



QUAD CITY TESTING LABORATORY

BOX 3711 • 119 N. DIVISION ST. • DAVENPORT, IOWA 52803 • PHONE (319)325-9113

10 CFR 71 QUALITY ASSURANCE PROGRAM
FOR INDUSTRIAL RADIOGRAPHY
FOR
QUAD CITY TESTING LABORATORY, INC.

U.S. MAIL PER REG.
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By Stephen P. Black Date 11-30-80
Stephen P. Black
Radiation Safety Officer

Rev 0 AB

Page # 1

NONDESTRUCTIVE & METALLURGICAL TESTING

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TABLE OF CONTENTS

TITLE AND APPROVAL.....	PAGE 1
TABLE OF CONTENTS.....	PAGE 2
STATEMENT OF POLICY.....	PAGE 3
ORGANIZATIONAL CHART.....	PAGE 4
RESPONSIBILITY - SAFETY OFFICER.....	PAGE 5, 6
RESPONSIBILITY - RADIOGRAPHERS.....	PAGE 7
TRAINING.....	PAGE 8, 9
DRAWINGS, CERTIFICATION, DESIGN.....	PAGE 10
DOCUMENT CONTROL.....	PAGE 10
PROCEDURE QCT-1 (DOCUMENTS).....	PAGE 11
HANDLING, STORAGE, SHIPPING.....	PAGE 12
PROCEDURE QCT-2 (EMERGENCY).....	PAGE 13
INSPECTION, TESTS, (OPERATING STATUS).....	PAGE 14
AUDITS.....	PAGE 14
LEAK TEST PROCEDURE.....	PAGE 15
QUARTERLY MAINTENANCE PROCEDURE.....	PAGE 16, 17
FORMS.....	PAGE 18, 19

STATEMENT OF POLICY FOR
QUALITY ASSURANCE PROGRAM

This company will make every effort to see that all shipments are conducted safely and by qualified personnel.

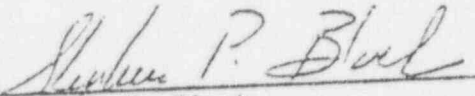
The radiation safety officer will have the authority and responsibility to assure that this manual and all aspects of 10 CFR 71 are implemented.

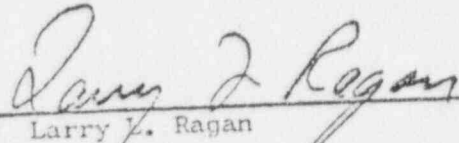
The final responsibility for the quality assurance program for Part 71 rests with the Iowa Corporation known as Quad City Testing Laboratory, Inc.

Any revisions to this manual will be revised by entire page.

Revisions will take affect only after acceptance by the Nuclear Regulatory Commission.

