

HOUSTON LIGHTING & POWER COMPANY
STANDARD HEALTH PHYSICS PROCEDURES

PROCEDURE NO. HP 12.220

Title: CONTROLS FOR RADIOACTIVE SOURCES

Revision No. 2

Date of Issue

Safety Classification

Radiologically Safety-Related X

Non-Radiologically Safety-Related

Status

Prepared by: Health Physics Division

Approved by: *[Signature]* Principal Health Physicist

Date Approved: 9/18/81 Date Effective: 10/1/81

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1.0 Purpose and Scope

- 1.1 The purpose of this procedure is to outline requirements for leak testing, frequency, inspection methods, documentation, and records maintenance for sealed and unsealed radioactive sources.
- 1.2 All or portions of this procedure may be applied to unlicensed sources as deemed necessary by the Health Physicist responsible for radioactive material control. Exempt (unlicensed) concentrations and quantities of radioactive materials are listed in Reference 7.1 (part 41.4 and schedule A & B) and in Reference 7.2 (part 30.14, 30.18 and schedules A & B).

2.0 Prerequisites

- 2.1 Packages containing radioactive materials shall be tested for leakage upon receipt.
- 2.2 Sealed sources requiring periodic leak testing are those which have a decay half-life greater than 30 days and:
 - 2.2.1 Contain in excess of 10 microcuries of alpha-emitting material.
 - 2.2.2 Contain in excess of 100 microcuries of beta- and/or gamma-emitting material.
 - 2.2.3 Contain in excess of 0.1 microcuries of alpha-emitting material plated onto an accessible surface.
 - 2.2.4 Are not otherwise specifically exempted from leak testing by Federal or State regulations.
- 2.3 The interval between successive sealed source/leak test/ shall not exceed:
 - 2.3.1 Six months for beta- and/or gamma-emitting sources.
 - 2.3.2 Three months for alpha-emitting sources (or neutron-emitting sources incorporating an alpha emitter).
 - 2.3.3 All sources, except exempt quantities, shall be inventoried quarterly.

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2.4 All documentation regarding tests required by this procedure shall be preserved indefinitely or until disposal is authorized by Federal or State regulations.

2.5 Methods used to perform leak tests and assay smears for radioactivity shall have sufficient sensitivity to detect 0.001 microcuries (2200 d/m) of removable activity.

3.0 Precautions

- 3.1 Smears shall be separated and handled in a manner to prevent cross contamination.
- 3.2 Personnel performing activities outlined in this procedure shall utilize protective measures to prevent contamination spread in the event of source leakage.
- 3.3 Wet smears shall be air dried before counting.
- 3.4 Personnel performing leak tests and associated activities shall wear appropriate personal monitoring devices and shall exercise care when testing for leaks on open source holders so that unnecessary radiation exposure can be avoided.
- 3.5 In the event a sealed source appears to be damaged or leaking, the source shall be removed from service and placed in an appropriate leak proof container. Health Physics Supervision shall be notified as soon as possible.

4.0 Equipment Required

- 4.1 Calibrated counting instruments as required for smear activity determination
- 4.2 Calibrated survey instruments
- 4.3 Smears and/or cotton swabs (such as Q-tips)
- 4.4 Contamination control equipment in the event of source leakage

