

DERBY CITY

INSPECTION, INC.

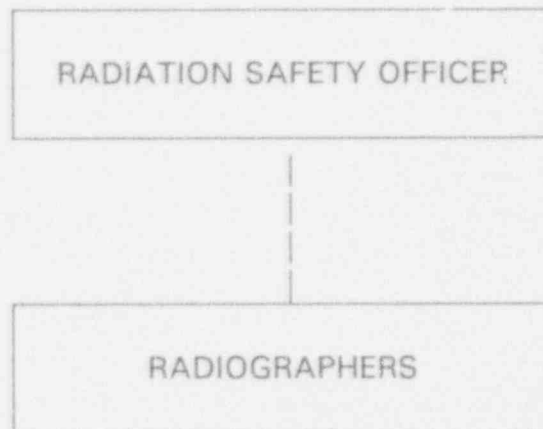
10CFR71 QA PROGRAM

FOR RADIOGRAPHY

10CFR71 QA PROGRAM FOR INDUSTRIAL RADIOGRAPHY

1.0 ORGANIZATION

- 1.1 The final responsibility for the Quality Assurance Program for Part 71 Requirements rests with Derby City Inspection, Inc. Design and Fabrication of radioactive material shipping packages shall not be conducted under this Quality Assurance Program.
- 1.2 The Quality Assurance Program is implemented using the following organization:



- 1.3 The Radiation Safety Officer is responsible for overall administration of the program, training and certification, document control, and auditing.
- 1.4 The Radiographers are responsible for handling, storing, shipping, inspection, test, operating status, and record keeping.

2.0 QUALITY ASSURANCE PROGRAM

- 2.1 The management of Derby City Inspection, Inc. establishes and implements this Quality Assurance Program. Training for all QA functions, prior to engagement in these functions, is required according to written procedures. QA Program revisions will be made according to written procedures with management approval. The QA Program will ensure that all defined QC procedures, engineering procedures, and specific provisions of

the package design approval are satisfied. The QA Program will emphasize control of the characteristics of the package that are critical to safety.

- 2.2 The Radiation Safety Officer shall assure that all radioactive material shipping packages are designed and manufactured under a Quality Assurance Program approved by the Nuclear Regulatory Commission for all packages designed or fabricated after January 1, 1979. This requirement can be satisfied by receiving a certification to this effect from the manufacturer.

3.0 DOCUMENT CONTROL

- 3.1 All documents related to a specific shipping package will be controlled through the use of written procedures. All document changes will be performed according to written procedures approved by management.
- 3.2 The Radiation Safety Officer shall insure that all QA functions are conducted in accordance with the latest applicable changes to these documents

4.0 HANDLING, STORAGE, AND SHIPPING

- 4.1 Written safety procedures concerning the handling, storage, and shipping of packages for certain special form radioactive material will be followed. Shipments will not be made unless all tests, certifications, acceptances, and final inspections have been completed. Work instructions will be provided for handling, storage, and shipping operations.
- 4.2 Radiography personnel shall perform the critical handling, storage, and shipping operations.

5.0 INSPECTION, TEST, AND OPERATING STATUS

- 5.1 Inspection, test, and operating status of packages for certain special form radioactive material will be indicated and controlled by written procedures. Status will be indicated by tag, label, marking, or log entry. Status of nonconforming parts or packages will be positively maintained by written procedures.
- 5.2 Radiography personnel shall perform the regulatory required inspections and tests in accordance with written procedures. The Radiation Safety Officer shall ensure that these functions are performed.

6.0 QUALITY ASSURANCE RECORDS

- 6.1 Records of package approvals (including references and drawings), inspections, tests, operating logs, audit results, personnel training and qualifications, and records of shipments will be maintained. Description of equipment and written procedures will also be maintained.
- 6.2 These records will be maintained in accordance with written procedures. The records will be identifiable and retrievable. A list of these records, with their storage locations, will be maintained by the Radiation Safety Officer.

7.0 AUDITS

- 7.1 Established schedules of audits of the Quality Assurance Program will be performed using written checklists. Results of audits will be maintained and reported to management. Audit reports will be evaluated and deficient areas corrected. The audits will be dependent on the safety significance of the activity being audited, but each activity will be audited at least once per year. Audit reports will be maintained as part of the quality assurance records. Members of the audit team shall have no responsibility in the activity being audited.

CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIALS PACKAGES

1. CERTIFICATE NUMBER	2. REVISION NUMBER	3. PACKAGE IDENTIFICATION NUMBER	4. PAGE NUMBER	5. TOTAL NUMBER PAGES
9033	8	USA/9033/B(U)	1	2

2. PREAMBLE

- a. This certificate is issued to certify that the packaging and contents described in item 5 below, meets the applicable safety standards set forth in Title 10, Code of Federal Regulations, Part 71, "Packaging and Transportation of Radioactive Material."
- b. This certificate does not relieve the consignor from compliance with any requirement of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into which the package will be transported.

3. THIS CERTIFICATE IS ISSUED ON THE BASIS OF A SAFETY ANALYSIS REPORT OF THE PACKAGE DESIGN OR APPLICATION

a. ISSUED TO (Name and Address)	b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION
Amersham Corporation 40 North Avenue Burlington, MA 01803	Amersham Corporation application dated December 1, 1989, as supplemented.
	c. DOCKET NUMBER 71-9033

4. CONDITIONS

This certificate is conditional upon fulfilling the requirements of 10 CFR Part 71, as applicable, and the conditions specified below

5.

(a) Packaging

(1) Model No.: 660, 660E, 660A, 660AE, 660B or 660BE

(2) Description

A steel encased uranium shielded Gamma Ray Projector. Primary components consist of an outer steel shell, polyurethane potting material, uranium shield, "S" tube, and end plugs. The contents are securely positioned in the "S" tube by a source cable locking device and shipping plug. Tamper-proof seals are provided on the packaging. The maximum total weight of the package is approximately 53 pounds.