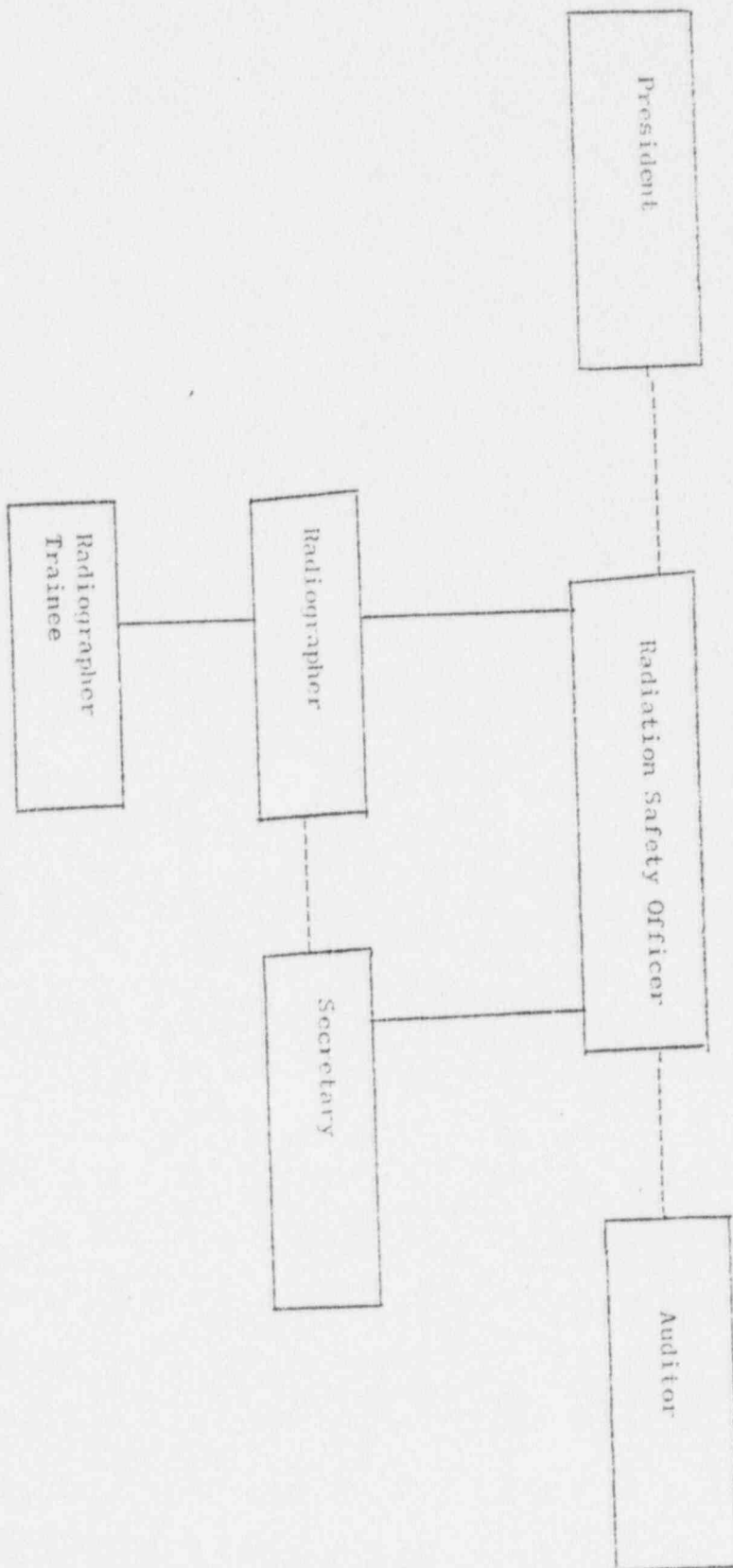
When acceptance has been granted, the page will be initialled by the Radiation Safety Officer.


Stephen P. Black
Radiation Safety Officer


Larry L. Ragan
President

QUAD CITY TESTING LABORATORY, INC.

ORGANIZATIONAL CHART



QUALITY ASSURANCE PROGRAM
RESPONSIBILITY

Radiation Safety Officer:

1. Is responsible for the overall administration of Title 10, Chapter I, Part 71 of federal regulations.
2. Will be responsible for all training and the documentation of that training.
3. Will be responsible for the training and certification of all radiographic personnel.
4. Will be responsible for all documents.
5. Will be responsible for auditing, but will assign auditing duties to someone knowledgeable, but not connected with implementation of the safety program.
6. Serve as liason officer with the Nuclear Regulatory Commission, State Radiation and other agencies on matters relating to licensing and use of Radiographic equipment.
7. Have direct supervisory responsibility for the organization and operation of the Quad City Testing Services Radiation Safety Program.
8. Maintain control of procurement and disposal of licensed by-product material.
9. Review, develop and maintain up-to-date operating and emergency procedures to assure compliance with NRC regulations and our license requirements.
10. Investigate with the President cause of incidents to assure company management that any necessary preventive action is taken.
11. Procure and maintain adequate radiation survey instruments and calibration services.
12. Establish and maintain adequate storage facilities.
13. Review, develop and maintain up-to-date operating and emergency procedures.
14. Assume control and institute corrective action in emergency situations.
15. Establish and control personnel monitoring system.
16. Control survey instrument calibration.
17. Establish and control leak test program.
18. Establish and control record keeping system.

