

U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report No. 78-01

Reference: 8/3/77 memo from R. J. Meyer

License No. 24-01113-07

Priority

VI

Category

E(2)

Licensee: Monsanto Co.
St. Louis, MO

Inspection conducted: None

Inspector:

G. A. Phillip

3-14-78
(Date)

Approved by

W. H. Schultz
W. H. Schultz

3-14-78
(Date)

Details:

A file review shows this license was superseded by
Amendment 2 to License No. 24-01113-20 issued 12/15/77.

A/82

MATERIALS DATA INPUT

4 INDUSTRIAL BYPRODUCT
REFERENCE COPY



DOCKET NUMBER 030-05071	MAIL CONTROL NO. 45677	DATE REQUEST REC'D 02/28/74	PROGRAM CODE PRIMARY
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SECONDARY PROGRAM CODES:				
#1	#2	#3	#4	#5

INDIVIDUAL LICENSEES	NAME	NAME
	NAME	NAME
	NAME	NAME

ORGANIZATION LICENSEES	ORGANIZATION NAME Monsanto Company	TYPE OF ORGANIZATION		
	DEPARTMENT OR BUREAU Inorganic Research	U. S. GOVERNMENT AGENCY	EDUCATIONAL INSTITUTION	
		MEDICAL INSTITUTION	<input checked="" type="checkbox"/> INDUST	OTHER

ADDRESS	BUILDING, STREET 800 North Lindbergh Boulevard	CITY St. Louis	STATE MO	ZIP CODE 63166
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BYPRODUCT	CHEMICAL OR PHYSICAL FORM	POSSESSION LIMIT
Copy A .. B .. C		

9A Determination of Dentin abrasion
9B Laboratory studies of materials
9C Instrument calibration

Copy 10
5
7 K.Y. Kim or J.J. O'Leary

Copy 13
5
add 23

[Handwritten signature]

MAIL TO: Kim	DATE MAILED	REVIEWER Ken	DATE COMPLETED 3/14/74
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APPLICATION FOR BYPRODUCT MATERIAL
USE OF SEALED SOURCES IN RADIOGRAPHY

SEE ATTACHED FORM AEC-313R INSTRUCTIONS—USE SUPPLEMENTAL SHEET WHERE NECESSARY.
ENSURE ALL ITEMS ARE COMPLETED AND THAT ALL NECESSARY ATTACHMENTS ARE FURNISHED. IF ANY PORTION
OF THE APPLICATION IS NOT APPLICABLE SPECIFICALLY SO STATE. DEFICIENT OR INCOMPLETE APPLICATIONS
MAY BE RETURNED WITHOUT CONSIDERATION.

1. (a) NAME AND ADDRESS OF APPLICANT
St. Louis Testing Laboratories, Inc.
2810 Clark Avenue
St. Louis, Missouri 63103

2. PREVIOUS LICENSE NUMBER, including if application is for renewal or amendment
of an existing byproduct material license:
24-188-2-(566) Amendment

1. (b) APPLICANT IS: An individual ☐ A partnership ☐ A Corporation ☒ An
Unincorporated Association ☐ Other ☐ If applicant is other than an individ-
ual, the applicable section on the reverse side must be completed.

3. LOCATION(S) WHERE SEALED SOURCES WILL BE USED AND, OR STORED. (If use
will be made in states other than named in 1, it may be used as noted here.)
Temporary jobsites throughout the United
States except in Agreement States and defined
in section 30.4 (u) of Title 10, Code of
Federal Regulations Part 30.

