED SOURCE | | LEAK TEST DATE | SHIPPING OR END OF QUARTER | |
|----------|---------------|-----------|-------------------|-----------------|------------|---------------|------------|----------------|----------------------------|-------------------|
| | | DATE | ACTIVITY (CURIES) | MODEL NO. | SERIAL NO. | MODEL NO. | SERIAL NO. | | DATE | ACTIVITY (CURIES) |
| 1. | I-192 | 2/28/83 | 100 | 660 | 356 | A-424-9 | 5297 | 3/1/83 | | |
| 2. | I-192 | 2/28/83 | 100 | 660 | 356 | A-424-9 | 5297 | 8/31/83 | 9/30/83 | 24 |
| 3. | | | | | | | | | | |
| 4. | I-192 | 8/7/83 | 205 | 616 | 55 | A-58104-8 | 2691 | 8/5/83 | 9/30/83 | 185 |
| 5. | I-192 | 4/15/83 | 102 | 660 | 351 | A-424-9 | 5321 | 3/27/83 | 9/1/83 | 50 |
| 6. | | | | | | | | | | |
| 7. | | | | | | | | | | |
| 8. | | | | | | | | | | |

NOTE: MAKE A SECOND LINE ENTRY FOR NEWLY LEAK TESTED SOURCES AND DRAW A LINE THROUGH THE FIRST LINE ENTRY.

SAMPLE
MAINTENANCE INSPECTION

| | CRANK TYPE EXPOSURE DEVICES UNIT NUMBER <u>#2</u> | VACUUM TYPE EXPOSURE DEVICES <u>#4</u> | CALIBRATION TYPE EXPOSURE DEVICES |
|--|---|---|---|
| 1. CHECK DRIVE CABLE CONNECTOR WITH GAUGE. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | | |
| 2. INSPECT DRIVE CABLE AND CLEAN. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | | |
| 3. LUBRICATE DRIVE CABLE. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | | |
| 4. INSPECT LOCK ASSEMBLY. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | | |
| 5. INSPECT SOURCE TUBE FOR DAMAGE OR WEAR. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | | |
| 6. CHECK LOCK OF EXPOSURE DEVICE. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> |
| 7. CHECK VACUUM SYSTEM OF MODEL 694 CONTROL. | | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> |
| 8. INSPECT SOURCE ROD OF EXPOSURE DEVICE. | | | <input type="checkbox"/> <input type="checkbox"/> |
| 9. SURVEY EXPOSURE DEVICE. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> |

ABOVE MAINTENANCE HAS BEEN PERFORMED AS CHECKED

RADIOGRAPHER Jim A. Jones DATE 9/30/83
SIGNATURE

SEE BACK OF FORM FOR QUARTERLY METER REPORT

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CBI QUARTERLY METER REPORT

LOCATION HOUSTON, TEXAS Contract No. 24561

QUARTER ☐ 1st ☐ 2nd ☒ 3rd ☐ 4th YEAR 83

| MANUFACTURER | MODEL NO. | SERIAL NO. | DATE OF CALIBRATION | DUE DATE | RECORDED BY |
|--|-----------|------------|---------------------|----------|-------------|
| SURVEY METERS (NOTE: Meters must be calibrated every 3 months) | | | | | |
| EBERLINE | E-130A | 734 | 8/4/83 | 11/4/83 | J. A. Jones |
| VICTOREEN | 592B | 3764 | 8/15/83 | 11/15/83 | J. A. Jones |
| SAMPLE | | | | | |
| DOSIMETERS (NOTE: Dosimeters must be calibrated every 6 months) | | | | | |
| VICTOREEN | 541R | 06707 | 5/3/83 | 11/3/83 | J. A. Jones |
| VICTOREEN | 541R | 07945 | 5/3/83 | 11/3/83 | J. A. Jones |
| VICTOREEN | 541R | 06714 | 5/3/83 | 11/3/83 | J. A. Jones |

Revised on 1/25/04

DOI: 10.1002/eqe.1407

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CBI

ISOTOPE RADIATION SAFETY MANUAL

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GAMMA RADIOGRAPHY UTILIZATION LOG

City HOUSTON State TEXAS Date 8/26/83 Report No. 5
Radiosotope Ir 192 Activity in curies 50 Leak test date 3/27/83 Contract No. 24561
Exposure device: Model No. 660 Sealed source: Model No. A-424-9
Serial No. 351 Serial No. 5321
Survey Material: Serial No. 734 3764
Calibration Date 8/4/83 8/15/83

| RADIOGRAPHER(S) & ASSISTANT(S) | PARTICIPANT # | DOSIMETER # | CALIBRATION DATE | INITIAL READING | FINAL READING | TOTAL |
|--------------------------------|---------------|--------------|------------------|-----------------|---------------|-----------|
| <u>JIM A. JONES</u> | <u>251</u> | <u>06707</u> | <u>5/3/83</u> | <u>0</u> | <u>5</u> | <u>5</u> |
| <u>SAM W. ROBERTS</u> | <u>752</u> | <u>07945</u> | <u>5/3/83</u> | <u>0</u> | <u>10</u> | <u>10</u> |
| | | | | | | |
| | | | | | | |

Time taken from locked storage 5:00 ☐ A.M. ☒ P.M.Location on site where isotope was used 1ST RIVE ERTS, TX #142

| PIECE MARK AND/OR SEAM | THICKNESS | DISTANCE TO FILM DIST. | EXPOSURE TIME | NUMBER EXPOSURES | TOTAL EXP. TIME (HOURS & MINUTES) |
|--------------------------------|------------|------------------------|---------------|------------------|-----------------------------------|
| <u>1A, 2A, 3A, 4A & 5A</u> | <u>24"</u> | <u>3 IN</u> | <u>35</u> | <u>105 min</u> | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

The following are mandatory (see operating and emergency procedures):

- Film badges and dosimeters worn by radiographers. ☒
- Dosimeters charged prior to start of operation. ☒
- Area posted with radiation warning signs. ☒
- Warning lights used when applicable. ☒
- Daily maintenance inspection completed. ☒
- Area roped off at 2 MR/HR level or less. ☒
- Area under constant surveillance during radiographic exposures. ☒

Total Time 1 HR 45 minTime locked in storage 12:05 ☒ A.M. ☐ P.M.Exposure device surveyed to determine that sealed source is in shielded position prior to securing in locked storage area. Meter reading = 20 MR/HR.

Radiographer executing final survey on projector before securing in locked storage.

Jim A. Jones
SIGNATURE

Remarks:

SEE BACK OF FORM FOR RADIATION SURVEY

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WL 134(FRONT)

**CBI RADIATION SURVEY**Report No. 5

Contract No. 24561

| CALCULATED DISTANCE | | |
|---------------------|------|---------------|
| INTENSITY | AIR | THROUGH MAT'L |
| 2 MR/HR | 384' | 222' |
| 100 MR/HR | 55' | 32' |

SHOW READINGS IN MR/HR OR R/HR

SHOW DISTANCE IN FEET FROM SOURCE

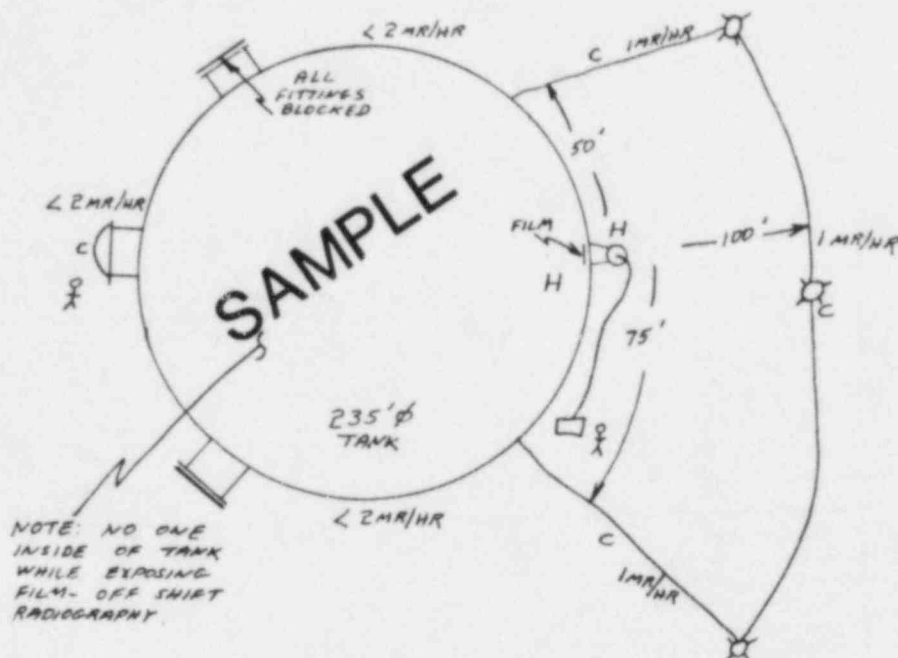
SHOW CAUTION RADIATION AREA SIGN POSITIONS WITH LETTER "C"

SHOW HIGH RADIATION AREA SIGN POSITIONS WITH LETTER 'H'

SHOW WARNING LIGHT POSITIONS WHEN APPLICABLE WITH SYMBOL:

☐ ☒

SKETCH OF RESTRICTED AREA:



A SURVEY IS TO BE MADE ON EACH RADIOGRAPHIC OPERATION

I HEREBY CERTIFY THAT ABOVE IS TRUE AND CORRECT
TO THE BEST OF MY KNOWLEDGE AND BELIEF

RADIOGRAPHER

Date _____

WL 134(BACK)



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QUARTERLY DOSIMETER REPORT

Name JONES, JIM A
(PRINT - LAST, FIRST, AND MIDDLE INITIAL)☐ Passport # 375-38-7802
☒ Soc. Sec. # (Check One)
☐ Company #PARTICIPANT NO. 251 LOCATION HOUSTON, TEXAS DISTRICT HOUSTON CONSTDOSIMETER(S): Serial No. 06707 QUARTER ☐ 1ST ☐ 2ND ☒ 3RD ☐ 4THCalibration Date 5/3/83 YEAR 83

DAILY DOSIMETER READINGS (MR) (WHOLE BODY)

| | PERIOD | | DAYS | | | | | | | TOTAL |
|----|--------|---------|------|------|-----|-------|-----|-----|-----|-------|
| | FROM | TO | MON | TUES | WED | THURS | FRI | SAT | SUN | |
| 1 | 7/4/83 | 7/10 | - | - | - | - | - | - | - | - |
| 2 | 7/11 | 7/17 | - | - | - | - | - | - | - | - |
| 3 | 7/18 | 7/24 | - | - | - | - | - | - | - | - |
| 4 | 7/25 | 7/31 | - | - | - | - | - | - | - | - |
| 5 | 8/1 | 8/7 | - | - | - | - | - | - | - | - |
| 6 | 8/8 | 8/14 | - | - | - | - | - | - | - | - |
| 7 | 8/15 | 8/21 | - | - | - | - | - | - | - | - |
| 8 | 8/22 | 8/28 | - | - | 5 | 0 | 5 | - | - | 10 |
| 9 | 8/29 | 9/4 | - | - | 10 | 0 | - | - | - | 15 |
| 10 | 9/5 | 9/11 | - | - | - | - | - | - | - | - |
| 11 | 9/12 | 9/18 | - | 5 | 0 | 5 | 5 | - | - | 20 |
| 12 | 9/19 | 9/25 | - | - | - | - | - | - | - | - |
| 13 | 9/26 | 10/2/83 | - | - | - | 10 | - | 10 | - | 20 |

WEEKLY RADIATION EXPOSURE (WHOLE BODY) (MR)

| PERIOD | WEEKS | | | | | | | | | | | | |
|----------------------------|-------|------|------|------|-----|------|------|------|-----|------|------|------|------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| WEEK ENDING | 7/10 | 7/17 | 7/24 | 7/31 | 8/7 | 8/14 | 8/21 | 8/28 | 9/4 | 9/11 | 9/18 | 9/25 | 10/2 |
| DOSIMETER | - | - | - | - | - | - | - | 10 | 15 | - | 20 | - | 20 |
| SECOND DOSIMETER (IF USED) | - | - | - | - | - | - | - | 10 | 25 | 25 | 45 | 45 | 65 |

REMARKS: _____

NAME Jim A. Jones DATE 10/1/83
SIGNATURE



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POCKET DOSIMETER CALIBRATION REPORT

Manufacturer & Model No. VICTOREEN 541R Calibration Date 5/3/83CHECKED IN A TRUE FIELD OF 100 MR/HR FOR 1.0 HOURS

| Serial Number | Reading | % Error | Serial Number | Reading | % Error |
|---------------|---------------|-------------|---------------|---------|---------|
| <u>06707</u> | <u>110 MR</u> | <u>+10%</u> | | | |
| <u>07945</u> | <u>90 MR</u> | <u>-10%</u> | | | |
| <u>06714</u> | <u>115 MR</u> | <u>+15%</u> | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

These instruments are certified:

- (1) To have a leakage rate of less than 20% of full scale during a 24 hour period.
- (2) To compare against a true field dosage within $\pm 20\%$ of the true field.

Calibration Due Date 11/3/83

CHICAGO BRIDGE & IRON COMPANY

RADIOGRAPHER

Jim A. Jones
SIGNATURE

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WL 287A REV MAY 84



WL 287A



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SAFETY/TRAINING MEETING REPORT

Contract No. 24561Location: HOUSTON, TEXAS Date 8/22/83
(CITY) (STATE)CHECK ONE: ☒ START-OF-JOB QUARTER ☐ 1ST ☐ 2ND ☒ 3RD ☐ 4TH YEAR 83Attended By: SAM W. ROBERTS (Asst.)
FOREMAN - SMITH
PUSHER - ROBERTS
ENTIRE CREWSubjects Covered: ISOTOPE SAFETY RULES:
ROPES, SIGNS & LIGHTS
STORAGE AREA LOCATION
JOB SITE RADIOGRAPHIC PLANS
GENERAL DISCUSSIONWL 188 Forms for all Assistant Radiographers are on hand ☒ YES ☐ NOMeeting Conducted By: CHECK ONE ☒ RADIOGRAPHER IN CHARGE Jim A. Jones
☐ DISTRICT RSO OR ARSO SIGNATURE
☐ RSO OR ARSO

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RADIATION SAFETY CHECK LIST

| | | | | |
|---|----------------------------------|--|---|---|
| Contract No. 24561 | Location: City HOUSTON | Radiographer charge JIM A. JONES | Safety Supervisor Reporting TIM A. | Date 8/14/83 |
| GAMMA X RAY <input checked="" type="checkbox"/> | State TEXAS | Foreman JOHN F. SMITH | JOHNSON | DISTRICT HOUSTON CONSTRUCTION |
| | | | | No Yes |
| 1. Is each survey meter calibration tag up-to-date? | | | | <input checked="" type="checkbox"/> |
| 2. Is each dosimeter calibration tag up-to-date? | | | | <input checked="" type="checkbox"/> |
| 3. Are survey meters being used? | | | | <input checked="" type="checkbox"/> |
| 4. Are dosimeters being used? | | | | <input checked="" type="checkbox"/> |
| 5. Does site have an operable dosimeter charger? | | | | <input checked="" type="checkbox"/> |
| 6. Are film badges being used? | | | | <input checked="" type="checkbox"/> |
| 7. Are film badges left in shack w/control badge at end of shift? | | | | <input checked="" type="checkbox"/> |
| 8. Does site have posting signs? | | | | |
| a) High radiation area (minimum 2) | | | | <input checked="" type="checkbox"/> |
| b) Radiation area (minimum 8) | | | | <input checked="" type="checkbox"/> |
| c) Radioactive material (minimum 4) | | | | <input checked="" type="checkbox"/> |
| 9. Does site have radiation barrier tape or rope? | | | | <input checked="" type="checkbox"/> |
| 10. Does site have warning lights? | | | | <input checked="" type="checkbox"/> |
| 11. Are signs and barrier tape or rope being used? (and warning lights at night?) | | | | <input checked="" type="checkbox"/> |
| 12. Is exposure device kept locked in storage when not being used? | | | | <input checked="" type="checkbox"/> |
| 13. Is storage area posted with signs? | | | | <input checked="" type="checkbox"/> |
| 14. Does site have required notices posted? | | | | |
| a) NRC-3 (Notice to Employees) | | | | <input checked="" type="checkbox"/> |
| b) WL 251 (CBI Notice to Employees) | | | | <input checked="" type="checkbox"/> |
| c) Section 206 (Noncompliance) | | | | <input checked="" type="checkbox"/> |
| d) State notices (When applicable) | | | | <input checked="" type="checkbox"/> |
| 15. Has site been visited by NRC or State Inspector? If yes, the date was 8/14/83 | | | | <input checked="" type="checkbox"/> |
| 16. Is a copy of the current CBI Isotope Radiation Safety Manual on the site? | | | | <input checked="" type="checkbox"/> |
| 17. Is a copy of the NRC or State License, Registration (as applicable) on the site? | | | | <input checked="" type="checkbox"/> |
| 18. Has the radiographer conducted the required radiation safety meeting with the crew at the start of job? | | | | <input checked="" type="checkbox"/> |
| 19. Has the district RSO or ARSO conducted the required quarterly safety meeting with the radiography crew? | | | | <input checked="" type="checkbox"/> |
| 20. Are all the WL 188 forms for the Assistant Radiographers on the site? | | | | <input checked="" type="checkbox"/> |
| 21. Does site have any unusual conditions that may require attention? (If yes, explain in "Remarks" below). | | | | <input checked="" type="checkbox"/> |
| Remarks: 14. WL 251 WAS MISSING FROM SHACK BULLETIN BOARD 15 IN PLACE NOW. | | | | |
| Distribution: Original - Construction Office (District RSO) Copy - Corp. Safety - DB/Corp. Welding Houston Copy - Radiographer in charge | | This information has been reviewed by Radiographer in Charge and Foreman Jim A. Jones Signature of Radiographer John F. Smith Signature of Foreman | | |

WL 238



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This Shipping Order must be typewritten in ink, in indelible pencil, or in Carbon, and retained by the Agent. 1

CBI Shipper's No. _____
Name of Carrier Carrier's No. _____

RECEIVE, subject to the classifications and tariffs in effect on the date of the issue of this Shipping Order.