QUALITY ASSURANCE PROGRAM

RESPONSIBILITY - Continued

Radiation Safety Officer:

19. Conduct inventories and maintain logs.
20. Establish and control internal inspection system.
21. Maintain exposure devices, radiography facilities and associated equipment.

QUALITY ASSURANCE PROGRAM

RESPONSIBILITY

Radiographers

Radiographers are responsible for the following:

1. The safe handling of radiographic projectors.
2. Storage of radiographic projectors and the stored radiation material.
3. Shipping of radioactive material and accompanying documents.
4. Inspection of radiographic projectors for proper operation.
5. Inspection of survey instruments for proper operation.
6. Leak Tests to be performed ever 6 months and necessary documentation.
7. Maintenance at 3 month intervals, unless needed on a higher frequency.
8. Daily utilization logs.
9. 3 month maintenance records.
10. Reporting of any idiosyncrasies in operating status of projectors, survey meters or accompanying documentation.

QUALITY ASSURANCE PROGRAM

TRAINING

The radiographer shall successfully attend a Radiation Safety Course and at the completion:

- I. Must know fundamentals of radiation safety, such as:
 - A. Characteristics of Gamma and X-ray radiation;
 - B. Units of radiation doses (MRDM) and the intensity of radioactivity (curie).
 - C. Hazards of excessive exposure to radiation.
 - D. Levels of radiation from licensed material and machines.
 - E. Methods of controlling radiation doses, by short work periods, longer working distances, and shielding.
- II. Must be able to use radiation detection instruments as to:
 - A. Proper operation.
 - B. Method of calibration.
 - C. Limitations of instruments.
 - D. Survey technique.
- III. Must understand the use of personnel monitoring equipment, such as:
 - A. Film badges
 - B. Pocket dosimeters.
- IV. Must know and be able to operate:
 - A. Remote handling equipment.
 - B. Radiographic exposure devices and machines.
 - C. Storage containers and source changers.
- V. Must know the company's operating and emergency procedures.
- VI. Must know the company's license limitations.
- VII. Radiographer - by attendance at Radiation Safety Course must know requirements of Federal Regulations of Title 10, Parts 19, 20, 30, and 34 of the U.S. Nuclear Regulatory Commission.

QUALITY ASSURANCE PROGRAM
TRAINING

I. Periodic Training

- A. Instructions shall be given to all radiographic personnel of changes in the radiography program, such as amendments to regulations, changes in sealed sources or X-ray machines, changes in survey instruments, changes in operating and emergency protection. Periodic training shall be conducted on a semi-annual basis.

II. On The Job Training

- A. Assistant radiographer must work with a qualified radiographer approximately three months, to obtain the necessary "know-how" in the handling and use of exposure devices, sealed sources, X-ray machines, survey instruments, film badges, dosimeters, film processing and maintenance of proper records.
- B. If a new employee has had previous experience with radiography while with another employer, he will be required to give evidence of the extent of his experience and training and will then be given such training as appears necessary to familiarize him with the Quad City Testing Laboratory license and equipment and to further evaluate his previous experience and training for the purpose of classifying him as assistant radiographer or radiographer.

III. Firms to Conduct Initial Training

1. Tech-ops
Burlington, Mass.
2. Hutchinson Area Vo-Tech Institute
Hutchinson, Minn.
3. Gamma Industries
Baton Rouge, LA.
4. Quad City Testing Laboratory, Inc.
Davenport, Iowa

QUALITY ASSURANCE PROGRAM

Drawings, Manufacturing, Certification, Design Approval

It is the responsibility of the Radiation Safety Officer to review and approve drawings and manufacturing certifications in accordance with 10 CFR Part 71.