(3) Drawings

The packaging is constructed in accordance with the following Technical Operations, Inc. Drawings:

- (i) Model No. 660B - Drawing No. 66025, Sheets 1, 2 and 3, Rev. D;
- (ii) Model No. 660 - Drawing No. 66025, Sheets 1, 2 and 3, Rev. B, and Sheet 4, Rev. -; or Drawing No. 66030, Sheets 1, 2, 3 and 4, Rev. -;
- (iii) Model No. 660A - Drawing No. 66030, Sheets 1, 2 and 3, Rev. A; or Drawing No. 66030, Sheets 1, 2 and 3, Rev. B.

Model Nos. with an E suffix have an electrical circuit.

(b) Contents

(1) Type and form of material

Iridium-192 sources which meet the requirements of special form radioactive material.

90/12/2000/8

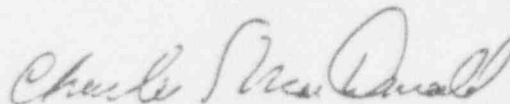
- (2) Maximum quantity of material per package
 - (i) 140 Curies for the Model No. 660B or 660BE package.
 - (ii) 120 Curies for the Model No. 660, 660E, 660A or 660AE package.
- 6. The source shall be secured in the shielded position of the packaging by the source assembly. The source assembly must be fabricated of materials capable of resisting a 1475 °F fire environment for one-half hour and maintaining their positioning function. The source assembly must engage the locking device. The source assembly must be of sufficient length and diameter to provide positive positioning of the source within the depleted uranium shield assembly.
- 7. The source assembly for use with this packaging is limited to Technical Operations, Inc. Model No. 424-9 as shown in Technical Operations, Inc. Drawing No. 42409, Rev. B.
- 8. The name plate must be fabricated of materials capable of resisting the fire test of 10 CFR Part 71 and maintaining its legibility.
- 9. In addition to the requirements of Subpart G of 10 CFR Part 71:
 - (a) The package must meet the Acceptance Test and Maintenance Program of Chapter 8.0 of the application, as supplemented; and
 - (b) The package shall be prepared for shipment in accordance with the Operating Procedures in Chapter 7.0 of the application, as supplemented.
- 10. The package authorized by this certificate is hereby approved for use under general license provisions of 10 CFR §71.12.
- 11. Expiration date: October 31, 1995

REFERENCES

Amersham Corporation Application dated December 1, 1989.

Supplements dated: April 24, August 23, September 6, September 17, October 26 and November 27, 1990.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

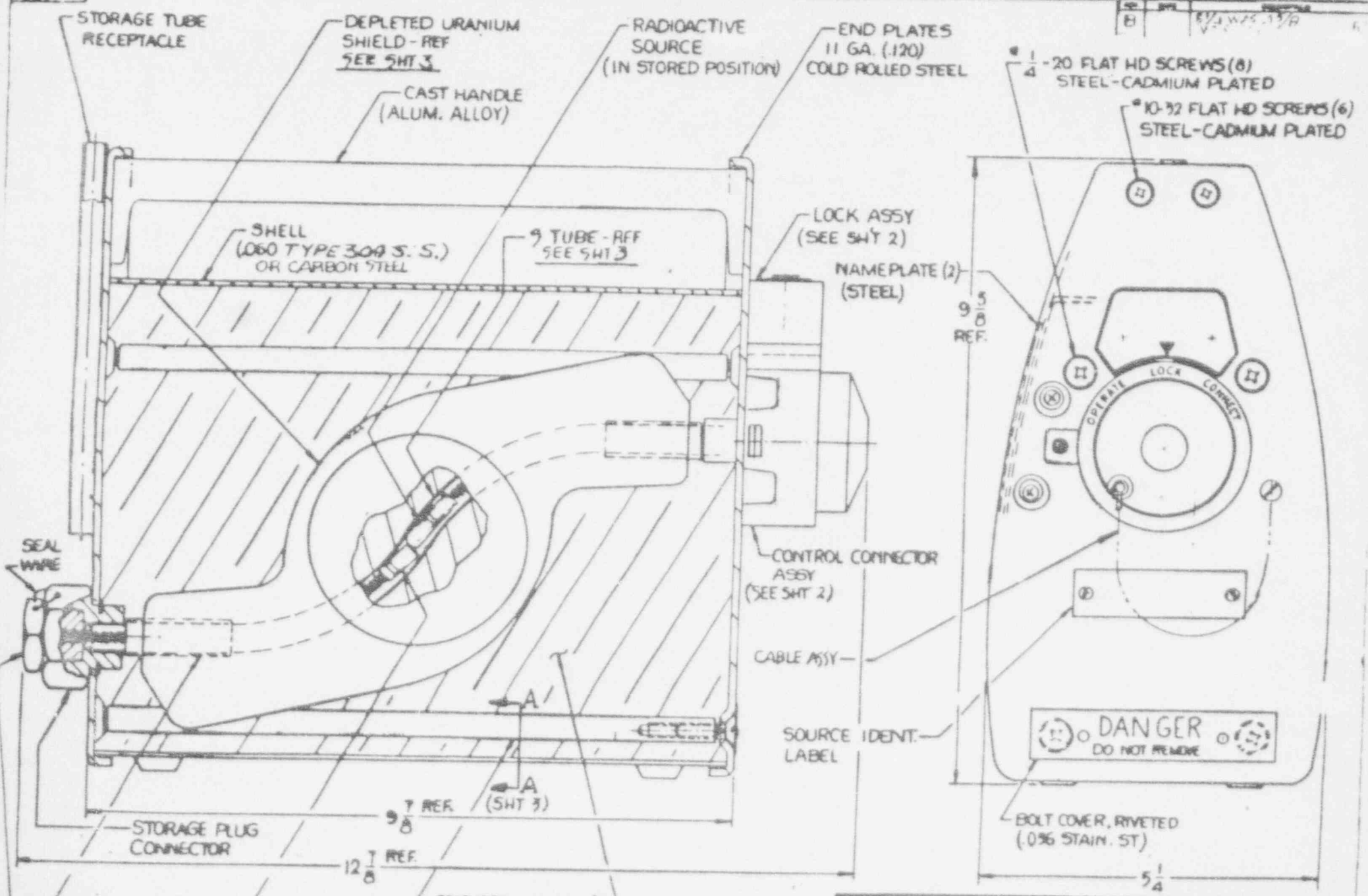


Charles E. MacDonald, Chief
 Transportation Branch
 Division of Safeguards
 and Transportation, NMSS

Date: DEC 05 1990

66030

REV. 1/15/58



TOTAL WEIGHT - 53 LBS

MOD. NO.	MAX. CAPACITY
660A	120 CI

<p>NOVED</p> <p>DATE BY</p> <p>APPROVED BY</p>	<p>MODEL 660 GAMMA RAY PROJECTOR SHIPPING CONTAINER DESCRIPTIVE ASSEMBLY</p> <p>66030</p>
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END PLATE - REF.