From **CHICAGO BRIDGE & IRON CO. AT HOUSTON, TEXAS** 19

The property described below, in apparent good order, except as noted, contains and consists of contents of packages unknown, marked, consigned, and destined as indicated below, which said carrier (the said carrier 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 at said destination, in the route otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to the said 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 terms and conditions of the Uniform Domestic Freight Bill of Lading and Uniform Freight Classification in effect on the date hereof, if there is a bill of lading shipment; or (2) in the applicable motor carrier classification or tariff if there is a motor carrier shipment.

Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Consigned to **EMERY AIRFREIGHT**
HOUSTON AIRPORT (IAH) Mail or street address of consignee—For purposes of notification only.

Destination **TECH/OPS, BURLINGTON** County _____ State **MASS**

Route **N/A**

Delivering Carrier **CBI** Car or Vehicle Initials **VFB-135** No. **N/A**

| No. Page | Kind of Package, Description of Articles, Special Marks, and Exceptions | WEIGHT (Subject to Correction) | Class or Rate | Check Carriers | Subject to Section 7 of Conditions of Standard Bill of Lading, if this shipment is to be delivered to the consignee without receipt by the consignee, the consignee shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and any other lawful charges. |
|----------|--|--------------------------------|---------------|----------------|---|
| 1 | X Shipping Package: Model <u>715</u> S/N <u>109</u> Radioactive Material SPECIAL FORM n.o.s. UN <u>2974</u> IRIDIUM 192 <u>50</u> Curies (Isotope) Source S/N <u>2690</u> Radioactive <u>YELLOW</u> <u>II</u> Labels Transport Index <u>.8</u> USA <u>9039</u> /B(u) This is to certify that the above named materials are properly classified and described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. <u>Jim A. Jones</u> Radiographer This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles, manufactured from depleted Uranium, UN 2909. | | | | Signature of Consignee If charges are to be prepaid, write or stamp here: To be prepaid Received \$ _____ to apply in payment of the charges on the property described herein. Agent or Cashier For (The signature here acknowledges only the amount prepaid.) Charges Advanced \$ _____ |

NOTE: If the shipment moves between two ports by a carrier the law requires that the Bill of Lading shall state whether it is carrier's or shipper's weight. 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 not exceeding _____.

CHICAGO BRIDGE & IRON COMPANY Shipper
Permanent post-office address of shipper: **4906 FAIRBANKS
NORTH HOUSTON ROAD (P.O. BOX 40066)
HOUSTON, TEXAS 77240**

For _____ Agent

Printed on 1-17-83



WL 85

ISOTOPE RADIATION SAFETY MANUAL

SECTION 16

FORMS

| | |
|------|------|
| DATE | 8/84 |
| REV. | 3 |
| PAGE | 18 |

This Shipping Order must be legibly filled in, in ink, in indelible pencil, or in carbon, and retained by the Agent.

1

CBI

Shipper's No. _____

(Name of Carrier)

Carrier's No. _____

RECEIVE, subject to the classifications and tariffs in effect on the date of the issue of this Shipping Order.

From **CHICAGO BRIDGE & IRON CO. AT HOUSTON, TEXAS** 19

The property described below, in apparent good order, except as noted (contents and condition of containers of packages unknown, marked, consigned, and destined as indicated below, which said carrier does not warrant being understood throughout this contract as meaning any person or corporation in possession of the property under the consignor's order to carry to or from said carrier or delivery at said destination, it is on the route, where, as to carrier's order on the route to said destination, it is mutually agreed as to the date of delivery 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 party who is so informed hereunder shall be subject to all the terms and conditions of the Chicago Domestic Freight Bill of Lading and Tariffs in Uniform Freight Classification in effect on the date hereof. If this is a rail or air water shipment, or if in the applicable Motor Carrier Classification or tariff, if this is a motor carrier shipment.

Shopper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions 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 **EMERY AIRFREIGHT
HOUSTON AIRPORT (IAH)**

Destination **TECH OPS, BURLINGTON** County _____

State **MASS**

Route **N/A**

Delivering Carrier **CBI**

Car or Vehicle Initials **VFB-135** No. **N/A**

| No. Pkg. | QTY | Kind of Package, Description of Articles, Special Marks, and Exceptions | WEIGHT (Subject to Correction) | Class or Rate | Check Column | Subject to Section 7 of Conditions of Air Tariff or Bill of Lading, if this shipment is to be delivered to the consignee without payment 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 special charges. |
|----------|-----|---|--------------------------------|---------------|--------------|---|
| 1 | X | Shipping Package: Model <u>65D</u> S/N <u>5</u> Radioactive Material <u>LSA</u> n.o.s. UN <u>2912</u> <u>DEPLETED URANIUM</u> <u>METAL SOLID</u> <u>0.005</u> Curies (isotope) Source S/N <u>N/A</u> Radioactive <u>YELLOW</u> <u>II</u> Labels Transport Index <u>.1</u> USA <u>9032</u> /B(u) This is to certify that the above named materials are properly classified and described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. <i>Jim A. Jones</i> Radiographer This package conforms to the conditions and limitations specified in 49 CFR 171.424 except for radioactive material articles manufactured from depleted uranium, UN 2912. | | | | Signature of Consignor If charges are to be prepaid, write or stamp here: To be Prepaid Received \$ _____ to apply in payment of the charges on the property described herein. Agent or Cashier Per: _____ (The signature here acknowledges only the amount prepaid.) Charges Advanced \$ _____ |

* If the shipment moves between two points by a carrier, by whom the law requires that the Bill of Lading shall state whether it 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 not exceeding

Per _____

Per _____

CHICAGO BRIDGE & IRON COMPANY

Shipper

Agent

Permanent post office address of shipper— 890 FAIRBANKS
NORTH HOUSTON ROAD (P.O. BOX 4068)
HOUSTON, TEXAS 77240

Revised 10-1-78

44-3871-72

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WL 85



ISOTOPE RADIATION SAFETY MANUAL

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in a 715 Drum

| | |
|--|--------------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model <u>715</u> | S/N _____ |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> <u>IRIDIUM 192</u> _____ Curies (Isotope) Source S/N _____ | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ <u>9039</u> /B(u) | |

Model 616 Empty in 715 Drum

| | |
|--|--------------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model <u>715</u> | S/N _____ |
| Radioactive Material <u>LSA</u> , n.o.s., UN <u>2912</u> <u>DEPLETED URANIUM</u> <u>METAL SOLID</u> <u>0.005</u> Curies (Isotope) Source S/N <u>N/A</u> | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ <u>9039</u> /B(u) | |

Model 650 w/Sealed Source

| | |
|--|--------------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model <u>650</u> | S/N _____ |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> <u>IRIDIUM 192</u> _____ Curies (Isotope) Source S/N _____ | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ <u>9032</u> /B(u) | |

Model 650 Empty

| | |
|--|--------------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model <u>650</u> | S/N _____ |
| Radioactive Material <u>LSA</u> , n.o.s., UN <u>2912</u> <u>DEPLETED URANIUM</u> <u>METAL SOLID</u> <u>0.005</u> Curies (Isotope) Source S/N <u>N/A</u> | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ <u>9032</u> /B(u) | |

Model 660 w/Sealed Source

| | |
|--|--------------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model <u>660</u> | S/N _____ |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> <u>IRIDIUM 192</u> _____ Curies (Isotope) Source S/N _____ | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ <u>9033</u> /B(u) | |

Model 660 Empty

| | |
|--|--------------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model <u>660</u> | S/N _____ |
| Radioactive Material <u>LSA</u> , n.o.s., UN <u>2912</u> <u>DEPLETED URANIUM</u> <u>METAL SOLID</u> <u>0.005</u> Curies (Isotope) Source S/N <u>N/A</u> | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ <u>9033</u> /B(u) | |



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Model 850 w/Sealed Source

| | |
|--|--------------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model <u>850</u> S/N _____ | |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> <u>IRIDIUM 192</u> _____ Curies (Isotope) Source S/N _____ | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ <u>9147</u> /B(u) | |

Model 850 Empty

| | |
|--|--------------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model <u>850</u> S/N _____ | |
| Radioactive Material <u>LSA</u> , n.o.s., UN <u>2912</u> <u>DEPLETED URANIUM</u> <u>METAL SOLID</u> <u>0.005</u> Curies (Isotope) Source S/N <u>N/A</u> | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ <u>9147</u> /B(u) | |

Model 900 w/Sealed Source

| | |
|--|--------------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model <u>900</u> S/N _____ | |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> <u>IRIDIUM 192</u> _____ Curies (Isotope) Source S/N _____ | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ <u>9141</u> /B(u) | |

Model 900 Empty

| | |
|--|--------------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model <u>900</u> S/N _____ | |
| Radioactive Material <u>LSA</u> , n.o.s., UN <u>2912</u> <u>DEPLETED URANIUM</u> <u>METAL SOLID</u> <u>0.005</u> Curies (Isotope) Source S/N <u>N/A</u> | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ <u>9141</u> /B(u) | |

Model 920 w/Sealed Source

| | |
|--|--------------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model <u>920</u> S/N _____ | |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> <u>IRIDIUM 192</u> _____ Curies (Isotope) Source S/N _____ | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ <u>9143</u> /B(u) | |

Model 920 Empty

| | |
|--|--------------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model <u>920</u> S/N _____ | |
| Radioactive Material <u>LSA</u> , n.o.s., UN <u>2912</u> <u>DEPLETED URANIUM</u> <u>METAL SOLID</u> <u>0.005</u> Curies (Isotope) Source S/N <u>N/A</u> | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ <u>9143</u> /B(u) | |



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Model 488 w/Sealed Source

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|---|
| Shipping Package: Model <u>488</u> S/N _____ |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> |
| <u>COBALT 60</u> _____ Curies (Isotope) |
| Source S/N _____ |
| Radioactive _____ Labels |
| Transport Index _____ |
| USA/ _____ /B(u) <u>DOT 55</u> |

Model 488 Empty - Not Applicable

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|---|
| Shipping Package: Model _____ S/N _____ |
| Radioactive Material _____, n.o.s., UN _____ |
| _____, Curies (Isotope) |
| Source S/N _____ |
| Radioactive _____ Labels |
| Transport Index _____ |
| USA/ _____ /B(u) _____ |

Model 520 w/Sealed Source

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|---|
| Shipping Package: Model <u>520</u> S/N _____ |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> |
| <u>COBALT 60</u> _____ Curies (Isotope) |
| Source S/N _____ |
| Radioactive _____ Labels |
| Transport Index _____ |
| USA/ _____ /B(u) <u>DOT 55</u> |

Model 520 Empty - Not Applicable

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|---|
| Shipping Package: Model _____ S/N _____ |
| Radioactive Material _____, n.o.s., UN _____ |
| _____, Curies (Isotope) |
| Source S/N _____ |
| Radioactive _____ Labels |
| Transport Index _____ |
| USA/ _____ /B(u) _____ |

Model 520 w/Sealed Source
in a 20WC Overpack

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|---|
| Shipping Package: Model <u>20WC</u> S/N _____ |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> |
| <u>COBALT 60</u> _____ Curies (Isotope) |
| Source S/N _____ |
| Radioactive _____ Labels |
| Transport Index _____ |
| USA/ <u>5800</u> /B <u>X</u> |

Model 520 Empty - Not Applicable

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|---|
| Shipping Package: Model _____ S/N _____ |
| Radioactive Material _____, n.o.s., UN _____ |
| _____, Curies (Isotope) |
| Source S/N _____ |
| Radioactive _____ Labels |
| Transport Index _____ |
| USA/ _____ /B(u) _____ |



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Model 571 w/Sealed Source
in an 801 Drum

| | |
|---|--------------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model | 801 |
| S/N | |
| Radioactive Material | |
| SPECIAL FORM, n.o.s., UN 2974 | |
| COBALT 60 | Curies |
| (Isotope) | |
| Source S/N | |
| Radioactive | Labels |
| Transport Index | |
| USA/ | /B(u) DOT 7A |

Model 773 Empty - Not Applicable

| | |
|---|--------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model | |
| S/N | |
| Radioactive Material | |
| n.o.s., UN | |
| | Curies |
| (Isotope) | |
| Source S/N | |
| Radioactive | Labels |
| Transport Index | |
| USA/ | /B(u) |

Model 672 w/Sealed Source

| | |
|---|--------------------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model | 672 |
| S/N | |
| Radioactive Material | |
| SPECIAL FORM, n.o.s., UN 2974 | |
| COBALT 60 | Curies |
| (Isotope) | |
| Source S/N | |
| Radioactive | Labels |
| Transport Index | |
| USA/ | /B(u) USA-DOT-B-70 |

Model 672 Empty

| | |
|---|--------------------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model | 672 |
| S/N | |
| Radioactive Material | |
| LSA, n.o.s., UN 2912 | |
| DEPLETED URANIUM | |
| METAL SOLID | 0.005 Curies |
| (Isotope) | |
| Source S/N | N/A |
| Radioactive | Labels |
| Transport Index | |
| USA/ | /B(u) USA-DOT-B-70 |

Model 676 w/Sealed Source

| | |
|---|--------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model | 676 |
| S/N | |
| Radioactive Material | |
| SPECIAL FORM, n.o.s., UN 2974 | |
| COBALT 60 | Curies |
| (Isotope) | |
| Source S/N | |
| Radioactive | Labels |
| Transport Index | |
| USA/ 9029 | /B(u) |

Model 676 Empty

| | |
|---|--------------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model | 676 |
| S/N | |
| Radioactive Material | |
| LSA, n.o.s., UN 2912 | |
| DEPLETED URANIUM | |
| METAL SOLID | 0.005 Curies |
| (Isotope) | |
| Source S/N | N/A |
| Radioactive | Labels |
| Transport Index | |
| USA/ 9029 | /B(u) |



ISOTOPE RADIATION SAFETY MANUAL

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| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|--|
| Shipping Package: Model <u>680</u> S/N _____ |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> <u>COBALT 60</u> _____ Curies (Isotope) Source S/N _____ |
| Radioactive _____ Labels Transport Index _____ USA/ <u>9035</u> /B(u) |

Model 680 Empty

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|--|
| Shipping Package: Model <u>680</u> S/N _____ |
| Radioactive Material <u>LSA</u> , n.o.s., UN <u>2912</u> <u>DEPLETED URANIUM</u> <u>METAL SOLID</u> <u>0.005</u> Curies (Isotope) Source S/N <u>N/A</u> |
| Radioactive _____ Labels Transport Index _____ USA/ <u>9035</u> /B(u) |

Model 770 w/Sealed Source

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|--|
| Shipping Package: Model <u>770</u> S/N _____ |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> <u>COBALT 60</u> _____ Curies (Isotope) Source S/N _____ |
| Radioactive _____ Labels Transport Index _____ USA/ <u>9148</u> /B(u) |

Model 770 Empty

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|--|
| Shipping Package: Model <u>770</u> S/N _____ |
| Radioactive Material <u>LSA</u> , n.o.s., UN <u>2912</u> <u>DEPLETED URANIUM</u> <u>METAL SOLID</u> <u>0.005</u> Curies (Isotope) Source S/N <u>N/A</u> |
| Radioactive _____ Labels Transport Index _____ USA/ <u>9148</u> /B(u) |

Model 771 w/Sealed Source

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|--|
| Shipping Package: Model <u>771</u> S/N _____ |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> <u>COBALT 60</u> _____ Curies (Isotope) Source S/N _____ |
| Radioactive _____ Labels Transport Index _____ USA/ <u>9107</u> /B(u) |

Model 771 Empty

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|--|
| Shipping Package: Model <u>771</u> S/N _____ |
| Radioactive Material <u>LSA</u> , n.o.s., UN <u>2912</u> <u>DEPLETED URANIUM</u> <u>METAL SOLID</u> <u>0.005</u> Curies (Isotope) Source S/N <u>N/A</u> |
| Radioactive _____ Labels Transport Index _____ USA/ <u>9107</u> /B(u) |



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Model 773 w/Sealed Source

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|---|------------------------|
| Shipping Package: Model | <u>773</u> |
| S/N | |
| Radioactive Material | |
| <u>SPECIAL FORM</u> | n.o.s., UN <u>2974</u> |
| <u>CESIUM 137</u> | Curies |
| (Isotope) | |
| Source S/N | |
| Radioactive | Labels |
| Transport Index | |
| USA/ | /B(u) <u>DOT 7A</u> |

Model 773 Empty - Not Applicable

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|---|------------|
| Shipping Package: Model | |
| S/N | |
| Radioactive Material | |
| | n.o.s., UN |
| | Curies |
| (Isotope) | |
| Source S/N | |
| Radioactive | Labels |
| Transport Index | |
| USA/ | /B(u) |

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|---|------------|
| Shipping Package: Model | |
| S/N | |
| Radioactive Material | |
| | n.o.s., UN |
| | Curies |
| (Isotope) | |
| Source S/N | |
| Radioactive | Labels |
| Transport Index | |
| USA/ | /B(u) |

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|---|------------|
| Shipping Package: Model | |
| S/N | |
| Radioactive Material | |
| | n.o.s., UN |
| | Curies |
| (Isotope) | |
| Source S/N | |
| Radioactive | Labels |
| Transport Index | |
| USA/ | /B(u) |

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|---|------------|
| Shipping Package: Model | |
| S/N | |
| Radioactive Material | |
| | n.o.s., UN |
| | Curies |
| (Isotope) | |
| Source S/N | |
| Radioactive | Labels |
| Transport Index | |
| USA/ | /B(u) |

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|---|------------|
| Shipping Package: Model | |
| S/N | |
| Radioactive Material | |
| | n.o.s., UN |
| | Curies |
| (Isotope) | |
| Source S/N | |
| Radioactive | Labels |
| Transport Index | |
| USA/ | /B(u) |



ISOTOPE RADIATION SAFETY MANUAL

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SHIPPER'S DECLARATION FOR DANGEROUS GOODS

Shipper

CHICAGO BRIDGE & IRON CO.
8900 FAIRBANKS RD. HOUSTON, TX
HOUSTON, TEXAS 77064

Air Waybill No.