4. SEALED SOURCES TO BE USED IN RADIOGRAPHY

BYPRODUCT MATERIAL (Element and Mass No.)	SOURCE MODEL NUMBER	NAME OF MANUFACTURER	MAXIMUM ACTIVITY PER SOURCE	NUMBER OF SOURCES
A. See B. Attachment C. #1	A. See B. Attachment C. #1	A. See B. Attachment C. #1	A. See B. Attachment C. #1	A. See B. Attachment C. #1

5. RADIOGRAPHIC EXPOSURE DEVICES AND/OR STORAGE CONTAINERS TO BE USED WITH SOURCES LISTED ABOVE

MODEL NUMBER	NAME OF MANUFACTURER (If custom made, attach complete design specification.)
A. STL-KBT-11	St. Louis Testing Laboratories, Inc. design A. specification previously submitted and approved.
B. KBT-12C	B. same
C. 489	C. Technical Operations

6. THE FOLLOWING INFORMATION IS ATTACHED AS A PART OF THIS APPLICATION: (Check appropriate blocks and attach information called for in the instructions with this form.)

	Not Applicable	Attached	Previously Submitted
(a) Description of radiographic facilities (Instruction 6-a)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> on 8-20-64
(b) Description of radiation detection instruments to be used (Instruction 6-b)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> on 5-12-61
(c) Instrument calibration procedures (Instruction 6-c)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> on 8-25-61
(d) Personnel monitoring equipment (Instruction 6-d)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> on 5-12-61
(e) Operating and emergency procedures (Instruction 6-e)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> on 8-25-61
(f) Training program (Instruction 6-f)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> on 8-25-61
(g) Internal inspection system or other management control (Instruction 6-g)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> on 8-25-61
(h) Overall organizational structure (Instruction 6-h)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> on 5-12-61
(i) Leak testing procedures (Instruction 6-i)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> on 8-15-66 (DATE)

CERTIFICATE (This item must be completed by applicant)

7. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, CERTIFY THAT THIS APPLICATION IS PREPARED IN CON-
FORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PART 30, AND THAT ALL INFORMATION CONTAINED HEREIN, INCLUDING ANY SUPPLEMENTS ATTACHED HERETO,
IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

RECEIVED
FEB - 1 1967
U.S. Atomic
COMMISSION
RADIOLOGICAL
MAIL ROOM

ST. LOUIS TESTING LABORATORIES, INC.
Applicant Named in Item 1
[Signature]
Director
Title of Certifying Official

DATE 1-9-67

WARNING.—18 U.S.C., Section 1001, Act of June 25, 1948, 62 Stat. 749, makes it a criminal offense to make a willfully false statement or representation to any department or
agency of the United States as to any matter within its jurisdiction.

92449 T/2 92004

LEGAL STRUCTURE OF APPLICANT

If applicant is a corporation, complete Items 8 through 11; if applicant is a partnership, complete Items 12 through 14; if applicant is an individual, complete Item 15; if applicant is a legal entity other than a partnership or corporation, complete Items 15 and 16. Attach separate sheets where space provided proves inadequate.

CORPORATION

8. STOCK OF APPLICANT CORPORATION

NO. OF SHARES AUTHORIZED	NO. OF SHARES ISSUED	NO. OF SHARES SUBSCRIBED	TOTAL NUMBER OF	
3000	60		(a) Stockholders	(b) Bondholders
			3	0

9. Is applicant corporation directly or indirectly controlled by another corporation or other legal entity?

YES ☐

NO ☐

If answer is "YES" give name and address of other corporation or other legal entity and describe how such control exists and the extent thereof.

C. D. Trowbridge 1035 Grand, Edwardsville, Illinois
 Mary E. Trowbridge 1035 Grand, Edwardsville, Illinois
 R. H. McRoberts, Jr. 6947 Pershing, St. Louis, Missouri

10. (a) Identify by name and address any individual, corporation, or other legal entity (1) owning 10 percent or more of the stock of applicant corporation issued and outstanding or (2) subscribing to 10 percent or more of the authorized but unissued stock of the corporation.

(b) Identify by name and address all officers and directors of the corporation.

11. Identify the State, District, Territory, or possession under the laws of which the applicant is incorporated.

PARTNERSHIP

12. Name and address of each individual or legal entity owning a partnership interest in the applicant.

13. State the percent of ownership of the applicant partnership held by each of the individuals or legal entities listed in Item 12.