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 will be satisfied by receiving a certification from the projector manufacturer. The certification shall be kept on file at the Quad City Testing Laboratory in Davenport, Iowa.

Document Control

Section 11

All documents pertaining to Radioactive Shipping Packages will be controlled through procedure QCT-1. All document changes will be made in accordance with QCT-1.

The following documents shall fall under the scope of QCT-1.

1. Shipping Papers
2. Receiving Papers
3. Source decay curves
4. Leak test results
5. Survey Instrument calibration
6. Periodic Audit results (Done at 3 month intervals)
7. Manufacturing certification and design approval
8. Personnel Training log.

QUALITY ASSURANCE PROGRAM

Procedure QCT-1

Obtaining and filing records will be the responsibility of the Radiation Safety Officer.

When ordering material from the manufacturer, it will be requested that all certification records shall accompany the material. Upon receipt of the material, the documents will be filed.

If documentation is not received with the material, a written request for the documentation will be sent out promptly.

When documentation is initialed by Quad City Testing Laboratory, copies of that documentation will be filed.

The Radiation Safety Officer shall insure that all quality assurance functions are conducted in accordance with the latest applicable changes to these documents.

These records will be readily retrievable, identifiable and available to management, and Nuclear Regulatory Inspection Personnel.

The Radiation Safety Officer will be responsible for the continued maintenance of the documents at 1021 South Farragut Street, Davenport, Iowa.

QUALITY ASSURANCE PROGRAM

Handling, Storage, and Shipping

Shipments of Radioactive materials will not be made unless all tests, certifications, acceptances and final inspections have first been completed.

The radiographer shall survey the projector containing the radioactive material during the following periods:

1. When taking projector out of storage compartment.
2. Prior to shipment by common carrier.
3. Immediately upon receipt from common carrier.
4. Immediately upon receipt from another radiographer.
5. Whenever projector is in operation. (Survey must be taken before and after the source is cranked in and out.
6. Prior to a leak test.
7. Prior to placing projector in storage compartment.
8. Anytime safe storage of source in projector is suspect.
9. During a source change.

Projectors shall be stored in lead lined storage boxes provided by Quad City Testing Laboratory. Storage containers shall be locked when source and projector are within the confines of the storage container.

In shipment our 660 projector must be locked with the storage plug inserted and locked with a tamper proof seal. When shipped with the contained Iridium 192, the Radioactive Yellow III label must be identified with "Iridium 192", the number of curies contained and the transportation index which is the maximum radiation level measured at a distance of 3 feet from the surface of the container.

When the 660 projector is shipped to you, unpack the system only with a properly calibrated survey meter.

If there is damage to the projector, notify the Radiation Safety Officer immediately.

If radiation levels exceed the approved levels, follow Emergency Procedure QCI-2.

QUALITY ASSURANCE PROGRAM

Q. C. T. -2

Emergency Procedure

Emergency Procedures

1. In the event the source cannot be returned to the safe position, immediately do the following:
 1. Survey and maintain restricted area.
 2. Notify Radiation Safety Supervisor, Maintain site surveillance.
2. In the event the source becomes detached in guide tube:
 1. Notify Radiation Safety Supervisor - Maintain site surveillance.

What is an Emergency?

1. In the event that the source cannot be returned to the safe position.
2. If the source becomes detached.
3. If the source is lost.
4. If the sealed source capsule is crushed.
5. If a falling object strikes the container or accident to the container or cable.
6. In the event of a plant emergency, such as a fire or accident.
7. Vehicular accident while traveling to an exposure site.
8. If receiving inspection shows signs of damage to projector.
9. If any safety devices or measures are inoperable or malfunctioning.
10. If any employee is suspected of receiving an excessive amount of radiation.
11. If anything represents any possible or existing hazard.