Page 1 of 1 Pages

Shipper's Reference Number
(optional)

Consignee

TECH/OPS
40 NORTH AVE.
BURLINGTON, MASS 01803

Two completed and signed copies of this Declaration must be handed to the operator.

WARNING

Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties. This Declaration must not, in any circumstances, be completed and/or signed by a consolidator, a forwarder or an IATA cargo agent.

TRANSPORT DETAILS

This shipment is within the limitations prescribed for:
(delete not applicable)☒ PASSENGER AND CARGO AIRCRAFT ONLY

Airport of Departure

HOUSTON
AIRPORT
(IAH)

Airport of Destination

Shipment type (delete not applicable)

~~Other~~ RADIOACTIVE

NATURE AND QUANTITY OF DANGEROUS GOODS

(see sub-Section 8.1 of IATA Dangerous Goods Regulations)

| Dangerous Goods Identification | | | | Quantity and type of packing | Packing inst. | Authorization |
|--|-------------------|--------------|-----------------|---|---------------|---|
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Iridium 192 Metal Solid 50 Curies | YELLOW II | Special Form Certificate USA/0154/S |
| SAMPLE | | | | This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. | T.I. -8 | Type B Package Certificate USA/9039/B(u) |
| | | | | Dimensions 43 x 43 x 65 cms | | |

Additional Handling Information

I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labelled, and are in all respects in the proper condition for transport by air according to the applicable international and National Government Regulations.

Name/Title of Signatory

RADIOGRAPHER

Place and Date

HOUSTON, TEXAS 8/1/84

Signature

(see warning above)



IATA

| SHIPPER'S DECLARATION FOR DANGEROUS GOODS | |
|---|---|
| Shipper CHICAGO BRIDGE & IRON Co. 8900 FAIRBANKS RD, HOUSTON TX HOUSTON, TEXAS 77064 | Air Waybill No. Page <u>1</u> of <u>1</u> Pages Shipper's Reference Number <small>(optional)</small> |
| Consignee TECH/OPS 40 NORTH AVE. BURLINGTON, MASS 01803 | |
| Two completed and signed copies of this Declaration must be handed to the operator. | |
| TRANSPORT DETAILS This shipment is within the limitations prescribed for <small>(delete non-applicable)</small> <div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 2px; text-align: center;"> PASSENGER AND CARGO AIRCRAFT </div> <div style="border: 1px solid black; padding: 2px; text-align: center;"> CARGO AIRCRAFT ONLY </div> </div> | Airport of Departure HOUSTON AIRPORT (IAH) Airport of Destination |
| Shipment type <small>(delete non-applicable)</small> <div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 2px; text-align: center;"> EXPLOSIVE </div> <div style="border: 1px solid black; padding: 2px; text-align: center;"> RADIOACTIVE </div> </div> | |
| NATURE AND QUANTITY OF DANGEROUS GOODS Proper Shipping Name, Class, UN Number, Identification Number, number of packages, packing instructions and all other required information as detailed in sub-Section 8.1 of IATA Dangerous Goods Regulations Radioactive material, special form, n.o.s., 7, UN2974, Iridium 192 Metal solid, <u>50</u> Curies <u>YELLOW II</u> , T. I. <u>.8</u> , Dimensions 43x43x65 cms Special form certificate USA/DT54/S and Type B Package certificate USA/9039/B(u) This package conforms to the conditions and limitations specified in 49 CFP 173.424 for excepted radioactive material, articles manufactured from depleted uranium, UN2909. | |
| Additional Handling Information | |
| I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labelled, and are in all respects in the proper condition for transport by air according to the applicable international and National Government Regulations | Name/Title of Signatory RADIOGRAPHER Place and Date HOUSTON, TEXAS 6/1/84 Signature <i>Jim A. Jones</i> <small>(See warning label)</small> |



ISOTOPE RADIATION SAFETY MANUAL

SECTION 16

FORMS

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PAGE 27EXAMPLES OF "NATURE AND QUANTITY OF DANGEROUS GOODS" FILLED OUTA) SHIPPING PACKAGES CONTAINING A SEALED SOURCE:

Model 616 in
Model 715 Drum

| NATURE AND QUANTITY OF DANGEROUS GOODS (see sub-Section B 1 of IATA Dangerous Goods Regulations) | | | |
|---|-------------------|--------------|-----------------|
| Dangerous Goods Identification | | | |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | |
| Quantity and type of packing Iridium 192 Metal Solid Curies | | | |
| This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. Dimensions 43 x 43 x 65 cms | | | |
| Packing inst. T.I. | | | |
| Authorization Special Form Certificate USA/0154/S Type B Package Certificate USA/9039/B(u) | | | |

Model 650
Source Changer

| NATURE AND QUANTITY OF DANGEROUS GOODS (see sub-Section B 1 of IATA Dangerous Goods Regulations) | | | |
|---|-------------------|--------------|-----------------|
| Dangerous Goods Identification | | | |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | |
| Quantity and type of packing Iridium 192 Metal Solid Curies | | | |
| This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. Dimensions 21 x 25.4 x 33.0 cms | | | |
| Packing inst. T.I. | | | |
| Authorization Special Form Certificate USA/0154/S Type B Package Certificate USA/9032/B(u) | | | |

Model 660

| NATURE AND QUANTITY OF DANGEROUS GOODS (see sub-Section B 1 of IATA Dangerous Goods Regulations) | | | |
|---|-------------------|--------------|-----------------|
| Dangerous Goods Identification | | | |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | |
| Quantity and type of packing Iridium 192 Metal Solid Curies | | | |
| This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. Dimensions 12 x 24 x 32.4 cms | | | |
| Packing inst. T.I. | | | |
| Authorization Special Form Certificate USA/0154/S Type B Package Certificate USA/9033/B(u) | | | |



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Model 850
Source Changer

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | (See sub-Section B 1 of IATA Dangerous Goods Regulations) | | |
|--|-------------------|--------------|-----------------|--|---------------|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Iridium 192 Metal Solid Curies This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. Dimensions 21.6 x 22.4 x 26.4 cms. | | Special Form Certificate USA/0179/S T.I. Type B Package Certificate USA/9147/B(u) |

Model 900

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | (See sub-Section B 1 of IATA Dangerous Goods Regulations) | | |
|--|-------------------|--------------|-----------------|--|---------------|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Iridium 192 Metal Solid Curies This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. Dimensions 13.3 x 19.7 x 31.1 cms. | | Special Form Certificate USA/0179/S T.I. Type B Package Certificate USA/9141/B(u) |

Model 920

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | (See sub-Section B 1 of IATA Dangerous Goods Regulations) | | |
|--|-------------------|--------------|-----------------|--|---------------|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Iridium 192 Metal Solid Curies This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. Dimensions 13.3 x 19.7 x 31.1 cms. | | Special Form Certificate USA/0179/S T.I. Type B Package Certificate USA/9143/B(u) |



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Source Changer

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | (See sub-Section B.1 of IATA Dangerous Goods Regulations) | | |
|--|--------------------|--------------|-----------------|--|---------------|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Div. Num. | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cobalt 60 Metal Solid Curies Dimensions 45 x 45 x 55 cms. | | Special Form Certificate USA/0165/S T.I. Type B Package DOT 55 |

Model 520

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | (See sub-Section B.1 of IATA Dangerous Goods Regulations) | | |
|--|--------------------|--------------|-----------------|--|---------------|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Div. Num. | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cobalt 60 Metal Solid Curies Dimensions 84 x 61 x 50 cms. | | Special Form Certificate USA/0165/S T.I. Type B Package DOT 55 |

Model 520 in
20WC Overpack

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | (See sub-Section B.1 of IATA Dangerous Goods Regulations) | | |
|---|--------------------|--------------|-----------------|---|---------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Div. Num. | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cobalt 60 Metal Solid Curies | | Special Form Certificate USA/0165/S |
| Inner Package conforms to specifications DOT 55 | | | | 20 WC Overpack Dimensions ____ x ____ x ____ cms. | | T.I. Type B Package Certificate USA/5800/S |



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Model 672

| NATURE AND QUANTITY OF DANGEROUS GOODS (See sub-Section 8.1 of IATA Dangerous Goods Regulations) | | | | | | |
|--|-------------------|--------------|-----------------|--|---------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cobalt 60 Metal Solid Curies This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. Dimensions 31.8 x 35 x 61.6 cms. | | Special Form Certificate USA/0165/S T.I. Type B Package Certificate USA-DOT-6-70 |

Model 676

| NATURE AND QUANTITY OF DANGEROUS GOODS (See sub-Section 8.1 of IATA Dangerous Goods Regulations) | | | | | | |
|--|-------------------|--------------|-----------------|--|---------------|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cobalt 60 Metal Solid Curies This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. Dimensions 35.6 x 38.1 x 73.7 cms. | | Special Form Certificate USA/0165/S T.I. Type B Package Certificate USA/9029/B(u) |

Model 680

| NATURE AND QUANTITY OF DANGEROUS GOODS (See sub-Section 8.1 of IATA Dangerous Goods Regulations) | | | | | | |
|--|-------------------|--------------|-----------------|--|---------------|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cobalt 60 Metal Solid Curies This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. Dimensions 28.8 x 37.5 x 53.4 cms. | | Special Form Certificate USA/0165/S T.I. Type B Package Certificate USA/9035/B(u) |



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Model 770
Source Changer

| NATURE AND QUANTITY OF DANGEROUS GOODS <i>(see sub-Section B 1 of IATA Dangerous Goods Regulations)</i> | | | | | | |
|---|-------------------|--------------|-----------------|--|---------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cobalt 60 Metal Solid Curies This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. Dimensions 58.4 x 61.0 x 50.8 cms. | T.I. | Special Form Certificate USA/0165/S Type B Package Certificate USA/9148/B(u) |

Model 771
Source Changer

| NATURE AND QUANTITY OF DANGEROUS GOODS <i>(see sub-Section B 1 of IATA Dangerous Goods Regulations)</i> | | | | | | |
|---|-------------------|--------------|-----------------|---|---------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cobalt Metal Solid Curies This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. Dimensions 47 x 58.4 x 61 cms. | T.I. | Special Form Certificate USA/0165/S Type B Package Certificate USA/9107/B(u) |



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Model 773

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | (See sub-Section B 1 of IATA Dangerous Goods Regulations) | | |
|--|-------------------|--------------|-----------------|--|--------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing list | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cesium 137 Metal Solid Curies Dimensions 8.5 x 12.7 x 12.7 cms. | | Special Form Certificate GB/24/S T.I. Type A Package DOT 7A |

Model 571 in
Model 801 Drum

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | (See sub-Section B 1 of IATA Dangerous Goods Regulations) | | |
|--|-------------------|--------------|-----------------|---|--------------|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing list | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cesium 137 Metal Solid Curies Dimensions 43 x 43 x 65 cms. | | Special Form Certificate USA/0165/S T.I. Type A Package DOT 7A |



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B) "EMPTY" SHIPPING PACKAGE (DOESN'T CONTAIN A SEALED SOURCE):

Model 616 in
Model 715 Drum

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | <i>(see sub-Section B 1 of IATA Dangerous Goods Regulations)</i> | | |
|--|-------------------|--------------|-----------------|---|--------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing test | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies Dimensions 43 x 43 x 65 cms. | T.I. | Type B Package Certificate USA/9039/B(u) |

Model 650
Source Changer

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | <i>(see sub-Section B 1 of IATA Dangerous Goods Regulations)</i> | | |
|--|-------------------|--------------|-----------------|---|--------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing test | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies Dimensions 21 x 25.4 x 33.7 cms. | T.I. | Type B Package Certificate USA/9032/B(u) |

Model 660

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | <i>(see sub-Section B 1 of IATA Dangerous Goods Regulations)</i> | | |
|--|-------------------|--------------|-----------------|---|--------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing test | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies Dimensions 12 x 24 x 32.4 cms. | T.I. | Type B Package Certificate USA/9033/B(u) |



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Source Changer

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | See sub-Section B 1 of IATA Dangerous Goods Regulations | | |
|--|-------------------|--------------|-----------------|---|---------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies | T.I. | Type B Package Certificate USA/9147/B(u) |
| | | | | Dimensions 21.6 x 22.4 x 26.4 cms. | | |

Model 900

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | See sub-Section B 1 of IATA Dangerous Goods Regulations | | |
|--|-------------------|--------------|-----------------|---|---------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies | T.I. | Type B Package Certificate USA/9141/B(u) |
| | | | | Dimensions 13.3 x 19.7 x 31.1 cms. | | |

Model 920

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | See sub-Section B 1 of IATA Dangerous Goods Regulations | | |
|--|-------------------|--------------|-----------------|---|---------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies | T.I. | Type B Package Certificate USA/9143/B(u) |
| | | | | Dimensions 13.3 x 19.7 x 31.1 cms. | | |



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| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | See sub-Section B 1 of IATA Dangerous Goods Regulations | | |
|--|-------------------|--------------|-----------------|---|---------------|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies Dimensions 31.8 x 35 x 61.6 cms. | T.I. | Type B Package Certificate USA-DOT-8-70 |

Model 676

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | See sub-Section B 1 of IATA Dangerous Goods Regulations | | |
|--|-------------------|--------------|-----------------|---|---------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies Dimensions 35.6 x 38.1 x 73.7 cms. | T.I. | Type B Package Certificate USA/9029/B(u) |

Model 680

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | See sub-Section B 1 of IATA Dangerous Goods Regulations | | |
|--|-------------------|--------------|-----------------|---|---------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies Dimensions 28.8 x 37.5 x 53.4 cms. | T.I. | Type B Package Certificate USA/9035/B(u) |



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Model 770
Source Changer

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | See sub-Section 8.1 of IATA Dangerous Goods Regulations | | |
|--|-------------------|--------------|-----------------|---|---------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies | | Type B Package Certificate USA/9148/B(u) |
| | | | | Dimensions 58.4 x 61.0 x 50.8 cms | T.I. | |

Model 771
Source Changer

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | See sub-Section 8.1 of IATA Dangerous Goods Regulations | | |
|--|-------------------|--------------|-----------------|---|---------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material SA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies | | Type B Package Certificate USA/9107/B(u) |
| | | | | Dimensions 47 x 58.4 x 61 cms | T.I. | |



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3.0 SHIPPING PACKAGE - RECEIVING REQUIREMENTS:

3.1 Upon receipt of a shipping package, survey to determine the radiation levels external to the package. Perform this survey:

3.1.1 As soon as practicable after receipt, but no later than three (3) hours.

or

3.1.2 If received at company facilities after normal working hours, no later than eighteen (18) hours.

3 3.2 When the radiation levels of a shipping package are in excess of 200 milliroentgens per hour at any exterior surface or 10 milliroentgens per hour at one meter (3.3 feet) from any exterior surface, immediately notify the District RSO or ARSO. The District RSO or ARSO shall notify the RSO or ARSO to determine the action to take. The NRC or other regulatory agencies and the final delivering carrier shall be notified as applicable. See Section 12.

3 3.3 When a shipping package is an overpack or when the shipping package is received in an outer shipping container, open that overpack or outer shipping container only in a Restricted Area.

3 3.4 Survey the exposure device immediately upon receipt if it is also the shipping package or upon removal from an overpack or an outer shipping container.

3.4.1 Technical Operations Model 571, 616, 660, 773, 900 and 920 exposure devices which all measure 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 measured at a distance six (6) inches away from any exterior surface.

3.4.2 Technical Operations Model 520, 672, 676 and 680 exposure devices which all measure four (4) inches or more from the sealed source storage position to any exterior surface of the device, shall have no radiation level in excess of 200 milliroentgens per hour at any exterior surface and ten (10) milliroentgens per hour measured at a distance of one meter (3.3 feet) from any exterior surface.