MODIFIED LOCK
(CORBIN # 02250)

10-72 SOC. HD
CAP SCREW (2)
WITH LOCKWASHER

COMPART. DR. SPRING
(SEE # UC-045-141)

SELECTOR BODY
(309 ST. STL.)

10-72 SOC. HD CAP SCR.
(STAIN. STL.) &
WITH LOCKWASHER

ANTI-ROTATE LUGS
(304 STAIN. STL.)
& COMPRESSION SPRING

COVER
(304 ST. STL.)

SLEEVE
(DRILL ROD)

SELECTOR RINGS
(309 ST. STL.)

SELECTOR RINGS
RETAINER
(309 ST. STL.)

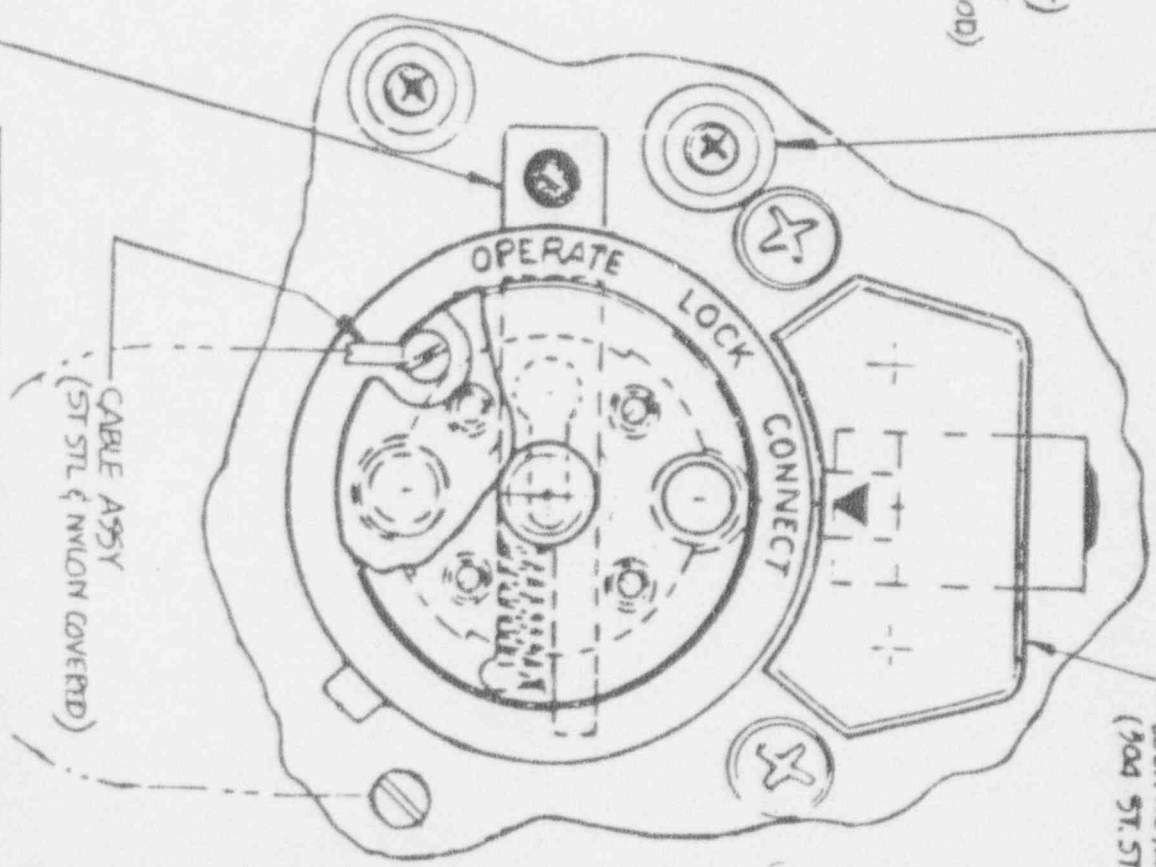
LOCK ASSEMBLY

LOCKING SLIDE
(1/4 x 1/2 FLAT GRD THROCK
OIL HARDENING)

PROTECTIVE BUMPER (2)
(RUBBER)

LOCK RETAINER
(304 ST. STL.)