14. Identify the State, District, Territory, or possession under the laws of which the applicant partnership is organized.

OTHER

15. Describe the nature of the applicant and identify the State, District, Territory, or possession under the laws of which it is organized.

16. State the total number of members or persons holding an ownership in the applicant, identify each by name and address, and indicate the ownership interest thereof.

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4. Sealed Sources to be used in Radiography

<u>SOURCE MATERIAL</u>	<u>SOURCE MODEL NUMBER</u>	<u>NAME OF MANUFACTURER</u>	<u>MAXIMUM ACTIVITY PER SOURCE</u>	<u>NUMBER OF SOURCES</u>
Iridium 192	Sealed Sources (AECL Type SRC-3) (capsule type C-164)	Atomic Energy of Canada Ltd. or Oak Ridge National Laboratories.	No single source to exceed 40 curies Total: 350 curies per amendment No. 8.	
Cobalt 60	Model #30	Isotope Specialties	10 Curies	1
Iridium 192	Model A-424-1	Technical Operations	No single source to exceed 10 curies. Total: 350 curies per amendment No. 6.	
Cobalt 60	Model NCC-1C-S	Nuclear Consultants Corporation	25 Millicuries	1

5. Radiographic Exposure Devices and/or Storage Containers to be used with sources listed above.

<u>MODEL NUMBER</u>	<u>NAME OF MANUFACTURER</u>
NCC-1C-25	Nuclear Consultants Corporation
Storage Container STIA	St. Louis Testing Laboratories, Incorporated design specifications previously submitted and approved.
Storage Container STLB	St. Louis Testing Laboratories, Incorporated design specifications previously submitted and approved.



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c. (1) Leak Testing Procedures

(1) METHOD

Sealed Sources to be Tested

Leak tests may be performed on sealed sources authorized by AEC License No. 24-00188-02, as well as additional 11192 and 0000 sealed sources in the possession of other licensees. The wipes shall be performed by the following personnel:

1. Authorized personnel of Licensees specifically licensed to use St. Louis Testing Laboratories, Inc. "Leak Test Kits".
2. Authorized personnel of St. Louis Testing Laboratories, Inc.

Leak Test Kits

Leak Test Kits will be supplied to Licensees specifically licensed to use the St. Louis Testing Laboratories, Inc. "Leak Test Kit". (See Attachment III)

Principle of the Method

Most radiographic sources emit gamma radiation. The radioactive material is also a beta emitter (CO^{60} , Cs^{137} , etc.) If the source capsule is leaking and a cotton swab wipe is made on the outside surface, some of the radioactive material will rub off on the cotton swab. The number of beta particles emitted from the cotton swab per minute is proportional to the amount of radioactive materials on the cotton swab. The amount of material present is determined by counting the beta particles being emitted.

Procedure

Each sealed source or the nearest accessible point to the source storage position will be wiped with an alcohol saturated cotton swab.

The Eberline Model RM-3A with HP-180 end window Geiger counter and SH-2 sample holder will be used to compare the beta activity of the wipe with a 0.005 uc Tc^{99} beta source (*). If the amount of radioactive material exceeds 0.005 uc, the amount will be estimated as follows: Subtract the background count from the counts obtained with the Tc^{99} source and from the counts obtained with the cotton swab. Divide net c/m for the cotton swab by net c/m for the source and multiply this ratio by 0.005 uc.

If the number of beta particles emitted from the wipe is less than from a 0.005 uc beta source, the source will then be considered as not leaking. If it is more than this, the source will be considered a leaking source.

(3) HANDLING AND DISPOSING OF SAMPLES

Any sample containing more than 0.005 micro curies of contamination will be transferred (using remote handling equipment) to a suitable shipping container and shall be disposed of at an approved Radioactive Waste Disposal Site in compliance with existing A.E.C. and I.C.C. regulations.