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- 3.5 If any exposure device readings are noted in excess of those specified in 3.4.1 or 3.4.2, immediately notify the District RSO or ARSO for instructions. The District RSO or ARSO shall notify the RSO or ARSO to determine the action to take.
- 3.6 Examine the exposure device or source changer for any signs of damage and to assure that all seal wires, locks, plugs, etc., as provided by the manufacturer, are in place.
- 3.7 After all required inspections and surveys, place the exposure device or source changer in storage, if not used immediately. Fill out form WL 189.

4.0 SHIPPING PACKAGE - INSPECTION AND PREPARATION:

- 4.1 Check the exposure device or source changer to assure that all shipping plugs, seal wires, locks, etc. are in place.

- 3 4.2 Check the shipping package for the following required markings. Relabel any missing or illegible markings.

- 4.2.1 USNRC Certification number or DOT Specification number.

- 4.2.1.1 USNRC Certification:

"USA/____/B(u)"

- 4.2.1.2 DOT Specification:

"DOT 7A" or "DOT 55"

- 4.2.2 Proper shipping name and identification number:

"Radioactive Material, special form, n.o.s., UN2974"

- 4.2.3 Type of shipping package in letters 1/2 inch (12mm) high:

"TYPE A" or "TYPE B"

- 3 4.3 If the shipping package is empty (doesn't contain a sealed source), do the following.

- 4.3.1 Tape over the words "Special Form" in the proper shipping name and print "LSA" on the tape.



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4.3.2 Tape over the identification number "UN2974" and print "UN2912" on the tape.

3 4.4 When a Model 715 Drum, Model 801 Drum or 20 WC overpack is the shipping package used:

4.4.1 Assure that pig hair, foam rubber or other packing material is in place to protect the fire insulation and prevent the enclosed exposure device from shifting during shipment.

4.4.2 Check the integrity of the fire resistant insulation shield.

4.4.3 Check for proper operation of the drum locking ring and bolting or fastener device.

4.5 Nonconforming or damaged shipping packages or parts shall be tagged or marked and the District Radiation Safety Personnel notified for instructions. DO NOT SHIP nonconforming or damaged shipping packages.

4.6 Attach a security seal to the shipping package:

4.6.1 At the shipping plug or source indicator knob for exposure devices.

3 4.6.2 At the bolt heads of the cover for source changers and overpacks.

4.6.3 At the locking ring bolt head for shipping drums.

3 4.7 When a shipping package is placed inside a crate, mark the outside of the crate as follows:

4.7.1 "Inside package complies with prescribed specifications"

4.7.2 Next list the required information of 4.2

or

If the package is empty, modify the information as required in 4.3.

3 4.8 Survey the shipping package to assure that the radiation level does not exceed 200 milliroentgens per hour at the external surfaces or 10 milliroentgens per hour at one meter (3.3 feet) from the surfaces.



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- 4.9 Each shipping package or crate must be labeled with the appropriate radioactive labels affixed to opposite sides of the shipping package or crate.

- 4.9.1 Use Radioactive White I Label if the radiation intensity is 0.5 MR/HR or less at the surface of the shipping package (not the crate, if used).



- 4.9.2 Use Radioactive Yellow II Label if the radiation intensity is 50 MR/HR or less at the surfaces of the shipping package and is 1 MR/HR or less at a distance of one meter (3.3 feet) from the surfaces (not the crate, if used).



- 4.9.3 Use Radioactive Yellow III Label if the radiation intensity is greater than 50 MR/HR at the surface of the shipping container or greater than 1 MR/HR at a distance of one meter (3.3 feet) from the surfaces (not the crate, if used).



- 4.10 Fill out the information on the shipping labels as follows.

4.10.1 Contents

- 4.10.1.1 Type of Radioisotope; ie Iridium 192, Cobalt 60, Cesium 137, or depleted Uranium.

4.10.2 Activity

- 4.10.2.1 For Iridium, Cobalt or Cesium, read the value from the decay chart.

- 4.10.2.2 For depleted Uranium use $\leq .005$ Ci.

- 4.10.3 Transport Index: For Yellow II or III Labels this is the radiation intensity measured at one meter (3.3 feet) from the surface of the shipping package (not the crate, if used).



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5.0 SHIPMENT VIA COMPANY VEHICLE:

- 3 5.1 Assure that the selected routes of travel are in accordance with all applicable regulations and, when required, that proper notice has been given to all regulatory agencies.
- 3 5.2 Fill out form WL 85 "Straight Bill of Lading" and document shipping information on form WL 189 "Radioactive Isotope Shipping/Receiving".
- 3 5.3 The original shipping papers shall accompany the shipment.
- 5.4 Place the shipping package or crate as far away as possible from the driver and/or other passenger(s).
- 3 5.5. Secure the shipping package or crate in the vehicle by use of cables or chains to prevent movement and unauthorized removal.
- 5.6 For radioactive Yellow III shipments, placard the vehicle on all four (4) sides (front, rear, and each side) with radioactive placards. See Figure 1.



Figure 1 Radioactive Placards



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5.7 Prior to operation of the vehicle perform a survey. The reading at the driver and passenger(s) location, or anywhere on the exterior surface of the vehicle, shall not exceed two (2) milliroentgens per hour. If the reading exceeds this value, provide additional shielding to reduce the reading to this value.

3 5.8 A Radiographer must accompany the shipment and in addition the Radiographer shall have:

5.8.1 Film Badge

5.8.2 Dosimeter

5.8.3 Survey Meter

5.8.4 Radiation Area Signs

5.8.5 CBI Isotope Safety Manual (Current Revision)

5.8.6 Rope(s)

3 5.9 When operating the vehicle, the shipping papers shall be within immediate reach of the operator while restrained by the lap belt.

3 5.10 Place the shipping papers on the driver seat and lock the vehicle or other compartments of the vehicle when unattended.

6.0 SHIPMENT VIA COMMON CARRIER - GROUND TRANSPORTATION:

3 6.1 Fill out form WL 85 "Straight Bill of Lading" and document shipping information on form WL 189 "Radioactive Isotope Shipping/Receiving".

6.2 The original shipping papers shall accompany the shipment.

6.3 Consign shipments only to common carriers qualified to handle such shipments.

6.4 Make notification of shipment ahead of time so that proper receiving arrangements can be made.

6.5 For shipments requiring Radioactive Yellow III Labels, provide the carrier with radioactive placards.

7.0 SHIPMENT VIA COMMON CARRIER - AIR TRANSPORTATION:

3 7.1 Fill out a "Shipper's Declaration for Dangerous Goods" form and document shipping information on form WL 189 "Radioactive Isotope Shipping/Receiving". If no "Shipper's Declaration for Dangerous Goods" form is available and the shipping package is being taken to the air carrier, fill out a "Straight Bill of Lading" form WL 85 to cover the ground transportation of the shipping package to the air carrier.



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- 3 7.2 The original shipping papers shall accompany the shipment.
- 7.3 Apply two (2) , "Danger Do Not Load in Passenger Aircraft" labels to the shipping package or crate, if used. See Figure 2.



Figure 2 Air Transportation Label



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1.0 RESPONSIBILITY:

1.1 Radiographers:

- 1.1.1 Maintain up-to-date records at the site.
- 1.1.2 Submit all required weekly and quarterly reports to the district office.
- 1.1.3 At the end of site radiographic work, send all required site records to the district office.

1.2 District Office:

- 1.2.1 Store all required records and forward copies to the RSO at the Houston Corporate Welding office.

1.3 Corporate Office:

- 1.3.1 Store all required records.

2.0 REQUIRED RECORDS:

- 2.1 The Table on page 7 lists the required report forms, when to complete and when copies are to be sent to the district office.

3.0 FORMS:

3.1 NRC-4 Occupational External Radiation Exposure History (Form WL 41):

- 3.1.1 Completed and signed by the individual when starting radiographic work with CBI.
- 3.1.2 Send original to district office.
- 3.1.3 Retain copy in jobsite file.

3.2 NRC-5 Current Occupational External Radiation Exposure (Form WL 40) or A Film Badge Service Company Quarterly Report (If it Contains all the Required NRC-5 Information):

- 3 3.2.1 Complete Form WL40 at the end of quarter in which the individual was doing radiographic work or use a film badge service company quarterly report.
- 3 3.2.2 Send original of Form WL40 to district office, if used.



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- 3.2.3 Retain copy in jobsite file.
- 3.2.4 When an individual transfers to another location, provide a copy of the latest NRC-5, or equivalent, report to the individual.
- 3.3 Assistant Radiographer Qualification (Form WL 188)
 - 3.3.1 Completed and signed by the District RSO or ARSO.
 - 3.3.2 Send original to district office.
 - 3.3.3 Retain copy in jobsite file.
 - 3.3.4 Provide a copy to the individual.
- 3.4 Radiographer "Certificate of Award" (Form WL 231)
 - 3.4.1 Completed and signed by the Chief Welding Engineer and the RSO or ARSO.
 - 3.4.2 Provide the original to the individual.
 - 3.4.3 Retain a copy for the district office individual's personnel file.
- 3.5 Radioactive Isotope Shipping/Receiving Report (Form WL 189)
 - 3.5.1 Completed and signed by the Radiographer whenever sealed sources are shipped or received.
 - 3.5.2 Send original to district office at end of week.
 - 3.5.3 Retain copy in jobsite file.
- 3.6 Physical Inventory, Leak Test and Maintenance (Form WL 44-Front)
 - 3.6.1 Make entries when:
 - 3.6.1.1 Sealed sources are received or shipped.
 - 3.6.1.2 Sealed sources are leak tested.
 - 3.6.1.3 Quarterly maintenance is performed.
 - 3.6.2 Completed and signed by the Radiographer at the end of each quarter.
 - 3.6.3 Send original to district office at the end of each quarter or the end of the job.
 - 3.6.4 Retain copy in jobsite file.



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3.7 Quarterly Meter Report (Form WL 44 Back)

3.7.1 Make entries when:

3.7.1.1 Survey meters are received or shipped.

3.7.1.2 Dosimeters are received or shipped.

3.7.2 Completed at end of quarter.

3.7.3 Send original to district office.

3.7.4 Retain copy in jobsite file.

3.8 Gamma Radiography Utilization Log (Form WL 134)

3.8.1 Completed and signed by the Radiographer for each sealed source each time it is removed from storage for radiographic, dosimeter calibration and source changing operations and for each week of non-use. For non-use periods, add the statement "Sealed source not used for the week of _____ to _____."

3.8.2 Send original to district office at end of week.

3.8.3 Retain copy in jobsite file.

3.9 Radiation Survey (Form WL 134 Back)

3.9.1 Completed and signed by the Radiographer for each sealed source each time it is removed from storage for radiographic, dosimeter calibration and source changing operations.

3.9.2 For repeat sketches, reference to previous sketches by date may be used up to four (4) weeks, after which a new sketch shall be required.

3.9.3 Send original to district office at end of week.

3.9.4 Retain copy in jobsite file.

3.10 Quarterly Dosimeter Report (Form WL 236)

3.10.1 Enter readings daily, totals weekly and completed and signed by the individual at the end of quarter.

3.10.2 Send original to district office.

3.10.3 Retain copy in jobsite file.

3.10.4 When an individual transfers to another location, provide a copy of the current report to the individual.



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3.11 Pocket Dosimeter Calibration Report (Form WL 287A)

3.11.1 Completed and signed by the Radiographer whenever dosimeters are calibrated.

3.11.1.1 Original to district office.

3.11.1.2 Retain copy in job site file.

3.12 Safety/Training Meeting Report (Form WL 46)

3.12.1 Meetings conducted and form completed and signed as follows:

3.12.1.1 At start of job by Radiographer-in-charge with entire crew.

3.12.1.2 Quarterly by District RSO or ARSO or by Corporate RSO or ARSO with Radiographers and Assistant Radiographers.

3.12.2 Send original to district office.

3.12.3 Retain copy in job site file.

3.13 Radiation Safety Checklist (Form WL 238)

3.13.1 Completed and signed by a Safety Supervisor whenever a construction job site is visited.

3.13.2 Send original to district office.

3.13.3 Send copy to Corporate Safety/RSO.

3.13.4 Retain copy in job site file.

▷ 3.14 Straight Bill of Lading - Short Form (Form WL 85)

3.14.1 Completed and signed by the Radiographer whenever a sealed source is shipped.

3.14.2 Send original with shipment.

3.14.3 Send copy to district office.

3.14.4 Retain copy in job site file.

3.15 Shippers' Declaration for Dangerous Goods (IATA)

3.15.1 Completed and signed by the Radiographer whenever a sealed source is shipped by Air Freight.



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3.15.2 Send original with shipment.

3.15.3 Send copy to district office.

4.0 TWO (2) YEAR RETENTION:

4.1 These records shall to be retained for two (2) years.

4.1.1 Source Records

4.1.1.1 Decay Chart (Tech/Ops).

4.1.1.2 Manufacturer's (Tech/Ops) Leak Test Report.

4.1.1.3 Physical Inventory, Leak Test and Maintenance (WL 44 (Front)).

4.1.1.4 Isotope Shipping/Receiving Report (WL 189).

3 4.1.1.5 Straight Bill of Lading (WL 85).

4.1.1.6 Shipper's Declaration for Dangerous Goods (IATA) (if applicable).

4.1.2 Personnel Records

4.1.2.1 Six (6) Month Isotope Quiz.

4.1.3 Survey Records

4.1.3.1 Utilization Log and Radiation Survey (WL 134 (Front) & WL 134 (Back)).

4.1.4 Meter Records

4.1.4.1 Quarterly Meter Report (WL 44 (Back)).

4.1.4.2 Vendor Survey Meter Calibration Reports.

4.1.4.3 Vendor Pocket Dosimeter Calibration Reports. (If CBI, WL287A)

4.1.5 Safety Records

4.1.5.1 Safety Training/Meeting Reports (WL 46).

4.1.5.2 Radiation Safety Check List (WL 238).



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5.0 FIVE (5) YEAR RETENTION:

5.1 These records shall be retained for five (5) years.

5.1.1 Transfer receipt from Manufacturer (Tech/Ops).

5.1.2 Isotope Radiographers examination.

6.0 INDEFINITE RETENTION:

6.1 These records shall be retained until the Nuclear Regulatory Commission (NRC) authorizes disposition.

6.1.1 NRC-4: Occupational External Radiation History (WL 41).

6.1.2 NRC-5: Current Occupational External Radiation Exposure (WL 40) or equivalent report containing the same information.

6.1.3 Quarterly Dosimeter Reports (WL 236).

6.1.4 Assistant Radiographer Certification (WL 188).

6.1.5 Radiographer Certificate of Award (WL 231).



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| OPERATION(S) | SPC-4 (WL 41) | ASSISTANT RADIOGRAPHER QUALIFICATION (WL 118) | CERTIFICATE OF AWARD (WL 211) | SAFETY/TRAINING MEETING REPORT (WL 45) | RADIATION/ISOTOPE SHIPPING/ RECEIVING REPORT (WL 189) | PHYSICAL INVENTORY, LEAK TEST AND MAINTENANCE (WL 44 FRONT) | QUARTERLY METER REPORT (WL 44 BACK) | POCKET DOSIMETER CALIBRATION REPORT (WL 287A) | GAMMA RADIOGRAPHY UTILIZATION LOG (WL 134) | RADIATION SURVEY REPORT (WL 216) | QUARTERLY DOSIMETER REPORT (WL 40) | WEC-5 (WL 40) or Equivalent Form | STRAIGHT LOADING - BILL OF MATERIALS (WL 85) | SHIPPER'S DECLARATION FOR DANGEROUS GOODS (HATA) | RADIATION SAFETY CHECK LIST (WL 218) |
|--|---------------|--|----------------------------------|---|--|--|--|--|---|-------------------------------------|---------------------------------------|-------------------------------------|--|---|---|
| NEW PERSONNEL: ASSISTANT RADIOGRAPHER | 1 | 1 | | | | | | | | | | | | | |
| NEW PERSONNEL: RADIOGRAPHER | | | 1 | | | | | | | | | | | | |
| SAFETY MEETING: START-OF-JOB QUARTERLY | | | | 2 | | | | | | | | | | | |
| RECEIPT OF SHIPPING CONTAINER(S) | | | | | 2 | 3 | | | | 3 | | | | | |
| SHIPPING OF SHIPPING CONTAINER(S) | | | | | 2 | 3 | | | | 3 | | 2 | 2 | | |
| RECEIPT OF SURVEY METERS AND/OR DOSIMETERS | | | | | | 3 | | | | | | | | | |
| USE OF EXPOSURE DEVICES: RADIOGRAPHY CALIBRATION | | | | | | | | 2 | 2 | 3 | | | | | |
| SEALED SOURCE CHANGING | | | | | 3 | | 2 | 2 | 2 | 3 | | | | | |
| QUARTERLY MAINTENANCE | | | | | 3 | | | | | 3 | | | | | |
| CONSTRUCTION SAFETY SUPERVISOR JOB-SITE VISIT | | | | | | | | | | | | | | | 2 |
| WEEKLY FILM BADGE REPORT FROM PROCESSOR | | | | | | | | | | | 3 | | | | |

1. Forms to be filled out once for new personnel.
2. Forms to be filled out and sent to the District Office at end of week.
3. Forms to be kept up-to-date daily during course of the quarter* and sent to the District Office at the end of each quarter.