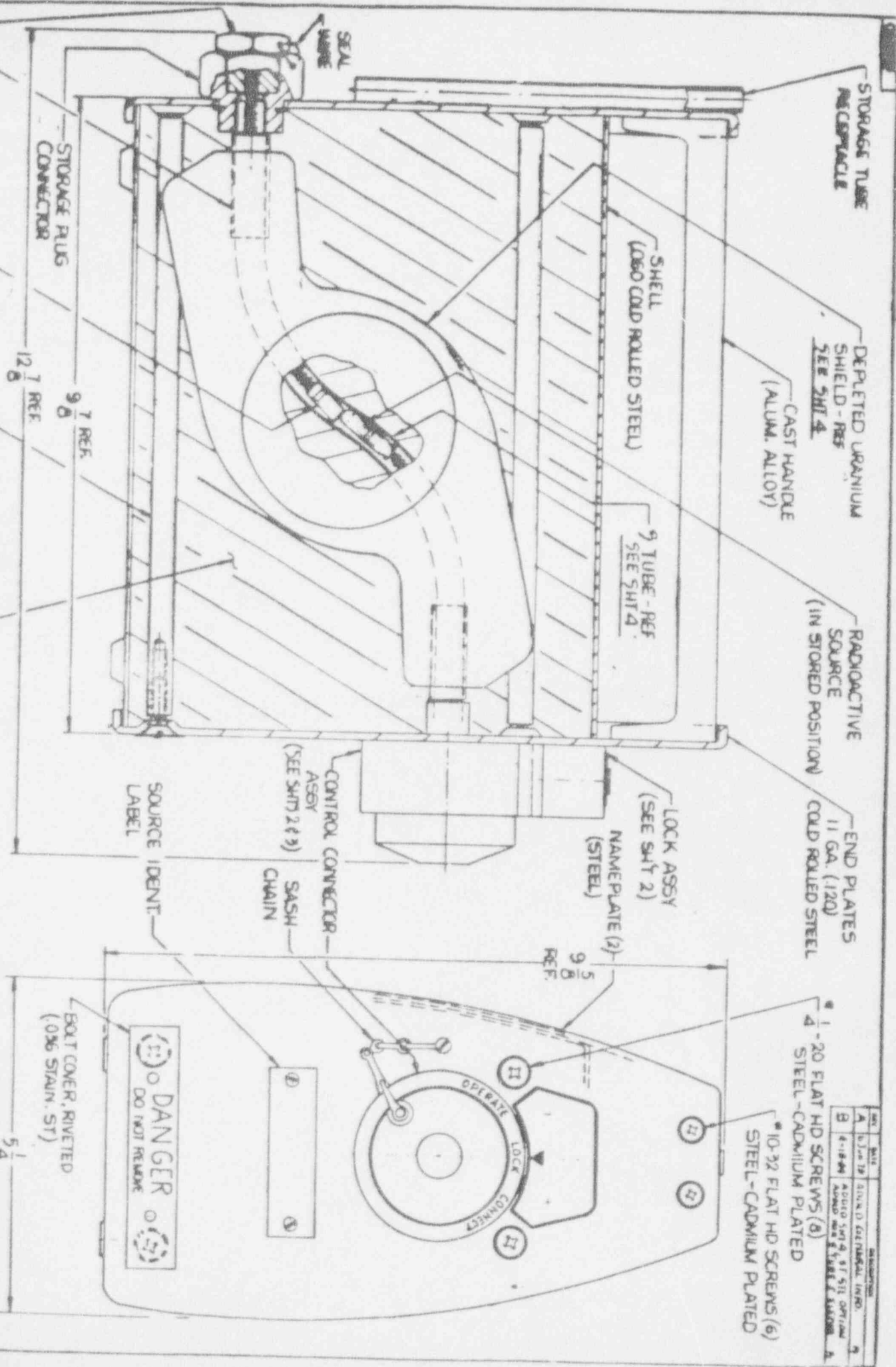
CABLE ASSY
(ST STL & NYLON COVERED)



NOTED

REV.	DATE	DESCRIPTION
A	10-72	304 ST. STL. 1
B	11-72	304 ST. STL. 2
C	11-72	304 ST. STL. 1 & 2
D	11-90	SEE SHIT 2

GENERAL INFORMATION		MODEL 660 GAMMA RAY PROJECTOR	
SHIPPING CONTAINER		DESCRIPTIVE ASSEMBLY	
REV.	DATE	REV.	DATE
C	66025	D	



REINFORCEMENT
SLABE - REF
SEE SHT 4

STORAGE PLUG ASSY

CONNECTING RODS (4)
12L4 STEEL

RIGID
POLYURETHANE
FOAM

TOTAL WEIGHT - 48 LBS

NOTED

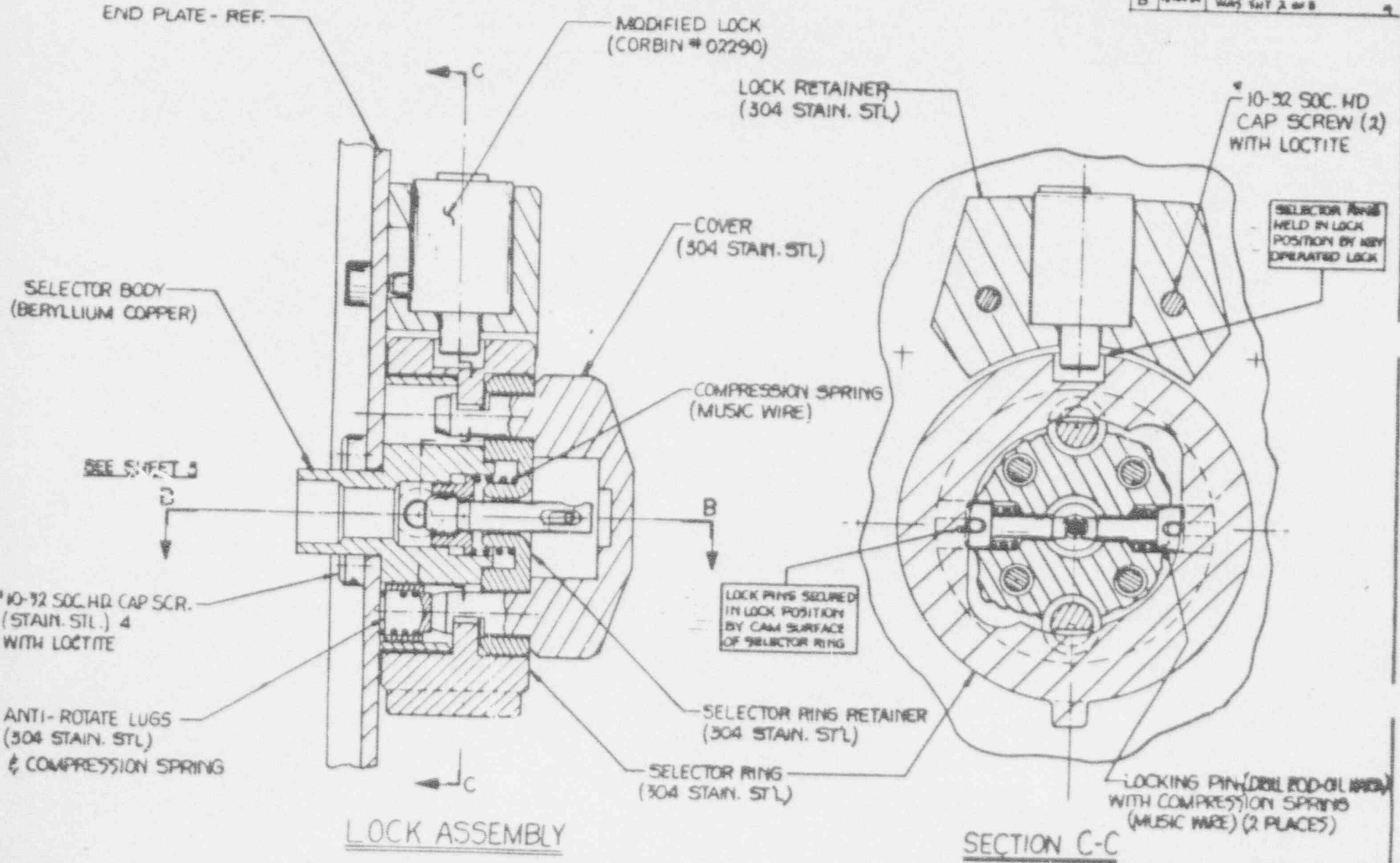
GENERAL OPERATING INSTRUCTIONS
RADIATION PRODUCTS DIVISION
GENERAL ELECTRIC COMPANY