Rev 0 13

Page #13

QUALITY ASSURANCE PROGRAM

Inspection, Tests, and Operating Status

The radiographer will perform a daily inspection pertaining to the operating status of the projector and all accessories included with or in any way affecting the safe operation of the sealed source. Nonconformances will be noted by a written description on the daily utilization log. Nonconformances will also be reported, verbally to the Radiation Safety Officer. The Radiation Safety Officer shall take immediate steps to resolve the nonconformances.

Leak tests will be performed at 6 month intervals. Leak tests will be performed by the radiographer in accordance with procedure QCT - 3.

Quarterly maintenance on projectors will be performed at 3 month intervals. Quarterly maintenance will be performed by the radiographers and recorded on quarterly maintenance forms. Quarterly maintenance will be performed by Procedure QCT - 4.

Audits

Periodic 3 month audits of the Quality Assurance Program will be performed using written check lists. 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.

QUALITY ASSURANCE PROGRAM

Q.C.T. - 3

Leak Test Procedure

1. The Iriditron and Tech/Op Models are leak tested by removing the safety plug and carefully inserting the applicator into the opening and wiping all internal surfaces.
2. The Tech/Op units T/o533, T/o660, T/o490 are leak tested the same. Tech/Op 616 shall be factory tested.
3. The survey meter calibration unit T/o571 is leak tested by wiping around the aperture on the side of the unit while the source is in the stored position. The Gamma Industries Pipeliner Unit is leak tested in the same manner as the Tech/Ops T/o571.
4. Withdraw the swab and place in plastic envelope.
5. Place the survey meter in a low background area, turn it to the most sensitive scale, move the swab to the meter (not the meter to the swab.)
6. If there is no indication on the meter, or an indication is no more than 0.2 mr/hr above background, put the plastic envelope with swab in the mailing box with the identification form properly filled out, mail to the assayer (Applied Health Physics or Tech/Ops).
7. If the swab should indicate more than 0.2 mr/hr, DO NOT MAIL - Contact your Radiation Safety Officer for specific instructions.
8. If the available survey meter does not detect as little as 0.2 mr/hr, but indicates less than 2.0 mr/hr radiation from the swab, you may send the swab via express shipment (parcel shipment, not mail). Do NOT SHIP if radiation is more than 2.0 mr/hr; contact your Radiation Safety Officer.

QUALITY ASSURANCE PROGRAM

Quarterly Maintenance Procedure

Q.C.T. - 4

Each projector is required to have a thorough check of all components and working parts every three months.

Tools required:

1. Clean pail or bucket.
2. Non-toxic solvent or degreaser.
3. 8" screwdriver.
4. 6" adjustable open end wrench.
5. Manufacturer's maintenance and instruction manual.

Procedure:

1. Wear your film badge and pocket dosimeter - carry a working, calibrated survey meter turned on.
2. Survey the projector on top and all sides - radiation level should be less than 200 mr/hr at contact with any surface.
3. Check all locks and plugs to be sure source cannot move from safe stored position.
4. Break connection where control cables are attached to projector.
5. Carefully crank exposed inner drive cable into pail and soak with solvent.
6. Disassemble control housings from crank and clean and inspect for crushed or otherwise damaged sheath - check couplings for thread condition, out of round, etc. - replace if necessary.
7. Disassemble crank and clean all parts and inspect - replace any necessary.
8. Clean and inspect all guide tubes for damage to sheath, couplings, threads - replace any necessary.
9. Reassemble crank and control cables.
10. Dry inner drive cable (low pressure compressed air or clean, lint free cloth) and lubricate sparingly with Texaco Uni-Temp grease. DO NOT OVER LUBRICATE.
11. Reinsert inner drive cable into control tubes and engage in crank - carefully crank control tube back to where it can be rethreaded onto projector. BE SURE TO KEEP DIRT OFF INNER CABLE.

QUALITY ASSURANCE PROGRAM

Q.C.T. - 1/4 Continued

12. Couple all guide tubes together and to projector.
13. Clear and post 2 sq. area as in radiography.
14. Crank source all the way out to exposure position and back into projector - Did it work smoothly? - crank should operate without binding at any point, source should move freely in guide tubes.