* Each quarter is 13 weeks long and there are four quarters in a year. The first quarter starts on the first Monday on or after January 1 and ends on a Sunday. Any fractional week at the beginning of a year is added to the last quarter of the previous year. Starting and ending dates for quarters shown on Film Badge Reports must agree with the above.



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Current Occupational External Radiation

Exposure NRC-5 WL 40 3 & 4

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Radiographer "Certificate of Award" WL 231 6

3> Radioactive Isotope Shipping/Receiving Report WL 189 7 & 8

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Safety Training Meeting Report WL 46 15

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3> Straight Bill of Lading WL85 17 thru 24

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NRC-4 OCCUPATIONAL EXTERNAL RADIATION EXPOSURE HISTORY

See Instructions on the Back

IDENTIFICATION

| | | |
|--|--|--|
| 1. NAME (PRINT - LAST, FIRST AND MIDDLE INITIAL) <i>JONES, JIM A.</i> | 2. <input checked="" type="checkbox"/> Passport # <i>375-38-7802</i> <input type="checkbox"/> Soc. Sec. # <input type="checkbox"/> Company # (Check One) | |
| 3. DATE OF BIRTH (MONTH, DAY, YEAR) <i>JAN 5, 1955</i> | CBI START DATE (MONTH, YEAR) <i>JAN, 1980</i> | 4. AGE IN FULL YEARS (IN) <i>25</i> |

OCCUPATIONAL EXPOSURE - PREVIOUS HISTORY

| 5. PREVIOUS EMPLOYMENTS INVOLVING RADIATION EXPOSURE - LIST NAME AND ADDRESS OF EMPLOYER | 6. DATES OF EMPLOYMENT (FROM-TO) | 7. PERIODS OF EXPOSURE | 8. WHOLE BODY (REM) | 9. RECORD OR CALCULATED (INSERT ONE) |
|--|---|-------------------------|---------------------|--------------------------------------|
| <i>MIDWEST X-RAY</i> | <i>1/5/79 TO 1/3/80</i> | <i>1/5/79 TO 1/3/80</i> | <i>.500</i> | <i>RECORD</i> |
| SAMPLE | | | | |
| | | | | |
| 10. REMARKS | 11. ACCUMULATED OCCUPATIONAL DOSE - TOTAL | | <i>.500</i> | |

13. CALCULATIONS - PERMISSIBLE DOSE WHOLE BODY:

- (A) PERMISSIBLE ACCUMULATED DOSE - 5 (N-18) *- 35.000 REM*
- (B) TOTAL EXPOSURE TO DATE (FROM ITEM 11) *- .500 REM*
- (C) UNUSED PART OF PERMISSIBLE ACCUMULATED DOSE (A-B) *- 34.500 REM*

12. CERTIFICATION: I CERTIFY THAT THE EXPOSURE HISTORY LISTED IN COLUMNS 5, 6, AND 7 IS CORRECT AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

Jim A Jones *1/8/80*
EMPLOYEE'S SIGNATURE DATE
CHICAGO BRIDGE & IRON Co.
14. NAME OF LICENSEE

WL 41(FRONT)



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INSTRUCTIONS FOR PREPARATION OF NRC FORM 4

This form or a clear and legible record containing all the information required on this form must be prepared by each licensee of the Nuclear Regulatory Commission who, pursuant to Section 20.101, proposes to expose an individual to a radiation dose in excess of the amounts specified in Paragraph 20.101(a) of the regulations in Part 20. Standards for Protection Against Radiation, 10 CFR. The requirement for completion of this form is contained in Section 20.102 of that regulation. The information contained in this form is used for estimating the external accumulated occupational dose of the individual for whom the form is completed. A separate Form NRC-4 shall be completed for each individual to be exposed to a radiation dose in excess of the limits specified in Paragraph 20.101(a) of Part 20 of the Commission's regulations. * Listed below by item are instructions and additional information directly pertinent to completing this form.

Identification

- Item 1. Self-explanatory.
Item 2. Self-explanatory except that, if individual has no social security number, passport number or company number, the word "none" shall be inserted.
Item 3. Self-explanatory.
Item 4. Enter the age in full years. This is called "N" when used in calculating the Permissible Dose. N is equal to the number of years of age of the individual on his last birthday.

Occupational Exposure

- Item 5. List the name and address of each previous employer and the address of employment. Start with the most recent employer and work back.
Include only those periods of employment since the eighteenth birthday involving occupational exposure to radiation. For periods of self-employment, insert the word "self-employed."
Item 6. Give the dates of each employment listed in Item 5.
Item 7. List periods during which occupational exposure to radiation occurred.
Item 8. List the dose recorded for each period of exposure from the records of previous occupa-

tional exposure of the individual as calculated under Section 20.102. Dose is to be given in rem.

"Dose to the whole body" shall be deemed to include any dose to the whole body, gonads, active blood-forming organs, head and trunk, or lens of eye.

- Item 9. After each entry in Item 8 indicate in Item 9 whether dose is obtained from records or calculated in accordance with Section 20.102.

Item 10. Self-explanatory.

Total Accumulated Occupational Dose (Whole Body)

- Item 11. The total for the whole body is obtained by summation of all values in Item 8.

Certification

- Item 12. Upon completion of the report, the employee must certify that the information in Columns 5, 6, and 7 is accurate and complete to the best of his knowledge. The date is the date of his signature.

Calculations

- Item 13. The lifetime accumulated occupational dose for each individual and the permissible dose under Paragraph 20.101(b) are obtained by carrying out the following steps: The value for N should be taken from Item 4. Subtract 18 from N and multiply the difference by 5 rem. (For example, John Smith, age 32; $N = 32$; $PAD = 5 (32 - 18) = 70$ rem.) Enter total exposure to date from Item 11. Subtract (b) from (a) and enter the difference under (c). The value in (c) represents the unused part of the permissible accumulated dose. This value for permissible dose is to be carried forward to Form NRC-5, "Current Occupational External Radiation Exposure (Whole Body)."

- Item 14. Self-explanatory.

* This form requires the signature of the employee concerned.

PRIVACY ACT STATEMENT

Pursuant to 5 U.S.C. 552(a)(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).

- AUTHORITY** Sections 53, 55, 59, 81, 103, 104, 161(b), and 161(c) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2073, 2093, 2095, 2111, 2133, 2134, 2201(b), and 2201(c)). The authority for soliciting the social security number is 10 CFR Part 20.
- 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.
- 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.
- 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.

- SYSTEM MANAGER(S) AND ADDRESS** Director, Office of Management Information and Program Control
U.S. Nuclear Regulatory Commission, Washington, D.C. 20555

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NRC-5 CURRENT OCCUPATIONAL EXTERNAL RADIATION EXPOSURE

See Instructions on Back

IDENTIFICATION

| | |
|--|---|
| 1. NAME (PRINT - Last, first, and middle initial) JONES, JIM A. | 2. <input type="checkbox"/> Passport # <input checked="" type="checkbox"/> Soc. Sec. # 375-38-7808 <input type="checkbox"/> Company # (Check One) |
| 3. DATE OF BIRTH (Month, day, year) JAN 5, 1955 | 4. NAME OF LICENSEE CHICAGO BRIDGE & IRON CO. |

| | | |
|---|---|---|
| 5. DOSE RECORDED FOR (Specify: Whole body, skin or whole body, or hands and forearms, feet and ankles.) WHOLE BODY | 6. WHOLE BODY DOSE STATUS (rem) 48.950 | 7. METHOD OF MONITORING (e.g. Film Badge - FB, Pocket Chamber - PC, Calculations - Calc.) X OR GAMMA FB BETA _____ NEUTRONS _____ |
|---|---|---|

| 8. PERIOD OF EXPOSURE (From - To) | DOSE FOR THE PERIOD (rem) | | | 13. RUNNING TOTAL FOR CALENDAR QUARTER (rem) |
|-----------------------------------|---------------------------|----------|-------------|--|
| | 9. X OR GAMMA | 10. BETA | 11. NEUTRON | |
| 7/4/83 TO 10/2/83 | 0.065 | | | 0.065 |

LIFETIME ACCUMULATED DOSE

| 14. PREVIOUS TOTAL (rem) | 15. TOTAL QUARTERLY DOSE (rem) | 16. TOTAL ACCUMULATED DOSE (rem) | 17. PREVIOUS ACC. DOSES IN TB (rem) | 18. UNLISTED PART OF PERMISSIBLE ACCUMULATED DOSE (rem) |
|--------------------------|--------------------------------|----------------------------------|-------------------------------------|---|
| 1.050 | 10/2/83 0.065 | 1.115 | 50.000 | 48.885 |

Printed in USA

WL 40 (FRONT) REV AUG 83

WL 40(FRONT)

The preparation and safekeeping of this form or a clear and legible record containing all the information required on this form is required pursuant to Section 20.401 of "Standards for Protection Against Radiation," 10 CFR 20, as a current record of occupational radiation exposures. Such a record must be maintained for each individual for whom personnel monitoring is required under Section 20.202. Note that a separate Form NRC-5 is to be used for recording external exposure to (1) the whole body; (2) skin of whole body; (3) hands and forearms; or (4) feet and ankles, as provided by item 5 below.

Listed below by item are instructions and additional information directly pertinent to completing this form.

Identification

Item 1. Self-explanatory.

Item 2. Self-explanatory except that, if individual has no social security number, passport number or company number, the word "none" shall be inserted.

Item 3. Self-explanatory.

Item 4. Self-explanatory.

Occupational Exposure

Item 5. "Dose to the whole body" shall be deemed to include any dose to the whole body, gonads, active blood-forming organs, head and trunk, or lens of eye. Unless the lenses of the eyes are protected with eye shields, dose recorded as whole body dose should include the dose delivered through a tissue equivalent absorber having a thickness of 300 mg/cm² or less. When the lenses of the eyes are protected with eye shields having a tissue equivalent thickness of at least 700 mg/cm², dose recorded as whole body dose should include the dose delivered through a tissue equivalent absorber having a thickness of 1,000 mg/cm² or less.

Dose recorded as dose to the skin of the whole body, hands and forearms, or feet and ankles should include the dose delivered through a tissue equivalent absorber having a thickness of 7 mg/cm² or less. The dose to the skin of the whole body, hands and forearms, or feet and ankles should be recorded on separate forms unless the dose to those parts of the body has been included as dose to the whole body on a form maintained for recording whole body exposure.

Item 6. This item need be completed only when the sheet is used to record whole body exposures and the licensee is exposing the individual under the provisions of Paragraph 20.101(b) which allows up to 3 rems per quarter to the whole body. Enter in this item the unused part of permissible accumulated dose taken from previous records of exposure, i.e., item 18 of the preceding Form AEC-5 or NRC-5 or item 13 of Form AEC-4 or NRC-4 if the individual's exposure during employment with the licensee begins with this record.

Item 7. Indicate the method used for monitoring the individual's exposure to each type of radiation to which he is exposed in the course of his duties. Abbreviations may be used.

Item 8. Doses received over a period of less than a calendar quarter need not be separately entered on the form provided that the licensee maintains a current record of the doses received by the individual which have not as yet been entered on the form. The period of exposure should specify the day the measurement of that exposure was initiated and the day on which it was terminated. For example, if only quarterly doses are entered, the period of exposure for the first calendar quarter of 1962 might be taken as running from

Monday, January 1, 1962, through Friday, March 30, 1962, and would be indicated in this item as Jan. 1, 1962-Mar. 30, 1962. If weekly doses are entered, a film badge issued Monday morning, January 1, 1962, and picked up Friday January 5, 1962, would be indicated as Jan. 1, 1962-Jan. 5, 1962.

Items 9, 10 and 11. Self-explanatory. The values are to be given in rem. All measurements are to be interpreted in the best method known and in accordance with Paragraph 20.4(c). Where calculations are made to determine dose, a copy of such calculations is to be maintained in conjunction with this record. In any case where the dose for a calendar quarter is less than 10% of the value specified in Paragraph 20.101(a), the phrase "less than 10%" may be entered in lieu of a numerical value.

Item 12. Add the values under items 9, 10 and 11 for each period of exposure and record the total. In calculating the "Total" any entry "less than 10%" may be disregarded.

Item 13. The running total is to be maintained on the basis of calendar quarters. Paragraph 20.3(a) (4) defines calendar quarter. No entry need be made in the item if only calendar quarter radiation doses are recorded in items 9, 10, 11 and 12.

Lifetime Accumulated Dose (Whole Body)

NOTE: If the licensee chooses to keep the individual's exposure below that permitted in Paragraph 20.101(a), items 14 through 18 need not be completed. However, in that case the total whole body dose for each calendar quarter recorded in item 13 (or item 12 if quarterly doses are entered in item 12) should not exceed 1 1/4 rem.

If an individual is exposed under the provisions of Paragraph 20.101(b), complete items 14 through 18 at the end of each calendar quarter and when the sheet is filled. Values in item 13, when in the middle of a calendar quarter, and values in item 18, must be brought forward to next sheet for each individual.

Item 14. Enter the previous total accumulated dose from previous dose records for the individual (e.g., from item 16 of Form AEC-5 or NRC-5 or item 11 of Form AEC-4 or NRC-4). The total occupational radiation dose received by the individual must be entered in this item, including any occupational dose received from sources of radiation not licensed by the Commission. If the individual was exposed to sources of radiation not licensed by the Commission during any calendar quarter after completing Form AEC-4 or NRC-4 and personnel monitoring equipment was not worn by the individual, it should be assumed that the individual received a dose of 1 1/4 rems during each such calendar quarter.

Item 15. Enter the total calendar quarter dose from item 13 (or from item 12 if quarterly doses are entered in item 12) and the date designating the end of the calendar quarter in which the dose was received (e.g., March 30, 1962).

Item 16. Add item 14 and item 15 and enter that sum.

Item 17. Obtain the Permissible Accumulated Dose (PAD) in rem for the WHOLE BODY. "N" is equal to the number of years of age of the individual on his last birthday. Subtract 18 from N and multiply the difference by 5 rem (e.g., John Smith, age 32; $N = 32$, $PAD = 5(32 - 18) = 70$ rem.).

Item 18. Determine the unused part of the PAD by subtracting item 16 from item 17. The unused part of the PAD is that portion of the Lifetime Accumulated Dose for the individual remaining at the end of the period covered by this sheet.

PRIVACY ACT STATEMENT

Pursuant to 5 U.S.C. 552(a)(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-5. This information is maintained in a system of records designated as NRC-27 and described as 40 Federal Register #1544 (October 1, 1975).

1. **AUTHORITY** Sections 53, 55, 56, 81, 103, 104, 161(b), and 161(c) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2073, 2083, 2095, 2111, 2123, 2134, 2201(b), and 2201(c)). This authority for collecting 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 your 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 any 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 complete Form NRC-5 on each individual for whom personnel monitoring is required under 10 CFR 20.202. Failure to do so may subject the licensee to enforcement action in accordance with 10 CFR 20.801. The social security number is used to assure that NRC has an accurate dossier 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. 20546.

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ASSISTANT RADIOGRAPHER QUALIFICATION

Name ROBERTS, SAM W ☐ Passport # 345-31-7804
(PRINT - Last, first and middle initial) ☒ Soc. Sec. # 345-31-7804
☐ Company # (Check One)

Participant Number 752

This Assistant Radiographer has:

- 1) Been instructed and given a copy of the operating and emergency procedures.
- 2) Successfully passed an oral/written examination.
- 3) Demonstrated operational competency.

Examination: Date 7/15/83 Score 94 %

This qualification is for: Isotope ☒ X Ray ☐

District RSO or ARSO Dave L Smith
Signature

Date 7/15/83

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WL 188



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CBI

NUCLEAR REGULATORY COMMISSION
RADIOGRAPHER'S LICENSE COURSE

Certificate of Award To

JIM JONES

In Recognition of the Successful Completion of a Concentrated
Program of in-company study, organized and directed by
Chicago Bridge and Iron Company

John P. Screens

Harry A. Cassette

WL 231 MAY 77

WL 231



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RADIOACTIVE ISOTOPE SHIPPING/ RECEIVING REPORT

Contract No. 24561
Location HOUSTON, TEXAS

CHECK ONE:

☐ SHIPPING TO: _____
Location (City, State), Contract _____
☒ RECEIVING FROM: BURLINGTON, MASS (TECH/OPS)
Location (City, State), Contract _____

Survey Meter: Serial No. 734 Calibration Date 8/4/83
Survey Meter Readings of Shipping Package: Surface: 10 MR/HR: 1M/3.3": 2.5 MR/HR
When receiving an exposure device, take a survey meter reading 6" from the surface of the device: 40 MR/HR
Radioisotope: I-192 Activity in curies: 205 Leak test date: 8/5/83 Due date: 2/5/84
Exposure device: Model No. 616 Sealed source: Model No. A-58101-B
Serial No. 55 Serial No. 2691
Shipping Drum/Overpack: Model No. 715
(When Applicable) Serial No. 109

MANDATORY CHECKLIST

Film badge and dosimeter worn by person shipping or receiving ☒
Labels (and markings when applicable) placed as required ☒
Security seal wires installed ☒
Decay chart and, if applicable, current leak test report enclosed ☒
MAINTENANCE, LEAK TEST AND PHYSICAL INVENTORY OF SEALED SOURCES REPORT form WL 44 filled out ☒

Shipping Only:

District RSO or ARSO aware of shipment ☐
Proper shipping form filled out (WL 85 or IATA) ☐
Carrier aware that shipment is to NRC/DOT(IATA) regulations ☐
Shipping Package inspected to CBI 10 CFR PART 71 Q.A. Program ☐
Placards used as required ☐

REMARKS: (Explain items not checked)

RADIOGRAPHER Jim A. Jones DATE 8/7/83
SIGNATURE

Printed in U.S.A.