MODEL 660 GAMMA RAY PROJECTOR
SHIPPING CONTAINER
DESCRIPTIVE ASSEMBLY

66025

REV	DATE	DESCRIPTION
A	5/26/59	REVISED GENERAL INSTR.
B	4-18-64	ADDED SHT 4, 5 & 6 ADDED SHT 7, 8 & 9

REV	DATE	DESCRIPTION
A	10 JUN 59	SEE SHEET 1
B	18 APR 60	WAS SHEET A OF B



NOTED		<small>REVISIONS APPROVED AND MANUFACTURING PRODUCTION DEPARTMENT APPROVED, ALL RIGHTS</small>	
<small>DESIGNED BY</small> <small>CHECKED BY</small> <small>APPROVED BY</small>	<small>DATE</small> <small>TIME</small> <small>PROJECT</small>	<small>ITEM TITLE</small> MODEL 660 GAMMA RAY PROJECTOR SHIPPING CONTAINER DESCRIPTIVE ASSEMBLY	
<small>REV. NO.</small> <small>REV. DATE</small> <small>REV. DESCRIPTION</small>		<small>CLASSIFICATION</small> C	<small>CONTROL NO.</small> 66025



U.S. Department
of Transportation

Research and
Special Programs
Administration

400 Seventh Street, S.W.
Washington, D.C. 20590

COMPETENT AUTHORITY CERTIFICATION
FOR A TYPE B(U)
RADIOACTIVE MATERIALS PACKAGE DESIGN
CERTIFICATE USA/9033/B(U), REVISION 7

This certifies that the radioactive materials package design described below has been certified by the competent authority of the United States as meeting the regulatory requirements for a Type B(U) packaging for radioactive materials as prescribed in the regulations of the International Atomic Energy Agency¹ and the United States of America.²

1. Package Identification - Amersham Model Nos. 660, 660E, 660A, 660AE, 660B or 660BE.
2. Packaging Description and Authorized Radioactive Contents - as described in U.S. Nuclear Regulatory Commission Certificate of Compliance No. 9033, Revision 8 (attached).
3. GENERAL CONDITIONS -
 - a. Each user of this certificate shall have in his possession a copy of this certificate and all documents necessary to properly prepare the package for transportation. The user shall prepare the package for shipment in accordance with the documentation and applicable regulations.
 - b. Each user of this certificate, other than the original petitioner, shall register his identity in writing to the Radioactive Materials Branch (DHM-23), Office of Hazardous Materials Technology, Research and Special Programs Administration, U.S. Department of Transportation, Washington D.C. 20590-0001.
 - c. This certificate does not relieve any consignor or carrier from compliance with any requirement of the Government of any country through or into which the package is to be transported.

1 "Safety Series No. 6, Regulations for the Safe Transport of Radioactive Materials, 1973 Revised Edition, as amended," published by the International Atomic Energy Agency (IAEA), Vienna, Austria.

2 Title 49, Code of Federal Regulations, Parts 100 - 199, United States of America.

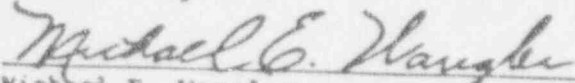
CERTIFICATE USA/9033/B(U), REVISION 7

4. Marking and Labeling - The package shall bear the marking USA/9033/B(U) in addition to other required markings and labeling.
5. Expiration Date - This certificate expires on October 31, 1995.

This certificate supersedes, in its entirety, all previously issued revisions of USA/9033/B(U).

This certificate is issued in accordance with paragraph 806 of the IAEA Regulations and Section 173.471 of Title 49 of the Code of Federal Regulations, in response to the December 5, 1990 petition by Amersham Corporation, Burlington, MA, and in consideration of other information on file in this Office.

Certified by:



Michael E. Wangler
Chief, Radioactive Materials Branch
Office of Hazardous Materials Technology

DEC 14 1990

(DATE)

Revision 7 - Issued to incorporate U.S. Nuclear Regulatory Commission Certificate of Compliance No. 9033, Revision 8.

CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIALS PACKAGES

1. a. CERTIFICATE NUMBER 9652	b. REVISION NUMBER 5	c. PACKAGE IDENTIFICATION NUMBER USA/9032/B(U)	d. PAGE NUMBER 1	e. TOTAL NUMBER PAGES 2
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PREAMBLE

- a. This certificate is issued to certify that the packaging and contents described in Item 5 below, meets the applicable safety standards set forth in Title 10, Code of Federal Regulations, Part 71, "Packaging and Transportation of Radioactive Material"
- b. This certificate does not relieve the consignor from compliance with any requirements of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into which the package will be transported.

3. THIS CERTIFICATE IS ISSUED ON THE BASIS OF A SAFETY ANALYSIS REPORT OF THE PACKAGE DESIGN OR APPLICATION
 a. ISSUED TO (Name and Address)
 b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION

Amersham Corporation
 40 North Avenue
 Burlington, MA 01803

Tech/Ops application dated
 August 8, 1979, as supplemented.

BOOKLET NUMBER 9032

4. CONDITIONS
 This certificate is conditional upon fulfilling the requirements of 10 CFR Part 71, as applicable, and the conditions specified below.

5.