(4) QUALIFICATIONS OF PERSONNEL

The following individuals whose qualifications were previously submitted May 12, 1961 and who have been actively engaged handling and/or using radioactive isotopes since that time, will be authorized to perform the leak tests in accordance with the foregoing leak testing procedures.

C. D. Trowbridge
Paul W. Sinn
Ronald E. Sinn
C. F. Cherry

(5) INSTRUMENTATION

Eberline Model RM-3A with HP-180 end window Geiger counter.
SH-2 Sample Holder.
0.005 uc Tc99 beta source

Model HP-180 Specifications

Operational Ranges: 0 to 500, 0 to 5,000, and 0 to 50,000 counts per minute.

Range Linearity: $\pm 10\%$ of full scale on each range.

Power Supply Range: 900 volts DC

Input Sensitivity: 100 millivolts or less depending on DISCR setting.

Detector: Hand Probe Model HP-180

Detector Cable Length: 60" heavy insulated, dirt, moisture proof UHF connector.

Detector Input: Front panel mounted, Amphenol 83-1s coaxial connector.

Meter: Triplet Model 420 PL, scale 0-500 cpm.

Meter Response: 1.5; 3: 4.5 seconds.

Voltage Requirements: 115/220 volts, single phase 50/60 cycle AC.

Operation Controls: Range Switch combined with Power Switch located on front panel. Detector voltage control located on rear of chassis.

Range Calibration Controls: Internally located. Separate control for each range, plus one control for Alpha range.

Speaker: Front panel mounted; volume continuously variable, Volume control on front panel.

Power Cable: Eight feet long three wire conductor with grounding type polarized connector. Furnished with a grounding plug adapter.

Meter Reset: Panel mounted button for rapid return of meter to zero.

Finish: Front panel insert-charcoal with silk screened nomenclature in white. Cabinet-baked gray hammertone enamel.

Dimensions: 13" wide, $5\frac{1}{2}$ " deep by $9\frac{1}{2}$ " high, including handle.

Weight: $7\frac{1}{2}$ pounds.

Hand Probe, Model HP-180

Case: 2024-T4 Aluminum, clear sulphuric anodized finished.

Cable: UG 59/U cable, 3 feet in length.

Connector: UHF

Shield: Protective wire mesh screen covers probe face.

Detectors: Amperex 100NB Geiger Mueller tube with a 3.5 mg/cm² mica window.

ATTACHMENT II (Cont.)

SH-2 Sample Holder

Sample Holder Position: With respect to distance from detector window in probe to top of sample holder slide: $5/16"$, $7/16"$, $9/16"$, $25/32"$, $1\ 1/32"$, $1\ 3/8"$, $1\ 25/32"$, $2\ 19/64"$, $2\ 51/64"$.

Dimensions: 4 inches long x $25/8$ inches wide x 4 inches high.

Finish: Clear sulphuric, anodize with enamel filled engraved nomenclature.

Material: 2024-T Aluminum

Weight: $1\frac{1}{2}$ pounds.

ATTACHMENT III

LEAK TEST KITS

St. Louis Testing Laboratories, Inc. Leak Test Kits will be comprised of the following:

1. Cotton swab (wooden shaft approximately 4" long with cotton tip)
2. Small screw top vial containing a small amount of alcohol.
3. Padded protective return mailing envelope.
4. Adhesive Label
5. Instruction sheet (See attachment V)

C. D. TROWBRIDGE, Director



Missouri Testing Laboratories, Inc.

2810 CLARK AVENUE • ST. LOUIS, MO. 63103
531-8080 Code 314

Chemical, Metallurgical, Physical, Non-Destructive, Spectrographic,
Agricultural Testing and Analyses
Investigations, Research and Development, Inspection, Field Services



DATE _____

REPORT NO. _____

John Doe Co.
110 Hickory
St. Louis, Mo.