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EXPOSURE DEVICE
MODEL

520

571

616

660

672

676

680

773

900

920

PACKAGING INSTRUCTIONS

Ship as is. No Crate or other
container is required. Alternate
is to ship in a 20WC overpack.

Ship only in the 801 shipping drum.

Ship only in the 715 shipping drum.

SHIP AS IS. NO CRATE OR OTHER CONTAINER
IS REQUIRED. ALTERNATE IS TO SHIP IN A SLAT
CRATE OR SOLID CRATE. WITH SOLID CRATE,
TRANSFER DOT INFORMATION FROM EXPOSURE
DEVICE TO THE OUTSIDE OF THE CRATE.

SOURCE CHANGER
MODEL

488

650

770

771

850

SHIP AS IS. NO CRATE OR OTHER CONTAINER
IS REQUIRED. ALTERNATE IS TO SHIP IN A SLAT
CRATE OR SOLID CRATE. WITH SOLID CRATE,
TRANSFER DOT INFORMATION FROM SOURCE
CHANGER TO THE OUTSIDE OF THE CRATE.

SAMPLE

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ISOTOPE RADIATION SAFETY MANUAL

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PAGE 9PHYSICAL INVENTORY, LEAK TEST
AND MAINTENANCELocation HOUSTON, TEXAS Contract No. 24561QUARTER ☐ 1st ☐ 2nd ☒ 3rd ☐ 4th YEAR 83

| UNIT NO. | RADIO-ISOTOPE | RECEIVING | | EXPOSURE DEVICE | | SEALED SOURCE | | LEAK TEST DATE | SHIPPING OR END OF QUARTER | |
|----------|---------------|-----------|-------------------|-----------------|------------|---------------|------------|----------------|----------------------------|-------------------|
| | | DATE | ACTIVITY (CURIES) | MODEL NO. | SERIAL NO. | MODEL NO. | SERIAL NO. | | DATE | ACTIVITY (CURIES) |
| 1. | I-192 | 2/28/83 | 100 | 660 | 356 | A-424-9 | 5297 | 3/1/83 | | |
| 2. | I-192 | 2/28/83 | 100 | 660 | 356 | A-424-9 | 5297 | 8/31/83 | 9/30/83 | 24 |
| 3. | | | | | | | | | | |
| 4. | I-192 | 8/7/83 | 205 | 616 | 55 | A-58109-8 | 2691 | 8/5/83 | 9/30/83 | 185 |
| 5. | I-192 | 4/15/83 | 102 | 660 | 351 | A-424-9 | 5321 | 3/27/83 | 9/1/83 | 50 |
| 6. | | | | | | | | | | |
| 7. | | | | | | | | | | |
| 8. | | | | | | | | | | |

NOTE: MAKE A SECOND LINE ENTRY FOR NEWLY LEAK TESTED SOURCES AND DRAW A LINE THROUGH THE FIRST LINE ENTRY.

SAMPLE
MAINTENANCE INSPECTION

| | CRANK TYPE EXPOSURE DEVICES | VACUUM TYPE EXPOSURE DEVICES | CALIBRATION TYPE EXPOSURE DEVICES |
|--|---|---|---|
| UNIT NUMBER <u>#2</u> | <u>#4</u> | | |
| 1. CHECK DRIVE CABLE CONNECTOR WITH GAUGE. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | | |
| 2. INSPECT DRIVE CABLE AND CLEAN. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | | |
| 3. LUBRICATE DRIVE CABLE. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | | |
| 4. INSPECT LOCK ASSEMBLY. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | | |
| 5. INSPECT SOURCE TUBE FOR DAMAGE OR WEAR. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | | |
| 6. CHECK LOCK OF EXPOSURE DEVICE. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> |
| 7. CHECK VACUUM SYSTEM OF MODEL 694 CONTROL. | | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> |
| 8. INSPECT SOURCE ROD OF EXPOSURE DEVICE. | | | <input type="checkbox"/> <input type="checkbox"/> |
| 9. SURVEY EXPOSURE DEVICE. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> |

ABOVE MAINTENANCE HAS BEEN PERFORMED AS CHECKED

RADIOGRAPHER Jim A. Jones DATE 9/30/83
SIGNATURE

SEE BACK OF FORM FOR QUARTERLY METER REPORT

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WL 44(FRONT)



QUARTERLY METER REPORT

LOCATION HOUSTON, TEXAS Contract No. 24561

QUARTER ☐ 1st ☐ 2nd ☒ 3rd ☐ 4th YEAR 83

[illegible]

WL 44(BACK)

CBI

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GAMMA RADIOGRAPHY UTILIZATION LOG

City HOUSTON State TEXAS Date 8/26/83 Report No. 5
Radioisotope Ir 192 Activity in curies 50 Leak test date 3/27/83 Contract No. 24561
Exposure device Model No. 660 Sealed source Model No. A-424-7
Serial No. 351 Serial No. 5321
Survey Meter(s) Serial No. 734 3764
Calibration Date 8/4/83 8/15/83

| RADIOGRAPHER(S) & ASSISTANT(S) | PARTICIPANT # | DOSIMETER # | CALIBRATION DATE | INITIAL READING | FINAL READING | TOTAL |
|--------------------------------|---------------|--------------|------------------|-----------------|---------------|-----------|
| <u>JIM A. JONES</u> | <u>251</u> | <u>06707</u> | <u>5/3/83</u> | <u>0</u> | <u>5</u> | <u>5</u> |
| <u>SAM W. ROBERTS</u> | <u>752</u> | <u>07945</u> | <u>5/3/83</u> | <u>0</u> | <u>10</u> | <u>10</u> |
| | | | | | | |
| | | | | | | |

Time taken from locked storage 5:00 ☐ A.M. ☒ P.M.Location on site where isotope was used 1ST FIVE ERTS, TX #142

| PIECE MARK AND/OR SEAM | THICKNESS | SOURCE TO FILM DIST. | EXPOSURE TIME | NUMBER EXPOSURES | TOTAL EXP. TIME (HOURS & MINUTES) |
|--------------------------------|-----------|----------------------|---------------|------------------|-----------------------------------|
| <u>1A, 2A, 3A, 4A & 5A</u> | | <u>24"</u> | <u>3 MIN</u> | <u>35</u> | <u>105 MIN</u> |
| | | | | | |
| | | | | | |
| | | | | | |

Total Time 1 HR 45 MIN

The following are mandatory (see operating and emergency procedures):

- Film badges and dosimeters worn by radiographers. ☒
- Dosimeters charged prior to start of operation. ☒
- Area posted with radiation warning signs. ☒
- Warning lights used when applicable. ☒
- Daily maintenance inspection completed. ☒
- Area roped off at 2 MR/HR level or less. ☒
- Area under constant surveillance during radiographic exposures. ☒

Time locked in storage 12:05 ☒ A.M. ☐ P.M.Exposure device surveyed to determine that sealed source is in shielded position prior to securing in locked storage area. Meter reading 60 MR/HR.

Radiographer executing final survey on protector before securing in locked storage

Jim A. Jones
SIGNATURE

Remarks

SEE BACK OF FORM FOR RADIATION SURVEY

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WL 134(FRONT)



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CBI RADIATION SURVEY

Report No. 5

Contract No. 24561

| CALCULATED DISTANCE | | |
|---------------------|------|---------------|
| INTENSITY | AIR | THROUGH MAT'L |
| 2 MR/HR | 384' | 222' |
| 100 MR/HR | 55' | 32' |

SHOW READINGS IN MR/HR OR R/HR

SHOW DISTANCE IN FEET FROM SOURCE

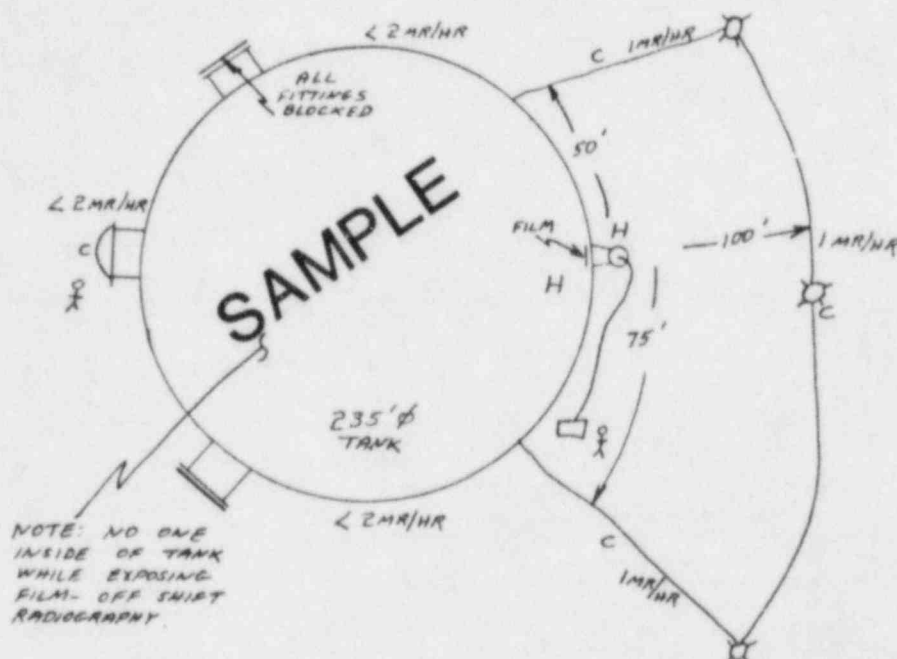
SHOW CAUTION RADIATION AREA SIGN POSITIONS WITH LETTER "C"

SHOW HIGH RADIATION AREA SIGN POSITIONS WITH LETTER "H"

SHOW WARNING LIGHT POSITIONS WHEN APPLICABLE WITH SYMBOL ☒

XXXXXX

SKETCH OF RESTRICTED AREA:



A SURVEY IS TO BE MADE ON EACH RADIOGRAPHIC OPERATION

I HEREBY CERTIFY THAT ABOVE IS TRUE AND CORRECT
TO THE BEST OF MY KNOWLEDGE AND BELIEFRADIOGRAPHER Jim A. JonesDate 8/26/83

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WL 134(BACK)



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QUARTERLY DOSIMETER REPORT

Name JONES, JIM A
(PRINT - LAST, FIRST, AND MIDDLE INITIAL)☐ Passport # 375-38-7802
☒ Soc. Sec. # _____ (Check One)
☐ Company # _____PARTICIPANT NO. 251 LOCATION HOUSTON, TEXAS DISTRICT HOUSTON CONSTDOSIMETER(S): Serial No. 06707 QUARTER ☐ 1ST ☐ 2ND ☒ 3RD ☐ 4THCalibration Date 5/3/83 YEAR 83

DAILY DOSIMETER READINGS (MR) (WHOLE BODY)

| PERIOD | FROM | TO | DAYS | | | | | | | TOTAL |
|--------|--------|---------|------|------|-----|-------|-----|-----|-----|-------|
| | | | MON | TUES | WED | THURS | FRI | SAT | SUN | |
| 1 | 7/4/83 | 7/10 | - | - | - | - | - | - | - | - |
| 2 | 7/11 | 7/17 | - | - | - | - | - | - | - | - |
| 3 | 7/18 | 7/24 | - | - | - | - | - | - | - | - |
| 4 | 7/25 | 7/31 | - | - | - | - | - | - | - | - |
| 5 | 8/1 | 8/7 | - | - | - | - | - | - | - | - |
| 6 | 8/8 | 8/14 | - | - | - | - | - | - | - | - |
| 7 | 8/15 | 8/21 | - | - | - | - | - | - | - | - |
| 8 | 8/22 | 8/28 | - | - | 5 | 0 | 5 | - | - | 10 |
| 9 | 8/29 | 9/4 | - | - | 10 | 0 | - | - | - | 15 |
| 10 | 9/5 | 9/11 | - | - | - | - | - | - | - | - |
| 11 | 9/12 | 9/18 | - | 5 | 0 | 5 | 5 | 5 | - | 20 |
| 12 | 9/19 | 9/25 | - | - | - | - | - | - | - | - |
| 13 | 9/26 | 10/2/83 | - | - | - | 10 | - | 10 | - | 20 |

WEEKLY RADIATION EXPOSURE (WHOLE BODY) (MR)

| PERIOD | WEEKS | | | | | | | | | | | | |
|----------------------------|-------|------|------|------|-----|------|------|------|-----|------|------|------|------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| WEEK ENDING | 7/10 | 7/17 | 7/24 | 7/31 | 8/7 | 8/14 | 8/21 | 8/28 | 9/4 | 9/11 | 9/18 | 9/25 | 10/2 |
| DOSIMETER | - | - | - | - | - | - | - | 10 | 15 | - | 20 | - | 20 |
| | - | - | - | - | - | - | - | 10 | 25 | 25 | 45 | 45 | 65 |
| SECOND DOSIMETER (IF USED) | | | | | | | | | | | | | |

REMARKS: _____

NAME Jim A Jones DATE 10/1/83
SIGNATURE



ISOTOPE RADIATION SAFETY MANUAL

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POCKET DOSIMETER CALIBRATION REPORT

Manufacturer & Model No. VICTOREEN 541R Calibration Date 5/3/83CHECKED IN A TRUE FIELD OF 100 MR/HR FOR 1.0 HOURS

| Serial Number | Reading | % Error | Serial Number | Reading | % Error |
|---------------|--------------|-------------|---------------|---------|---------|
| <u>06707</u> | <u>110MR</u> | <u>+10%</u> | | | |
| <u>07945</u> | <u>90MR</u> | <u>-10%</u> | | | |
| <u>06714</u> | <u>115MR</u> | <u>+15%</u> | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

These instruments are certified:

- (1) To have a leakage rate of less than 20% of full scale during a 24 hour period.
(2) To compare against a true field dosage within $\pm 20\%$ of the true field.

Calibration Due Date 11/3/83

CHICAGO BRIDGE & IRON COMPANY

RADIOGRAPHER

Jim A. Jones
SIGNATURE

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WL 287A REV MAY 82



WL 287A



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SAFETY/TRAINING MEETING REPORT

Contract No. 24561Location: HOUSTON, TEXAS Date 8/22/83
(CITY) (STATE)CHECK ONE: ☒ START-OF-JOB QUARTER ☐ 1ST ☐ 2ND ☒ 3RD ☐ 4TH YEAR 83Attended By: SAM W. ROBERTS (Asst)
FOREMAN - SMITH
PUSHER - ROBERTS
ENTIRE CREWSubjects Covered: ISOTOPE SAFETY RULES:
ROPES, SIGNS & LIGHTS
STORAGE AREA LOCATION
JOB SITE RADIOGRAPHIC PLANS
GENERAL DISCUSSIONWL 188 Forms for all Assistant Radiographers are on hand ☒ YES ☐ NOMeeting Conducted By: CHECK ONE ☒ RADIOGRAPHER IN CHARGE Jim A. Jones
☐ DISTRICT RSO OR ARSO SIGNATURE
☐ RSO OR ARSO



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RADIATION SAFETY CHECK LIST

| | | | | | |
|---|-------|--|---|--|---|
| Contract No. 24561 | | Location: City HOUSTON State TEXAS | Radiographer in charge JIM A JONES Foreman JOHN F. SMITH | Safety Supervisor Reporting TIM A. JOHNSON | Date 8/14/83 District HOUSTON CONSTRUCTION |
| GAMMA <input checked="" type="checkbox"/> | X RAY | | | | |
| | | | | | No Yes |
| 1. Is each survey meter calibration tag up to date? | | | | | <input checked="" type="checkbox"/> |
| 2. Is each dosimeter calibration tag up to date? | | | | | <input checked="" type="checkbox"/> |
| 3. Are survey meters being used? | | | | | <input checked="" type="checkbox"/> |
| 4. Are dosimeters being used? | | | | | <input checked="" type="checkbox"/> |
| 5. Does site have an operable dosimeter charger? | | | | | <input checked="" type="checkbox"/> |
| 6. Are film badges being used? | | | | | <input checked="" type="checkbox"/> |
| 7. Are film badges left in shack w/control badge at end of shift? | | | | | <input checked="" type="checkbox"/> |
| 8. Does site have posting signs? | | | | | |
| a) High radiation area (minimum 2) | | | | | <input checked="" type="checkbox"/> |
| b) Radiation area (minimum 6) | | | | | <input checked="" type="checkbox"/> |
| c) Radioactive material (minimum 4) | | | | | <input checked="" type="checkbox"/> |
| 9. Does site have radiation barrier tape or rope? | | | | | <input checked="" type="checkbox"/> |
| 10. Does site have warning lights? | | | | | <input checked="" type="checkbox"/> |
| 11. Are signs and barrier tape or rope being used? (and warning lights if night?) | | | | | <input checked="" type="checkbox"/> |
| 12. Is exposure device kept locked in storage when not being used? | | | | | <input checked="" type="checkbox"/> |
| 13. Is storage area posted with signs? | | | | | <input checked="" type="checkbox"/> |
| 14. Does site have required notices posted? | | | | | |
| a) NRC-3 (Notice to Employees) | | | | | <input checked="" type="checkbox"/> |
| b) WL 251 (CBI Notice to Employees) | | | | | <input checked="" type="checkbox"/> |
| c) Section 206 (Noncompliance) | | | | | <input checked="" type="checkbox"/> |
| d) State notices (When applicable) | | | | | <input checked="" type="checkbox"/> |
| 15. Has site been visited by NRC or State Inspector? If yes, the date was 8/8/83 | | | | | <input checked="" type="checkbox"/> |
| 16. Is a copy of the current CBI Isotope Radiation Safety Manual on the site? | | | | | <input checked="" type="checkbox"/> |
| 17. Is a copy of the NRC or State License Registration (as applicable) on the site? | | | | | <input checked="" type="checkbox"/> |
| 18. Has the radiographer conducted the required radiation safety meeting with the crew at the start of job? | | | | | <input checked="" type="checkbox"/> |
| 19. Has the district RSO or ARSO conducted the required quarterly safety meeting with the radiography crew? | | | | | <input checked="" type="checkbox"/> |
| 20. Are all the WL 188 forms for the Assistant Radiographers on the site? | | | | | <input checked="" type="checkbox"/> |
| 21. Does site have any unusual conditions that may require attention? (If yes, explain in "Remarks" below.) | | | | | <input checked="" type="checkbox"/> |
| Remarks: 14. WL 251 WAS MISSING FROM SHACK BULLETIN BOARD IS IN PLACE NOW. | | | | | |
| Distribution: Original - Construction Office (District RSO) Copy - Corp. Safety - OB/Corp. Welding Houston Copy - Radiographer in charge | | | This information has been reviewed by Radiographer in Charge and Foreman: Jim A Jones Signature of Radiographer John F Smith Signature of Foreman | | |

Printed in U.S.A.