Note: Some projectors may have lock mechanisms that secure source pigtail - these should be cleaned with solvent and air dried, and checked for good operation. A small amount of graphited lock fluid may be used to insure smooth engagement.

If there is an exposed source connector, check it carefully with the gauge provided by the manufacturer.

15. Record the maintenance check on the Quarterly Maintenance Log.
16. Secure the projector as in radiography procedure.

DAILY UTILIZATION LOG

Date: _____ Name: _____ Projector Model#: _____ S.N. _____ Source: _____ Curies Ir 192 _____

Co⁶⁰ _____

Dosimeter Reading:

Start _____ mr.

Finish _____ mr.

DAILY MAINTENANCE CHECK

Check for proper function, visual damage:

Projector locks, plugs, threads, labeling _____

Guide tube outer sheath, couplings _____

Control cable sheath, couplings _____

Control crank operation _____

DO NOT USE ANY COMPONENT THAT CAN CAUSE A MALFUNCTION - REPLACE OR REPORT TO SUPERVISOR.

Final security check at end of use: (survey projector in contact with top and all sides) _____ mr/hr (highest reading)

QUARTERLY MAINTENANCE LOG

Date: _____

Name: _____

Indicate O.K. or Replaced:

Projector: Model# _____ S. N. _____

Safety Plug _____
Labels _____
Lock _____

Control:

Housings _____
Gears _____
Bushings _____
Handle _____
Other _____

Control Cables:

Housing _____
Couplings _____

Guide Tubes:

Housing _____
Couplings _____

Final survey at contact with top and all sides - highest reading _____ mr/hr

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

1.(a) Certificate Number	1.(b) Revision No.	1.(c) Package Identification No.	1.(d) Pages No.	1.(e) Total No.
9033	3	USA/9033/8()	1	2

2. PREAMBLE

- 2.(a) This certificate is issued to satisfy Sections 173.393a, 173.394, 173.395, and 173.398 of the Department of Transportation Hazardous Materials Regulations (49 CFR 170.189 and 14 CFR 103) and Sections 145-19-10a and 145-19-100 of the Department of Transportation Dangerous Cargoes Regulations (46 CFR 145-149), as amended.
- 2.(b) The packaging and contents described in item 5 below, meets the safety standards set forth in Subpart C of Title 10, Code of Federal Regulations, Part 71, "Packaging of Radioactive Materials for Transport and Transportation of Radioactive Material Under Certain Conditions."
- 2.(c) This certificate does not relieve the consignor from compliance with any requirement of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into which the package will be transported.

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

3.(a) Prepared by (Name and address):

Technical Operations, Inc.
Northwest Industrial Park
Burlington, Massachusetts 01803

3.(b) Title and identification of report or application:

Technical Operations, Inc. application
dated November 8, 1974.

3.(c) Docket No. 71-9033

4. CONDITIONS

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

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

(a) Packaging

(1) Model Nos.: 660 and 660E

(2) Description

A steel encased, uranium shielded Gamma Ray Projector. Primary components consist of an outer steel shell, polyurethane potting material, uranium shield, Zircalloy or Titanium "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 48 pounds.

(3) Drawings

The packaging is constructed in accordance with the Technical Operations, Inc. Drawings Nos. 66025, Rev. A, Sheets 1, 2, and 3.

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7908160560
ZPP

(b) Contents

(1) Type and form of material

Iridium-192 sources which meet the requirements of special form as defined in 471.4(e) of 10 CFR Part 71.

(2) Maximum quantity of material per package

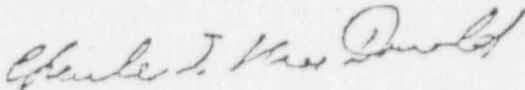
120 curies

6. The source assembly for use with this packaging is limited to Technical Operations, Inc. Model No. A424-9 as shown in Technical Operations, Inc. Drawing No. C42400, Sheet 2 of 3, Rev. F.
7. The name plate shall be fabricated of materials capable of resisting the fire test of 10 CFR Part 71 and maintaining their legibility.
8. The package authorized by this certificate is hereby approved for use under general license provisions of Paragraph 71.12(b) of 10 CFR Part 71.
9. Expiration date: July 31, 1984.