LEAK TEST CERTIFICATE

SUBJECT: Leak tests of sealed sources in compliance with AEC regulations.

SAMPLE IDENTIFICATION AND ISOTOPES

* ACTIVITY OF SAMPLE

Source D-431	IR ¹⁹²	Less than .0001 uc
Source D-666	IR ¹⁹²	.002 uc
Source D-661	CO ⁶⁰	Less than .0001 uc

DATE OF COMPLETION OF TEST 12-12-66

It is noted that the above results are below the maximum permissible levels, and as such are considered "Not Leaking".

* 10CFR34 Section 34.25 (d) sets the maximum permissible level of removable contamination at .005 uc.

Respectfully submitted,

Paul W. Sinn
Administrator

92004

INSTRUCTIONS

The Leak Test Kit is comprised of the following items:

1. Cotton Swab (wooden shaft approx. 4" long)
2. Small screw top vial containing a small amount of alcohol.
3. Adhesive label.
4. Padded protective return mailing envelope.

The cotton swab is to be used to wipe the sealed source or the nearest accessible point to the source storage position. This is accomplished by first opening the small glass vial containing the alcohol and inserting the cotton tipped end of the swab into the vial. When the cotton tip is completely saturated with the alcohol, withdraw the swab from the vial and use it to wipe the sealed source or the nearest accessible point to the source storage position. Upon completion of the wipe, the end of the swab containing the cotton tip is again inserted into the glass vial and the wooden shaft broken off to permit replacement of the screw cap. After you have secured the screw cap on the vial containing the cotton swab, you are ready to affix the adhesive label to the vial. This label must contain the following information.

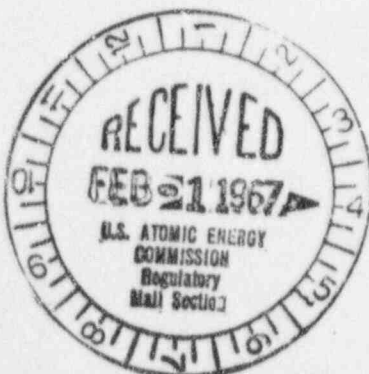
Date

Type of Isotope

Source Identification

Repeat the above steps for each sealed source to be leak tested, always being sure to place only one sample in each vial.

After all sources have been wiped and the wipes secured in the vials and the vials labeled, they are to be placed in the padded protective mailing envelope and mailed to St. Louis Testing Laboratories, Inc. for evaluation.



92449

DML:LB:JMS (24-00188-02)
(24-00188-03)

MAR 7 1967

St. Louis Testing
Laboratories, Inc.
2810 Clark Avenue
St. Louis, Missouri 63103

Attention: Mr. C. D. Treubridge

Gentlemen:

We are enclosing License 24-00188-03 and Amendment 12 to License 24-00188-02 in response to your January 9 and February 14, 1967, applications.

The amendment to License 24-00188-02 authorizes storage of radiography sources in Columbia, South Carolina, by incorporating your application into License Condition 16. This amendment also authorizes your revised leak test procedure in Condition 17.

License 24-00188-03 authorizes the leak testing of cobalt 60 and Iridium 192 sources for your customers.

In addition, we have evaluated the information submitted with your January 9, 1967, application concerning your "Leak Test Kit". This information has been placed on file for reference by your customers in their license applications.

Please note that in those cases where a relatively high radiation exposure risk is involved (because of relatively high activity sources, device configuration, etc.), it may be necessary to obtain more specific (stop-by-stop) procedures for taking contamination samples from the source or device.