WL 238 Rev. 4-1-83

WL 238

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This Shipping Order must be fully filled in, in ink, in duplicate form, or in Carbon, and retained by the Agent.

1

CBI

Shipper's No.

(Name of Carrier)

Carrier's No.

RECEIVE, subject to the classifications and terms in effect on the date of the issue of this Shipping Order.

From CHICAGO BRIDGE & IRON CO. AT HOUSTON, TEXAS 19

The property described below is apparent good order, except as noted hereon, and consists of contents of packages unknown, marked, consigned, and destined as indicated herein, which said packages are being shipped through this contract as manifesting any person or corporation in possession of the property under the unit bill issued to carry it to its destination or delivery at said destination. It is hereby agreed that no liability shall attach to the carrier or its agents for loss of or damage to the property from fire while such property is in transit, whether by land, water, air, or otherwise, until after the expiration of 90 days after the date of receipt of the property at its destination, provided that the carrier has complied with all applicable laws and regulations relating to the transportation of hazardous materials, and that the carrier has taken all reasonable precautions to protect the property from loss or damage during its transit.

Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions 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 **EMERY AIRFREIGHT
HOUSTON AIRPORT (IAH)**

FINAL
Destination **TECH OPS, BURLINGTON**

County

State **MASS**

Route **N/A**

Delivering Carrier **CBI**

Car or Vehicle Initials **VFB-135** No. **N/A**

No. Page Item Kind of Package, Description of Articles, Special Marks, and Exceptions

Weight (Subject to Correction)

Class or Rate

Check Carriers

1 X Shipping Package Model **715**
S/N **109**

Radioactive Material
SPECIAL FORM n.o.s. UN **2974**

IRIDIUM 192 SD Curies
(Isotope)

Source S/N **2690**

Radioactive **YELLOW II** Labels

Transport Index **.8**

USA **9039** /B(u)

This is to certify that the above named materials are properly classified and described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Juni A Jones
Radiographer

This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles, manufactured from depleted Uranium, UN 2909.

SAMPLE

Signature of Consignee

If charges are to be prepaid, write or stamp here "To Be Prepaid"

Received \$
to apply in payment of the charges on the property described herein.

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 it is carried on or shipped by 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 not exceeding

per

Per

CHICAGO BRIDGE & IRON COMPANY

Shipped

Agent

Permanent post-office address of shipper—**200 FAIRBANKS
NORTH HOUSTON ROAD (P.O. BOX 4000)
HOUSTON, TEXAS 77240**

Printed on 10-1-6

U.S. GOVERNMENT PRINTING OFFICE: 1964 O - 317-712

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WL 85



ISOTOPE RADIATION SAFETY MANUAL

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1

This Shipping Order must be legibly filled in, in ink, in indelible pencil, or in Carbon, and retained by the Agent.

CBI Shipper's No. _____
(Name of Carrier) Carrier's No. _____

RECEIVE, subject to the classifications and tariffs in effect on the date of the issue of this Shipping Order.

From **CHICAGO BRIDGE & IRON CO. AT HOUSTON, TEXAS** 19

The property described below, in apparent good order, except as noted contents and condition of packages unknown, marked, consigned, and destined as indicated below, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property) under the contract agrees to carry to its active place or places of said destination, if on the route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to the said carrier of all or any of said property over all or any portion of said route to destination, and as to each party's and time charges in all or any of said property, that every party is to be deemed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth in the Uniform Freight Classification in effect on the date hereof. If this is a car or a rail-car shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.

Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back hereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions 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 **EMERY AIRFREIGHT**
HOUSTON AIRPORT (IAH)

Destination **TECH/OPS, BURLINGTON** County _____ State **MASS**

Route **N/A**

Delivering Carrier **CBI** Car or Vehicle Initials **VFB-135** No. **N/A**

| No. Page | HM | Kind of Package, Description of Articles, Special Marks, and Exceptions | WEIGHT (Subject to Correction) | Class or Rate | Check Column | Subject to Section 7 of Conditions of Bill of Lading, if this shipment is to be delivered to the consignee without recourse to 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. |
|----------|----|--|--------------------------------|---------------|--------------|---|
| 1 | X | Shipping Package: Model <u>650</u> S/N <u>5</u> Radioactive Material <u>LSA</u> n.o.s. UN <u>2912</u> <u>DEPLETED URANIUM</u> <u>METAL SOLID</u> <u>0.005</u> Curies (Isotope) Source S/N <u>N/A</u> Radioactive <u>YELLOW</u> <u>II</u> Labels Transport Index <u>.1</u> USA/ <u>9032</u> /B(u) This is to certify that the above named materials are properly classified and described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. <u>Jim A. Jones</u> Radiographer This package conforms to the conditions and limitations specified in 49 CFR 171.424 for excepted radioactive materials, articles manufactured from depleted uranium, UN 2912. | | | | Signature of Consignor If charges are to be prepaid, write or stamp here: "To Be Prepaid." Received \$ _____ to apply in payment of the charges on the property described herein. 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 it is Car or a 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 not exceeding _____

CHICAGO BRIDGE & IRON COMPANY

Shipper _____ Per _____
Permanent post-office address of shipper— 6900 FAIRBANKS
NORTH HOUSTON ROAD P.O. BOX 40066
HOUSTON, TEXAS 77240
Agent _____

Revised 10-1-72

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WL 85



ISOTOPE RADIATION SAFETY MANUAL

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PAGE 19Model 616 w/Sealed Source
in a 715 Drum

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|--|
| Shipping Package: Model <u>715</u> S/N _____ |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> <u>IRIDIUM 192</u> _____ Curies (Isotope) Source S/N _____ |
| Radioactive _____ Labels Transport Index _____ USA/ <u>9039</u> /B(u) |

Model 616 Empty in 715 Drum

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|--|
| Shipping Package: Model <u>715</u> S/N _____ |
| Radioactive Material <u>LSA</u> , n.o.s., UN <u>2912</u> <u>DEPLETED URANIUM</u> <u>METAL SOLID</u> <u>0.005</u> Curies (Isotope) Source S/N <u>N/A</u> |
| Radioactive _____ Labels Transport Index _____ USA/ <u>9039</u> /B(u) |

Model 650 w/Sealed Source

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|--|
| Shipping Package: Model <u>650</u> S/N _____ |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> <u>IRIDIUM 192</u> _____ Curies (Isotope) Source S/N _____ |
| Radioactive _____ Labels Transport Index _____ USA/ <u>9032</u> /B(u) |

Model 650 Empty

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|--|
| Shipping Package: Model <u>650</u> S/N _____ |
| Radioactive Material <u>LSA</u> , n.o.s., UN <u>2912</u> <u>DEPLETED URANIUM</u> <u>METAL SOLID</u> <u>0.005</u> Curies (Isotope) Source S/N <u>N/A</u> |
| Radioactive _____ Labels Transport Index _____ USA/ <u>9032</u> /B(u) |

Model 660 w/Sealed Source

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|--|
| Shipping Package: Model <u>660</u> S/N _____ |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> <u>IRIDIUM 192</u> _____ Curies (Isotope) Source S/N _____ |
| Radioactive _____ Labels Transport Index _____ USA/ <u>9033</u> /B(u) |

Model 660 Empty

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|--|
| Shipping Package: Model <u>660</u> S/N _____ |
| Radioactive Material <u>LSA</u> , n.o.s., UN <u>2912</u> <u>DEPLETED URANIUM</u> <u>METAL SOLID</u> <u>0.005</u> Curies (Isotope) Source S/N <u>N/A</u> |
| Radioactive _____ Labels Transport Index _____ USA/ <u>9033</u> /B(u) |



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Model 850 w/Sealed Source

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|---|--------|
| Shipping Package: Model | 850 |
| S/N | |
| Radioactive Material | |
| SPECIAL FORM, n.o.s., UN 2974 | |
| IRIDIUM 192 Curies | |
| (Isotope) | |
| Source S/N | |
| Radioactive | Labels |
| Transport Index | |
| USA/ 9147 | /B(u) |

Model 850 Empty

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|---|--------|
| Shipping Package: Model | 850 |
| S/N | |
| Radioactive Material | |
| LSA, n.o.s., UN 2912 | |
| DEPLETED URANIUM | |
| METAL SOLID 0.005 Curies | |
| (Isotope) | |
| Source S/N | N/A |
| Radioactive | Labels |
| Transport Index | |
| USA/ 9147 | /B(u) |

Model 900 w/Sealed Source

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|---|--------|
| Shipping Package: Model | 900 |
| S/N | |
| Radioactive Material | |
| SPECIAL FORM, n.o.s., UN 2974 | |
| IRIDIUM 192 Curies | |
| (Isotope) | |
| Source S/N | |
| Radioactive | Labels |
| Transport Index | |
| USA/ 9141 | /B(u) |

Model 900 Empty

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|---|--------|
| Shipping Package: Model | 900 |
| S/N | |
| Radioactive Material | |
| LSA, n.o.s., UN 2912 | |
| DEPLETED URANIUM | |
| METAL SOLID 0.005 Curies | |
| (Isotope) | |
| Source S/N | N/A |
| Radioactive | Labels |
| Transport Index | |
| USA/ 9141 | /B(u) |

Model 920 w/Sealed Source

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|---|--------|
| Shipping Package: Model | 920 |
| S/N | |
| Radioactive Material | |
| SPECIAL FORM, n.o.s., UN 2974 | |
| IRIDIUM 192 Curies | |
| (Isotope) | |
| Source S/N | |
| Radioactive | Labels |
| Transport Index | |
| USA/ 9143 | /B(u) |

Model 920 Empty

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|---|--------|
| Shipping Package: Model | 920 |
| S/N | |
| Radioactive Material | |
| LSA, n.o.s., UN 2912 | |
| DEPLETED URANIUM | |
| METAL SOLID 0.005 Curies | |
| (Isotope) | |
| Source S/N | N/A |
| Radioactive | Labels |
| Transport Index | |
| USA/ 9143 | /B(u) |



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Model 488 w/Sealed Source

| | |
|---|---------------------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model | <u>488</u> |
| S/N | |
| Radioactive Material | |
| <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> | |
| <u>COBALT 60</u> | Curies |
| (Isotope) | |
| Source S/N | |
| Radioactive | Labels |
| Transport Index | |
| USA/ | /B(u) <u>DOT 55</u> |

Model 488 Empty - Not Applicable

| | |
|---|--------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model | |
| S/N | |
| Radioactive Material | |
| n.o.s., UN | |
| | Curies |
| (Isotope) | |
| Source S/N | |
| Radioactive | Labels |
| Transport Index | |
| USA/ | /B(u) |

Model 520 w/Sealed Source

| | |
|---|---------------------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model | <u>520</u> |
| S/N | |
| Radioactive Material | |
| <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> | |
| <u>COBALT 60</u> | Curies |
| (Isotope) | |
| Source S/N | |
| Radioactive | Labels |
| Transport Index | |
| USA/ | /B(u) <u>DOT 55</u> |

Model 520 Empty - Not Applicable

| | |
|---|--------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model | |
| S/N | |
| Radioactive Material | |
| n.o.s., UN | |
| | Curies |
| (Isotope) | |
| Source S/N | |
| Radioactive | Labels |
| Transport Index | |
| USA/ | /B(u) |

Model 520 w/Sealed Source
in a 20WC Overpack

| | |
|---|-------------------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model | <u>20WC</u> |
| S/N | |
| Radioactive Material | |
| <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> | |
| <u>COBALT 60</u> | Curies |
| (Isotope) | |
| Source S/N | |
| Radioactive | Labels |
| Transport Index | |
| USA/ | <u>5800</u> /B(X) |

Model 520 Empty - Not Applicable

| | |
|---|--------|
| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
| Shipping Package: Model | |
| S/N | |
| Radioactive Material | |
| n.o.s., UN | |
| | Curies |
| (Isotope) | |
| Source S/N | |
| Radioactive | Labels |
| Transport Index | |
| USA/ | /B(u) |



ISOTOPE RADIATION SAFETY MANUAL

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in an 801 Drum

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|---|
| Shipping Package: Model <u>801</u> S/N _____ |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> |
| <u>COBALT 60</u> _____ Curies (Isotope) |
| Source S/N _____ |
| Radioactive _____ Labels |
| Transport Index _____ |
| USA/ _____ /B(u) <u>DOT 7A</u> |

Model 773 Empty - Not Applicable

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|---|
| Shipping Package: Model _____ S/N _____ |
| Radioactive Material _____, n.o.s., UN _____ |
| _____, Curies (Isotope) |
| Source S/N _____ |
| Radioactive _____ Labels |
| Transport Index _____ |
| USA/ _____ /B(u) _____ |

Model 672 w/Sealed Source

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|---|
| Shipping Package: Model <u>672</u> S/N _____ |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> |
| <u>COBALT 60</u> _____ Curies (Isotope) |
| Source S/N _____ |
| Radioactive _____ Labels |
| Transport Index _____ |
| USA/ _____ /B(u) <u>USA-DOT-B-70</u> |

Model 672 Empty

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|---|
| Shipping Package: Model <u>672</u> S/N _____ |
| Radioactive Material <u>LSA</u> , n.o.s., UN <u>2912</u> |
| <u>DEPLETED URANIUM</u> <u>METAL SOLD</u> <u>0.005</u> Curies (Isotope) |
| Source S/N <u>N/A</u> |
| Radioactive _____ Labels |
| Transport Index _____ |
| USA/ _____ /B(u) <u>USA-DOT-B-70</u> |

Model 676 w/Sealed Source

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|---|
| Shipping Package: Model <u>676</u> S/N _____ |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> |
| <u>COBALT 60</u> _____ Curies (Isotope) |
| Source S/N _____ |
| Radioactive _____ Labels |
| Transport Index _____ |
| USA/ <u>9029</u> /B(u) _____ |

Model 676 Empty

| Kind of Package, Description of Articles, Special Marks, and Exceptions |
|--|
| Shipping Package: Model <u>676</u> S/N _____ |
| Radioactive Material <u>LSA</u> , n.o.s., UN <u>2912</u> |
| <u>DEPLETED URANIUM</u> <u>METAL SOLID</u> <u>0.005</u> Curies (Isotope) |
| Source S/N <u>N/A</u> |
| Radioactive _____ Labels |
| Transport Index _____ |
| USA/ <u>9029</u> /B(u) _____ |



ISOTOPE RADIATION SAFETY MANUAL

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| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|--|-------------------------------|
| Shipping Package: | Model <u>680</u> S/N _____ |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> <u>COBALT 60</u> _____ Curies (Isotope) Source S/N _____ | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ <u>9035</u> /B(u) | |

Model 680 Empty

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|--|-------------------------------|
| Shipping Package: | Model <u>680</u> S/N _____ |
| Radioactive Material <u>LSA</u> , n.o.s., UN <u>2912</u> <u>DEPLETED URANIUM</u> <u>METAL SOLID</u> <u>0.005</u> Curies (Isotope) Source S/N <u>N/A</u> | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ <u>9035</u> /B(u) | |

Model 770 w/Sealed Source

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|--|-------------------------------|
| Shipping Package: | Model <u>770</u> S/N _____ |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> <u>COBALT 60</u> _____ Curies (Isotope) Source S/N _____ | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ <u>9148</u> /B(u) | |

Model 770 Empty

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|--|-------------------------------|
| Shipping Package: | Model <u>770</u> S/N _____ |
| Radioactive Material <u>LSA</u> , n.o.s., UN <u>2912</u> <u>DEPLETED URANIUM</u> <u>METAL SOLID</u> <u>0.005</u> Curies (Isotope) Source S/N <u>N/A</u> | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ <u>9148</u> /B(u) | |