(a) Packaging

- (1) Model No.: 650
- (2) Description

A steel encased, uranium shielded, Iridium-192 source changer. Primary components consist of an outer steel shell, polyurethane potting material, uranium shield, titanium "U" tube, and source holddown assembly. The source holddown assembly secures the source assembly in position within the crimped "U" tube. Tamper-proof seals and a padlock are provided on the packaging. Total weight of the package is approximately 70 pounds.

(3) Drawings

The packaging is constructed in accordance with the Technical Operations, Inc. Drawing No. 65002, Rev. B, Sheets 1, 2, and 3.

(b) Contents

(1) Type and form of material

Iridium 192 as sealed sources which meet the requirements of special form radioactive material.

(2) Maximum quantity of material per package

240 curies

~~8916170275~~

Page 2 - Certificate No. 9032 - Revision No. 5 - Docket No. 71-9032

6. The source shall be secured in the shielded position of the packaging by the source assembly. The source assembly must be fabricated of materials capable of resisting a 1475°F fire environment for one-half hour and maintaining their positioning function. The cable of the source assembly must engage the source hold-down assembly. The flexible cable of the source assembly must be of sufficient length and diameter to provide positive positioning of the source at the crimp of the "U" tube.
7. The nameplates shall be fabricated of materials capable of resisting the fire test of 10 CFR Part 71 and maintaining their legibility.
8. In addition to the requirements of Subpart G of 10 CFR Part 71:
 - (a) Each package must meet the Acceptance Tests and Maintenance Program of Chapter 8 of the application, and
 - (b) the package shall be prepared for shipment in accordance with the Operating Procedures of Chapter 7 of the application.
9. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR §71.42.
10. Expiration date: October 31, 1994.

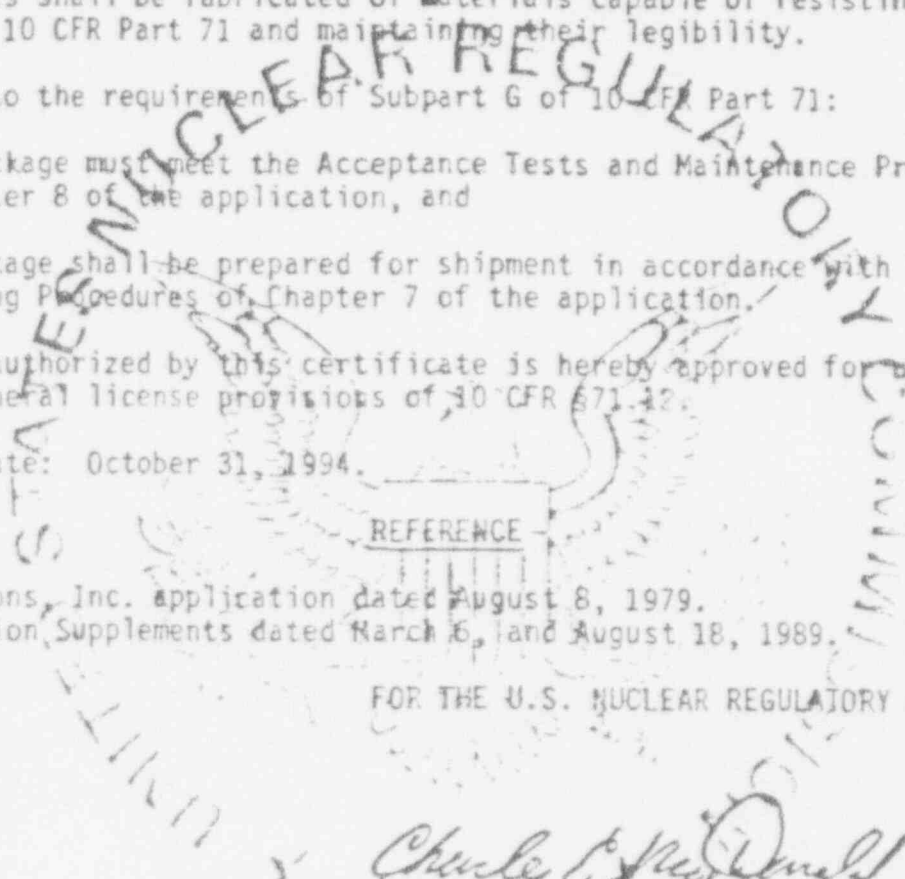
REFERENCE

Technical Operations, Inc. application dated August 8, 1979.
 Amersham Corporation Supplements dated March 6, and August 18, 1989.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