Very truly yours,

cc: Standard Branch Distribution
Compliance, Region III

William O. Miller
Inspector General
Division of Nuclear Licensing

- Enclosures:
1. License 24-00188-03
2. Amendment 12 of

OFFICE	24-00188-03	DML:LB			
SURNAME	WOMiller	3/6/67			
DATE	3/6/67	3/6/67			

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0702070101 IP

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 32, 33, 34, and 35, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee		
1. Name	St. Louis Testing Laboratories, Inc.	3. License number
2. Address	2810 Clark Avenue St. Louis, Missouri 63103	4. Expiration date
		5. Reference No.
6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioac- tivity which licensee may pos- sess at any one time
A. Cobalt 60 and Iridium 192	A. See Item 9.A. below	A. See Item 9.A. below

9. Authorized use

- A. The licensee is authorized to perform tests for leakage and/or contamination from sealed sources of cobalt 60 or iridium 192 housed in radiographic exposure devices.

CONDITIONS

10. Tests for leakage and/or contamination may be performed only at temporary job sites of the licensee anywhere in the United States where the Atomic Energy Commission maintains jurisdiction for regulating the use of byproduct material. This condition does not prohibit use in agreement States (as defined in Section 30.4(c), 10 CFR 30) under reciprocity procedures which may be established by those States.



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S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Page 2 of 2 Pages

Supplementary Sheet

License Number 24-00188-03

Continued from Page 1

11. The licensee shall comply with the provisions of Title 10, Part 20, Code of Federal Regulations, Chapter 1, "Standards for Protection Against Radiation."
12. Tests for leakage and/or contamination shall be performed by C. D. Trowbridge, Paul W. Sinn, Ronald E. Sinn, or C. F. Cherry.
13. Tests for leakage and/or contamination shall be capable of detecting 0.005 microcurie of contamination on the test sample. The test sample shall be taken from appropriate accessible surfaces of the device in which the sealed source is permanently or semipermanently mounted or stored. The customer shall be furnished a report of leak test results in terms of microcuries.
14. Sealed sources shall not be removed from their shielded devices for the purpose of accomplishing the tests authorized in Item 9. above. Tests for leakage and/or contamination of sources in their devices shall be made of appropriate exterior accessible surfaces with the device in the "off" or shielded position.
15. This license authorizes the possession of byproduct material, contained in the sealed sources and/or devices authorized to be leak tested in Item 9.A., in the form of leak test samples and contamination on the equipment used to obtain these samples.
16. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated January 9, 1967.

Date WEH MAR 7 1967

WEH/uy

REP 7/6/62

For the U. S. Atomic Energy Commission

Original Signed By
Robert E. Brinkman

by Isotopes Branch

Division of Materials Licensing
Washington, D. C. 20545

LICENSE CONTROL FORM

St. Louis Testing Laboratories, Inc 2810 Clark Avenue St. Louis, Missouri 63103	LICENSE NUMBER 24-185-3	EXPIRATION DATE 2/28/69	CONTROL NUMBER 92328 92449 92328
DATE REC'D 02-16-67		DATE ISSUED MAR 7 1967	PMUS 614 2 ASC 212 WONT

01 () LETTER () APPLICATION DATED:

BYPRODUCT	CHEMICAL OR PHYSICAL FORM	POSS. LIMIT
A Cobalt 60 and Iridium 192	A. See Item 9A below	A. See Item 9A below

A. The licensee is authorized to perform tests for leakage and/or contamination from sealed sources of Cobalt 60 or Iridium 192 housed in radiographic exposure devices.

Tests for leakage and/or contamination may be performed only at temporary job sites of the licensee anywhere in the United States where the Atomic Energy Commission maintains jurisdiction for regulating the use of byproduct material. This condition does not prohibit use in agreement states (as defined in Section 30.4(c), 10 CFR 230) under reciprocity provisions which may be established by those states.

⑤ Tests for leakage and/or contamination shall be performed by C.D. Frowbridge, Paul W. Shaw, Donald E. Sinn, or C.F. Cherry.
 (over)

MAIL TO:	Frowbridge Director	DATE MAILED: MAR 7 1967	REVIEWER: WBA PBA	DATE COMPLETED: 2-23-67 3-6-67
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