Model 771 w/Sealed Source

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|--|-------------------------------|
| Shipping Package: | Model <u>771</u> S/N _____ |
| Radioactive Material <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> <u>COBALT 60</u> _____ Curies (Isotope) Source S/N _____ | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ <u>9107</u> /B(u) | |

Model 771 Empty

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|--|-------------------------------|
| Shipping Package: | Model <u>771</u> S/N _____ |
| Radioactive Material <u>LSA</u> , n.o.s., UN <u>2912</u> <u>DEPLETED URANIUM</u> <u>METAL SOLID</u> <u>0.005</u> Curies (Isotope) Source S/N <u>N/A</u> | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ <u>9107</u> /B(u) | |



ISOTOPE RADIATION SAFETY MANUAL

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| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|---|--------------|
| Shipping Package: Model <u>773</u> | S/N _____ |
| Radioactive Material | |
| <u>SPECIAL FORM</u> , n.o.s., UN <u>2974</u> | |
| <u>CESIUM 137</u> _____ Curies | |
| (Isotope) | |
| Source S/N _____ | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ _____ /B(u) <u>DOT 7A</u> | |

Model 773 Empty - Not Applicable

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|---|--------------|
| Shipping Package: Model _____ | S/N _____ |
| Radioactive Material | |
| _____, n.o.s., UN _____ | |
| _____, Curies | |
| (Isotope) | |
| Source S/N _____ | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ _____ /B(u) _____ | |

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|---|--------------|
| Shipping Package: Model _____ | S/N _____ |
| Radioactive Material | |
| _____, n.o.s., UN _____ | |
| _____, Curies | |
| (Isotope) | |
| Source S/N _____ | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ _____ /B(u) _____ | |

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|---|--------------|
| Shipping Package: Model _____ | S/N _____ |
| Radioactive Material | |
| _____, n.o.s., UN _____ | |
| _____, Curies | |
| (Isotope) | |
| Source S/N _____ | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ _____ /B(u) _____ | |

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|---|--------------|
| Shipping Package: Model _____ | S/N _____ |
| Radioactive Material | |
| _____, n.o.s., UN _____ | |
| _____, Curies | |
| (Isotope) | |
| Source S/N _____ | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ _____ /B(u) _____ | |

| Kind of Package, Description of Articles, Special Marks, and Exceptions | |
|---|--------------|
| Shipping Package: Model _____ | S/N _____ |
| Radioactive Material | |
| _____, n.o.s., UN _____ | |
| _____, Curies | |
| (Isotope) | |
| Source S/N _____ | |
| Radioactive _____ | Labels _____ |
| Transport Index _____ | |
| USA/ _____ /B(u) _____ | |



ISOTOPE RADIATION SAFETY MANUAL

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SHIPPER'S DECLARATION FOR DANGEROUS GOODS

Shipper

CHICAGO BRIDGE & IRON CO.
8900 FAIRBANKS RD. HOUSTON, TX
HOUSTON, TEXAS 77064

Air Waybill No.

Page 1 of 1 PagesShipper's Reference Number
(optional)

Consignee

TECH/OPS
40 NORTH AVE.
BURLINGTON, MASS 01803

Two completed and signed copies of this Declaration must be handed to the operator.

TRANSPORT DETAILS

This shipment is within the limitations prescribed for:
(delete non-applicable)☒ PASSENGER AND CARGO AIRCRAFT
☐ CARGO AIRCRAFT ONLY

Airport of Departure

HOUSTON
AIRPORT
(IAH)

Airport of Destination:

WARNING

Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties. This Declaration must not, in any circumstances, be completed and/or signed by a consolidator, a forwarder or an IATA cargo agent.

Shipment type (delete non-applicable)

~~Other~~ RADIOACTIVE

NATURE AND QUANTITY OF DANGEROUS GOODS

(See sub-Section 8.1 of IATA Dangerous Goods Regulations)

| Dangerous Goods identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
|--|-------------------|--------------|-----------------|---|-------------------------|---|
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Iridium 192 Metal Solid 50 Curies | YELLOW II | Special Form Certificate USA/0154/S |
| SAMPLE | | | | This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. | T.I. 8 | Type B Package Certificate USA/9039/B(u) |
| | | | | Dimensions 43 x 43 x 65 cms | | |

Additional Handling Information

I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labelled, and are in all respects in the proper condition for transport by air according to the applicable international and National Government Regulations.

Name/Title of Signatory

RADIOGRAPHER

Place and Date

HOUSTON, TEXAS 8/1/84

Signature

(See warning above)



IATA



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| SHIPPER'S DECLARATION FOR DANGEROUS GOODS | |
|---|---|
| Shipper CHICAGO BRIDGE & IRON Co. 8900 FAIRBANKS RD. HOUSTON TX. HOUSTON, TEXAS 77064 | Air Waybill No. Page 1 of 1 Pages Shipper's Reference Number <small>(optional)</small> |
| Consignee TECH/OPS 40 NORTH AVE. BURLINGTON, MASS 01803 |  |
| Two completed and signed copies of this Declaration must be handed to the operator | |
| TRANSPORT DETAILS | |
| This shipment is within the limitations prescribed for <small>(where non-applicable)</small> <input checked="" type="checkbox"/> PASSENGER AND PASSENGER AIRCRAFT <input type="checkbox"/> CARGO AIRCRAFT ONLY | Airport of Departure HOUSTON AIRPORT (IAH) |
| Airport of Destination | Shipment type <small>(where non-applicable)</small> RADIOACTIVE |
| NATURE AND QUANTITY OF DANGEROUS GOODS Proper Shipping Name, Class, UN Number, Identification Number, number of packages, packing instructions and all other required information as detailed in sub-Section B1 of IATA Dangerous Goods Regulations Radioactive material, special form, n.o.s., 7, UN2974. Iridium 192 Metal solid, <u>50</u> Curies <u>YELLOW II</u> , T. I. <u>.8</u> , Dimensions 43x43x65 cms Special form certificate USA/0154/S and Type B Package certificate USA/9039/B(u) This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted uranium, UN2909. Additional Handling Information | |
| I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labelled, and are in all respects in the proper condition for transport by air according to the applicable International and National Government Regulations. | |
| Name/Title of Signatory RADIOGRAPHER Place and Date HOUSTON, TEXAS 8/1/84 Signature <i>Jim A. Jones</i> <small>(see warning above)</small> | |



IATA ALTERNATE FORM



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EXAMPLES OF "NATURE AND QUANTITY OF DANGEROUS GOODS" FILLED OUTA) SHIPPING PACKAGES CONTAINING A SEALED SOURCE:

Model 616 in
Model 715 Drum

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | (See sub-Section 8.1 of IATA Dangerous Goods Regulations) | | |
|--|-------------------|--------------|-----------------|---|----------------------|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing instructions | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Iridium 192 Metal Solid Curies This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. Dimensions 43 x 43 x 65 cms | | Special Form Certificate USA/0154/S T.I. Type B Package Certificate USA/9039/B(u) |

Model 650
Source Changer

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | (See sub-Section 8.1 of IATA Dangerous Goods Regulations) | | |
|--|-------------------|--------------|-----------------|---|----------------------|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing instructions | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Iridium 192 Metal Solid Curies This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. Dimensions 21 x 25.4 x 33.7 cms | | Special Form Certificate USA/0154/S T.I. Type B Package Certificate USA/9032/B(u) |

Model 660

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | (See sub-Section 8.1 of IATA Dangerous Goods Regulations) | | |
|--|-------------------|--------------|-----------------|--|----------------------|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing instructions | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Iridium 192 Metal Solid Curies This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. Dimensions 12 x 24 x 32.4 cms. | | Special Form Certificate USA/0154/S T.I. Type B Package Certificate USA/9033/B(u) |



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Model 850
Source Changer

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | | See sub-Section 8.1 of IATA Dangerous Goods Regulations | | |
|--|-------------------|--------------|-----------------|---|---|---------------|---|
| Dangerous Goods Identification | | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Iridium 192 Metal Solid Curies | | | Special Form Certificate USA/0179/S |
| | | | | This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. | | | T.I. Type B Package Certificate USA/9147/B(u) |
| | | | | Dimensions 21.6 x 22.4 x 26.4 cms. | | | |

Model 900

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | | See sub-Section 8.1 of IATA Dangerous Goods Regulations | | |
|--|-------------------|--------------|-----------------|---|---|---------------|---|
| Dangerous Goods Identification | | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Iridium 192 Metal Solid Curies | | | Special Form Certificate USA/0179/S |
| | | | | This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. | | | T.I. Type B Package Certificate USA/9141/B(u) |
| | | | | Dimensions 13.3 x 19.7 x 31.1 cms. | | | |

Model 920

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | | See sub-Section 8.1 of IATA Dangerous Goods Regulations | | |
|--|-------------------|--------------|-----------------|---|---|---------------|---|
| Dangerous Goods Identification | | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Iridium 192 Metal Solid Curies | | | Special Form Certificate USA/0179/S |
| | | | | This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. | | | T.I. Type B Package Certificate USA/9143/B(u) |
| | | | | Dimensions 13.3 x 19.7 x 31.1 cms. | | | |



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Source Changer

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | <i>(see sub-Section B 1 of IATA Dangerous Goods Regulations)</i> | | |
|--|-------------------|--------------|-----------------|--|----------------------|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing instructions | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cobalt 60 Metal Solid Curies Dimensions 45 x 45 x 55 cms. | | Special Form Certificate USA/0165/S T.I. Type B Package DOT 55 |

Model 520

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | <i>(see sub-Section B 1 of IATA Dangerous Goods Regulations)</i> | | |
|--|-------------------|--------------|-----------------|--|----------------------|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing instructions | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cobalt 60 Metal Solid Curies Dimensions 84 x 61 x 50 cms. | | Special Form Certificate USA/0165/S T.I. Type B Package DOT 55 |

Model 520 in
20WC Overpack

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | <i>(see sub-Section B 1 of IATA Dangerous Goods Regulations)</i> | | |
|--|-------------------|--------------|-----------------|--|----------------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing instructions | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cobalt 60 Metal Solid Curies Inner Package conforms to specifications DOT 55 | | Special Form Certificate USA/0165/S T.I. Type B Package Certificate USA/5800/B |
| | | | | 20 WC Overpack Dimensions ____ x ____ x ____ cms. | | |



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Model 672

| NATURE AND QUANTITY OF DANGEROUS GOODS <small>(See sub-Section B 1 of IATA Dangerous Goods Regulations)</small> | | | | | | |
|---|-------------------|--------------|-----------------|--|---------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cobalt 60 Metal Solid Curies This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. Dimensions 31.8 x 35 x 61.6 cms. | | Special Form Certificate USA/0165/S T.I. Type B Package Certificate USA-DOT-R-70 |

Model 676

| NATURE AND QUANTITY OF DANGEROUS GOODS <small>(See sub-Section B 1 of IATA Dangerous Goods Regulations)</small> | | | | | | |
|---|-------------------|--------------|-----------------|--|---------------|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cobalt 60 Metal Solid Curies This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. Dimensions 35.6 x 38.1 x 73.7 cms. | | Special Form Certificate USA/0165/S T.I. Type B Package Certificate USA/9029/B(u) |

Model 680

| NATURE AND QUANTITY OF DANGEROUS GOODS <small>(See sub-Section B 1 of IATA Dangerous Goods Regulations)</small> | | | | | | |
|---|-------------------|--------------|-----------------|--|---------------|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cobalt 60 Metal Solid Curies This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. Dimensions 28.8 x 37.5 x 53.4 cms. | | Special Form Certificate USA/0165/S T.I. Type B Package Certificate USA/9035/B(u) |



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Model 770
Source Changer

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | See sub-Section B 1 of IATA Dangerous Goods Regulations | | |
|--|-------------------|--------------|-----------------|--|---------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cobalt 60 Metal Solid Curies This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. Dimensions 58.4 x 61.0 x 50.8 cms. | T.I. | Special Form Certificate USA/0165/S Type B Package Certificate USA/9148/B(u) |

Model 771
Source Changer

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | See sub-Section B 1 of IATA Dangerous Goods Regulations | | |
|--|-------------------|--------------|-----------------|---|---------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cobalt Metal Solid Curies This package conforms to the conditions and limitations specified in 49 CFR 173.424 for excepted radioactive material, articles manufactured from depleted Uranium, UN2909. Dimensions 47 x 58.4 x 61 cms. | T.I. | Special Form Certificate USA/0165/S Type B Package Certificate USA/9107/B(u) |



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Model 773

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | <i>(See sub-Section B 1 of IATA Dangerous Goods Regulations)</i> | | |
|--|-------------------|--------------|-----------------|--|----------------------|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing instructions | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cesium 137 Metal Solid Curies Dimensions 8.5 x 12.7 x 12.7 cms. | T.I. | Special Form Certificate GB/24/S Type A Package DOT 7A |

Model 571 in
Model 801 Drum

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | <i>(See sub-Section B 1 of IATA Dangerous Goods Regulations)</i> | | |
|--|-------------------|--------------|-----------------|---|----------------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing instructions | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material Special Form, n.o.s. | 7 | UN2974 | | Cesium 137 Metal Solid Curies Dimensions 43 x 43 x 65 cms. | T.I. | Special Form Certificate USA/0165/S Type A Package DOT 7A |



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B) "EMPTY" SHIPPING PACKAGE (DOESN'T CONTAIN A SEALED SOURCE):

Model 616 in
Model 715 Drum

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | <i>(see sub-Section B 1 of IATA Dangerous Goods Regulations)</i> | | |
|--|-------------------|--------------|-----------------|--|---------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies | T.I. | Type B Package Certificate USA/9039/B(u) |
| | | | | Dimensions 43 x 43 x 65 cms. | | |

Model 650
Source Changer

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | <i>(see sub-Section B 1 of IATA Dangerous Goods Regulations)</i> | | |
|--|-------------------|--------------|-----------------|--|---------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies | T.I. | Type B Package Certificate USA/9032/B(u) |
| | | | | Dimensions 21 x 25.4 x 33.7 cms. | | |

Model 660

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | <i>(see sub-Section B 1 of IATA Dangerous Goods Regulations)</i> | | |
|--|-------------------|--------------|-----------------|--|---------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing Inst. | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies | T.I. | Type B Package Certificate USA/9033/B(u) |
| | | | | Dimensions 12 x 24 x 32.4 cms. | | |



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Source Changer

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | | See sub-Section B.1 of IATA Dangerous Goods Regulations | | |
|--|-------------------|--------------|-----------------|---|---|---|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing instructions | Authorization | |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies Dimensions 21.6 x 22.4 x 26.4 cms. | T.I. | Type B Package Certificate USA/9147/B(1) | |

Model 900

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | | See sub-Section B.1 of IATA Dangerous Goods Regulations | | |
|--|-------------------|--------------|-----------------|---|---|---|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing instructions | Authorization | |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies Dimensions 13.3 x 19.7 x 31.1 cms. | T.I. | Type B Package Certificate USA/9141/B(v) | |

Model 920

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | | See sub-Section B.1 of IATA Dangerous Goods Regulations | | |
|--|-------------------|--------------|-----------------|---|---|---|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing instructions | Authorization | |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies Dimensions 13.3 x 19.7 x 31.1 cms. | T.I. | Type B Package Certificate USA/9143/B(a) | |



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Model 672

| NATURE AND QUANTITY OF DANGEROUS GOODS <small>(See sub-Section B 1 of IATA Dangerous Goods Regulations)</small> | | | | | | |
|---|-------------------|--------------|-----------------|--|-------------|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing and | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies | T.I. | Type B Package Certificate USA-DOT-8-70 |
| | | | | Dimensions 31.8 x 35 x 61.6 cms. | | |

Model 676

| NATURE AND QUANTITY OF DANGEROUS GOODS <small>(See sub-Section B 1 of IATA Dangerous Goods Regulations)</small> | | | | | | |
|---|-------------------|--------------|-----------------|--|-------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing and | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies | T.I. | Type B Package Certificate USA/9029/B(6) |
| | | | | Dimensions 35.6 x 38.1 x 73.7 cms. | | |

Model 680

| NATURE AND QUANTITY OF DANGEROUS GOODS <small>(See sub-Section B 1 of IATA Dangerous Goods Regulations)</small> | | | | | | |
|---|-------------------|--------------|-----------------|--|-------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing and | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies | T.I. | Type B Package Certificate USA/9035/B(6) |
| | | | | Dimensions 28.8 x 37.5 x 53.4 cms. | | |



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Model 770
Source Changer

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | See sub-Section 8.1 of IATA Dangerous Goods Regulations | | |
|--|-------------------|--------------|-----------------|--|--------------|---|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing info | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies Dimensions 58.4 x 61.0 x 50.8 cms | T.I. | Type B Package Certificate USA/9140/B(u) |

Model 771
Source Changer

| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | See sub-Section 8.1 of IATA Dangerous Goods Regulations | | |
|--|-------------------|--------------|-----------------|--|--------------|--|
| Dangerous Goods Identification | | | | Quantity and type of packing | Packing info | Authorization |
| Proper Shipping Name | Class or Division | UN or ID No. | Subsidiary Risk | | | |
| Radioactive Material LSA, n.o.s. | 7 | UN2912 | | Depleted Uranium Metal Solid _____ Curies Dimensions 47 x 58.4 x 61 cms | T.I. | Type B Package Certificate USA/9107/B (u) |