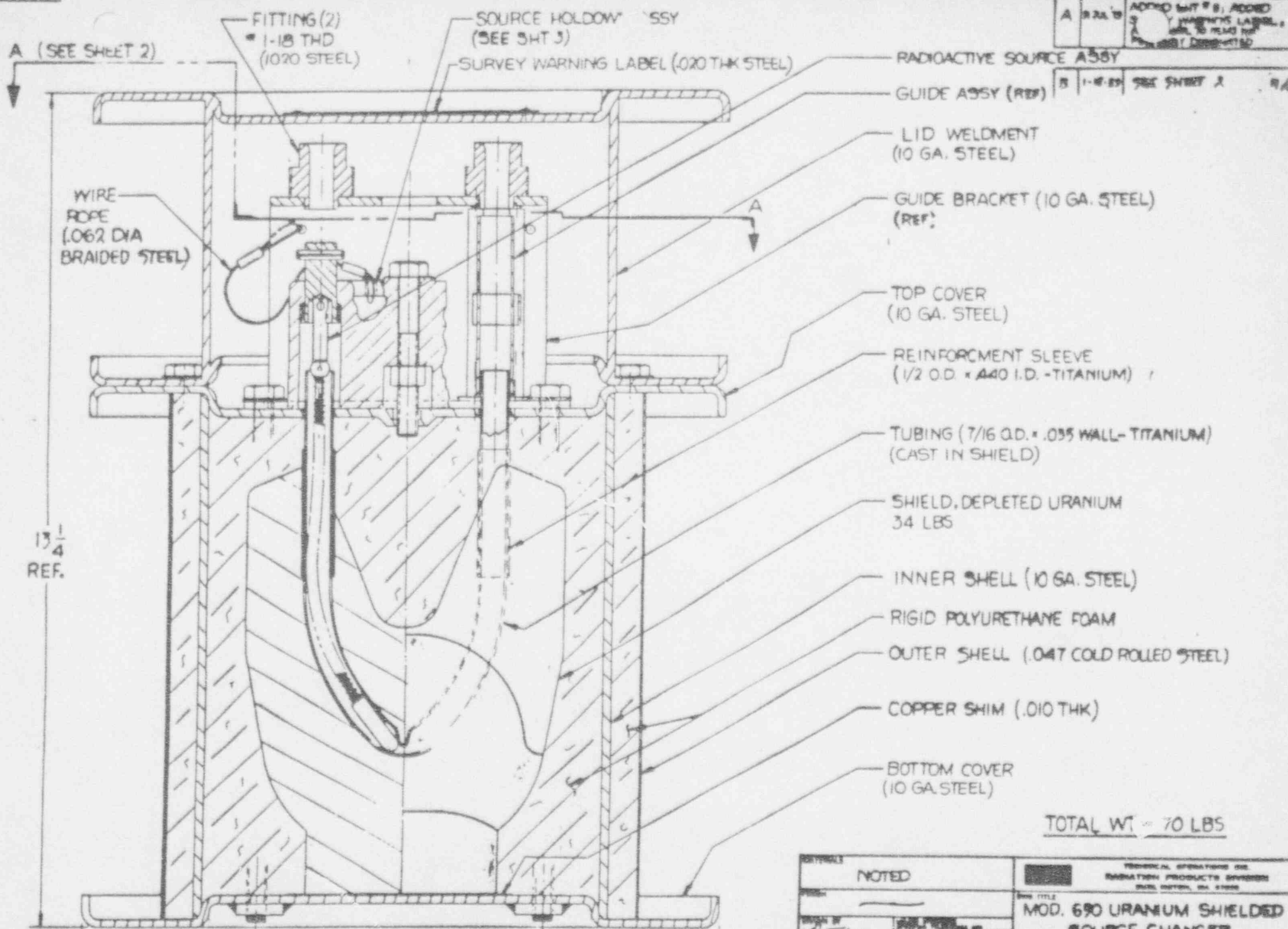
Charles E. MacDonald
 Charles E. MacDonald, Chief
 Transportation Branch
 Division of Safeguards
 and Transportation, NMSS

Date:



69002

REV	DATE	DESCRIPTION
A	10-22-59	ADDED SHIT # 8, ADDED SURVEY WARNING LABEL, SEE SHEET 2
B	1-16-60	SEE SHEET 2



A (SEE SHEET 2)

FITTING (2)
1-18 THD
(1020 STEEL)

SOURCE HOLDOW SSY
(SEE SHIT 3)

SURVEY WARNING LABEL (.020 THK STEEL)

RADIOACTIVE SOURCE ASSY

GUIDE ASSY (REF)

LID WELDMENT
(10 GA. STEEL)

GUIDE BRACKET (10 GA. STEEL)
(REF)

TOP COVER
(10 GA. STEEL)

REINFORCEMENT SLEEVE
(1/2 O.D. x 4.00 I.D. - TITANIUM)

TUBING (7/16 O.D. x .035 WALL - TITANIUM)
(CAST IN SHIELD)

SHIELD, DEPLETED URANIUM
34 LBS

INNER SHELL (10 GA. STEEL)

RIGID POLYURETHANE FOAM

OUTER SHELL (.047 COLD ROLLED STEEL)

COPPER SHIM (.010 THK)

BOTTOM COVER
(10 GA. STEEL)

WIRE ROPE
(.062 DIA
BRAIDED STEEL)

13 1/4
REF.

10
REF.

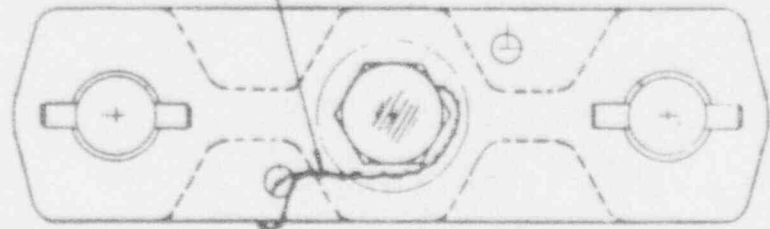
TOTAL WT - 70 LBS

NOTED		FEDERAL OPERATIONS DIV. RADIATION PRODUCTS DIVISION BOSTON, MASS. 02108	
DESIGNED BY	DATE	REV	MOD. 690 URANIUM SHIELDED SOURCE CHANGER DESCRIPTIVE ASSEMBLY
DRAWN BY	DATE	REV	69002
CHECKED BY	DATE	REV	Sheet 1 of 3

65002

REV.	DATE	DESCRIPTION
A	7-24-58	FOR SHEET # 1
B	1-10-59	SHEET # 2 OF 4

.040 DIA SAFETY WIRE (STEEL)



5/16 -18 HEX HD BOLT (STEEL-DRILLED HD)

MODIFIED CLEVIS PIN (2) (STEEL)

1/8 DIA ROLL PIN (2) (STEEL)

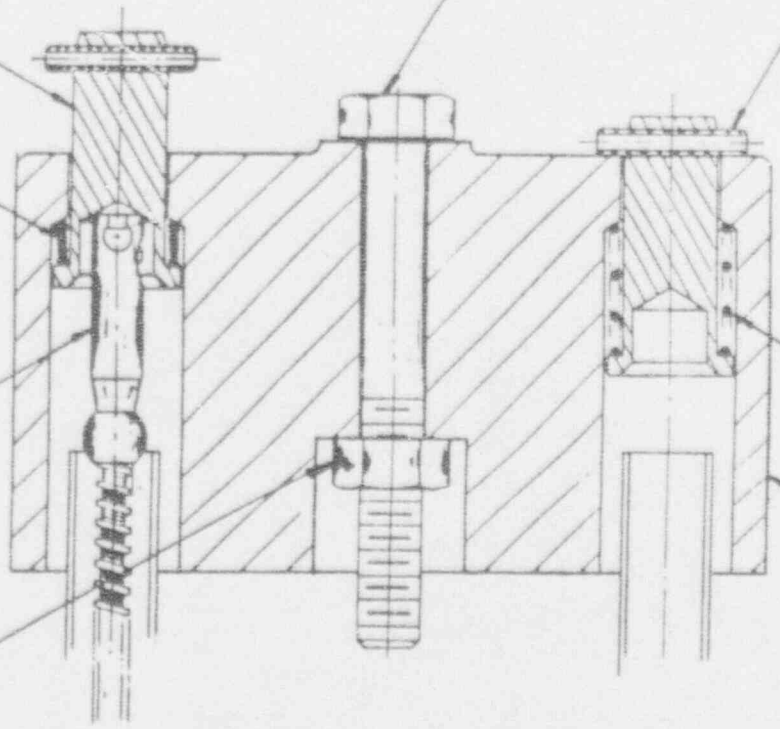
CLEVIS PIN SPRING LOADED DOWNWARD TO APPLY A FORCE TO SOURCE ASSEMBLY. THIS ASSURES THAT THE SOURCE REMAINS IN THE PROPER STOPPED POSITION