REFERENCES

Technical Operations, Inc. application dated November 8, 1974.
Supplements dated: December 15, 1978 and June 15, 1979.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION


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

Date: JUL 25 1979

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

1.(a) Certificate Number 9032	1.(b) Revision No. 2	1.(c) Package Identification No. USA/9032/B()	1.(d) Pages No. 1	1.(e) Total No. Pages 2
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2. PREAMBLE

- 2.(a) This certificate is issued to satisfy Sections 173.393a, 173.394, 173.395, and 173.396 of the Department of Transportation Hazardous Materials Regulations (49 CFR 170.129 and 14 CFR 103) and Sections 145-19-10a and 145-19-100 of the Department of Transportation Dangerous Cargo Regulations (46 CFR 145-149), as amended.
- 2.(b) The packaging and contents described in Item 5 below, meets the safety standards set forth in Subpart C of Title 10, Code of Federal Regulations, Part 71, "Packaging of Radioactive Materials for Transport and Transportation of Radioactive Material Under Certain Conditions."
- 2.(c) This certificate does not relieve the consignor from compliance with any requirement of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into which the package will be transported.

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

3.(a) Prepared by (Name and address): Technical Operations, Inc. Radiation Products Division Northwest Industrial Park Burlington, Massachusetts 01803	3.(b) Title and identification of report or application: Technical Operations, Inc. application dated August 8, 1979. 3.(c) Docket No. 71-9032
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4. CONDITIONS

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

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

(a) Packaging

(1) Model No.: Model 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 holdown assembly. The source holdown 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. A, Sheets 1, 2 and 3 of 3.

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ZPP

5. (b) Contents

(1) Type and form of material

Iridium-192 as sealed sources which meet the requirements of special form as defined in §71.4(o) of 10 CFR Part 71.

(2) Maximum quantity of material per package

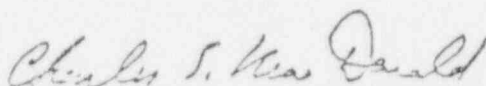
240 Curies

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 holdown 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. The package authorized by this certificate is hereby approved for use under the general license provisions of Paragraph 71.12(b) of 10 CFR Part 71.
9. Expiration date: September 30, 1984.

REFERENCE

Technical Operations, Inc. application dated August 8, 1979.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION


Charles E. MacDonald, Chief
Transportation Certification Branch
Office of Nuclear Material
Safety and Safeguards

SEP 17 1979

Date:

NRC FORM 311
(12-78)

U.S. NUCLEAR REGULATORY COMMISSION

1. APPROVAL NUMBER

QUALITY ASSURANCE PROGRAM APPROVAL
FOR RADIOACTIVE MATERIAL PACKAGES

0040

REVISION NUMBER

0

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, and Title 10, Code of Federal Regulations, Chapter 1, Part 71, and in reliance on statements and representations heretofore made in Item 5 by the person named in Item 2, the Quality Assurance Program identified in Item 5 is hereby approved. This approval is issued to satisfy the requirements of Section 71.51 of 10 CFR Part 71. This approval is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

2. NAME

Technical Operations, Inc.

3. EXPIRATION DATE

October 31, 1984

STREET ADDRESS

Northwest Industrial Park

4. DOCKET NUMBER

CITY

Burlington

STATE

MA

ZIP CODE

01803

71-0040

5. QUALITY ASSURANCE PROGRAM APPLICATION DATE(S)

July 9, 1979

6. CONDITIONS

Activities conducted under applicable criteria of Appendix E of 10 CFR Part 71 to be executed with regard to transportation packages by October 1, 1979.

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IP

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

SIGNATURE

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

DATE

AUG 03 1979