SOURCE ASSY-REF

COMPRESSION SPRING (2) (STEEL MUSIC WIRE)

SOURCE HOLDOWN (CAST IRON)

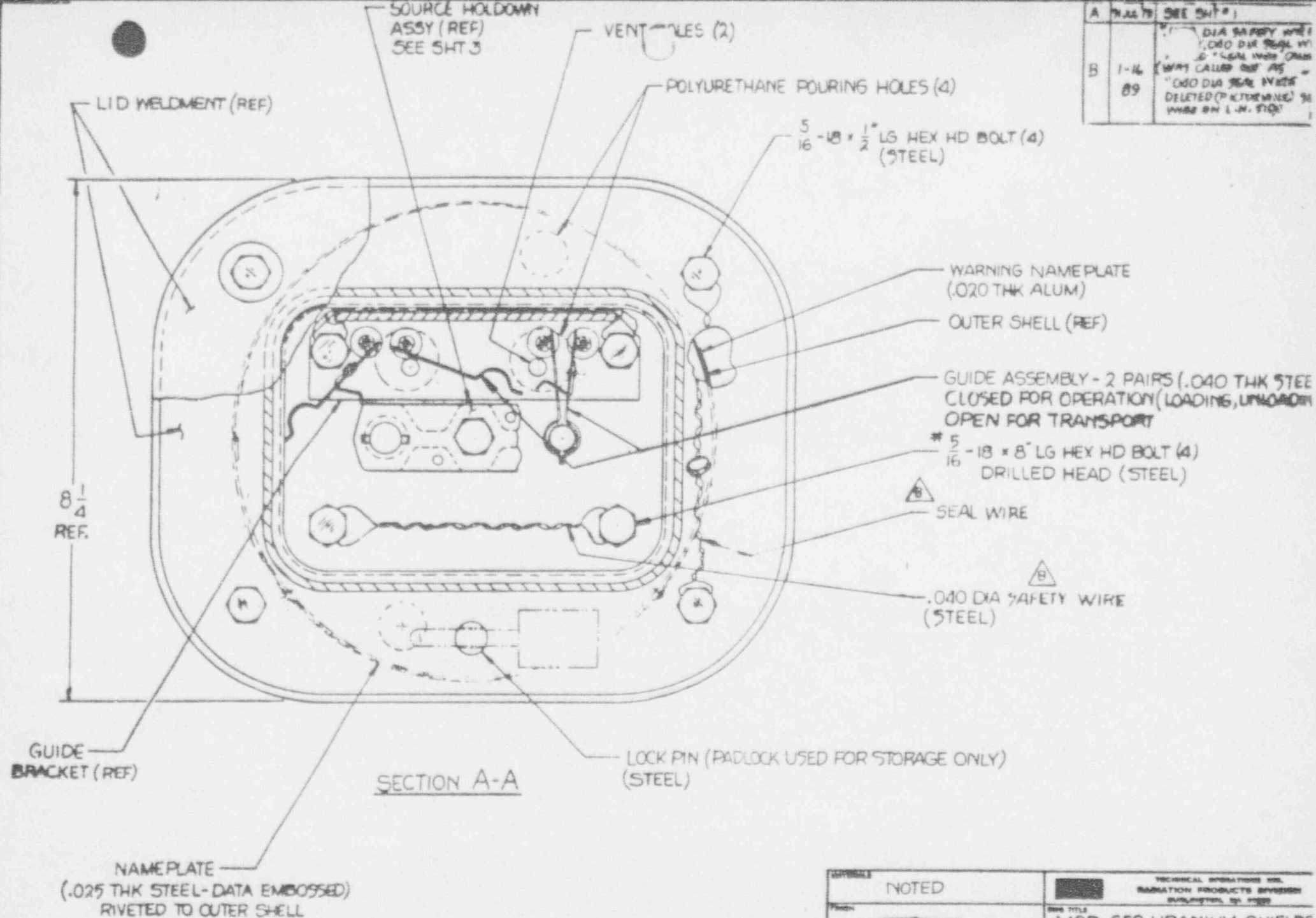
5/16 -18 HEX HD NUT (STEEL) ASSEMBLED WITH LOC-TITE



SOURCE HOLDOWN ASSY

PROJECT: DRAWING NO: DESIGNED BY: CHECKED BY: APPROVED BY:		TECHNICAL OPERATIONS DE RADIATION PHYSICS DIVISION BLDG 1700, RM 2100
MOD 650 URANIUM SHIELDED SOURCE CHANGER DESCRIPTIVE ASSEMBLY		CLASSIFICATION: 1C1 65002

A	1-16	89	SEE SHT #1
B	1-16	89	DIA SAFETY WIRE (.040 DIA SEAL WIRE) "WIRE CALLED OUT AS" "DIA DIA SEAL WIRE" DELETED (PICTURE) IN IMAGE ON L.H. SHT



NOTED		TECHNICAL OPERATIONS DIV. RADIATION PRODUCTS DIVISION BETHLEHEM, PA 18020	
DATE	2/16/68	REV	1
DESIGNED BY	W. J. ...	CLASSIFICATION	C
APPROVED BY	W. J. ...	SCALE	1:1
PART TITLE		MOD 650 URANIUM SHIELD SOURCE CHANGER DESCRIPTIVE ASSEMBLY	
PART NUMBER		65002	
SHEET		2 OF 3	

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