5.0 Procedure

- 5.1 Source Control Documentation

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- 5.1.1 When a licensed source is received (or a source prepared from licensed source material) it shall be uniquely identified by assigning to it a source control number which shall be permanently affixed to the source, source rod or chain.
- 5.1.2 Appropriate data to describe a new source shall be recorded on Form HP 12-1, Radioactive Material Record:
- 5.1.2.1 Source Control Number (1) - Locally assigned sequential number.
- 5.1.2.2 Physical form (2) - Solid (solid-sealed, solid-plated, etc.), liquid or gas.
- 5.1.2.3 License (3) - Authorization to possess the source. Circle whether State or NRC and list license number. If the source is an exempt quantity according to Reference 7.1 (Part 4.1 Schedules A & B) or Reference 7.2 (Part 30 Schedules A & B) write "EXEMPT" in this block.
- 5.1.2.4 Source Manufacturer (4) - Name of the fabricator of the source. If it was fabricated locally in the laboratory (such as from a liquid source) state something similar to "Fabricated at CHPL using _ ml aliquot from source # (number) on (Date) _".
- 5.1.2.5 Received From (5) - List the actual supplier of the source and his address.
- 5.1.2.6 Date of Acquisition (6) - List the date the source was received or prepared.
- 5.1.2.7 Model No. (7) and Serial No. (8) - List the source model number and/or serial number. If no model number or serial number exists (as for a locally prepared source) write "NONE" in the block(s).
- 5.1.2.8 Source Container (9) - Give a short description of the device in which the source is contained or stored (such as blue lead pig 10" tall X 9" diameter, Model 1000B Gamma Calibrator, pipeline flow monitoring device, 30 ml polyethylene bottle, etc).

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- 5.1.2.9 Radionuclide (10) - List the radionuclide(s) contained in the source.
- 5.1.2.10 Activity (11) - List the activity, in curies, reported on the assay date.
- 5.1.2.11 Assay Date (12) - List the date the activity was initially determined.
- 5.1.2.12 Date (13a) - List the date a particular action or event took place.
- 5.1.2.13 Action or Event (13b) - enter items as follows:
- Record the initial receipt and storage location. If the storage location of the source is changed or the device containing the source is changed, record this information in Block 13b. Line out the old information in Block 9 and insert "See Block 13b" with the date the change was made and recorded.
 - For liquid sources, record the volume and activity of liquid received in the vial or bottle and record the volume and activity remaining each time a quantity is removed.
 - Record the action or event affecting the source (such as received, transferred, disposed of, leak tested, inventoried, etc).
- 5.1.2.14 Remarks (13c) - Some of the items that can be listed are as follows:
- For solid sources, the leak test results in microcuries.
 - For liquid sources, the volume (and activity) of liquid source removed and the reason.
 - For transfers, the complete address and license number of the facility to which the source is transferred.

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d. For disposal, the exact method and location of source disposal.

e. Other explanations of actions affecting the source.

5.1.2.15 Initials (13d) - Designated individuals specified in the license or other documents shall initial this block verifying that the action and/or entry for that date is correct and complete.

5.1.2.16 Final Disposition (14), Transferred to (15) and Transfer Date (16) - When the source is removed from HL&P accountability, enter the disposition (returned to vendor, shipped as waste, etc.), to whom the source was transferred (vendor, waste disposal company, etc.) and date the transfer was accomplished.

5.1.2.17 Form Retention Date - List the appropriate date for retention of the form after final disposal of the source. If the source was obtained under an NRC license the form must be retained for at least two years, but if the source was obtained under a Texas State license the form must be retained indefinitely, unless the State specifies otherwise.

5.2 Inventory of Sources

Each licensed source shall be accounted for by an inventory quarterly, when initially received and when shipped offsite unless the source is inaccessible (such as a start up source in a reactor).

5.2.1 Determine the identity of the source (by checking the source control number or serial number posted near the source).

5.2.2 Verify the presence of the source by visually checking that it is present. If the source cannot be reasonably checked visually, check by other means available (such as taking radiation levels on the source container or operating the source if it is an instrument check source).

5.2.3 Record the date and write "Inventoried" on the Radioactive Material Record Form (HP 12-1).

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5.2.4 If a licensed source is missing and cannot be located or accounted for, notify the Operational Services Section Supervisor at once or during non-working hours call the H.P. on the Health Physics Emergency call list.

5.3 Leak Testing of Sealed Sources

5.3.1 Preliminary checks

- 5.3.1.1 Visually inspect the sealed source for cracks, corrosion or other conditions that could result in leakage and release of radioactive material.
- 5.3.1.2 Ensure that source or device bears appropriate warning labels.
- 5.3.1.3 Document results of above determination. If nonconformities exist in any of the above that cannot be corrected at the time of the test, notify the Radiation Protection Supervisor, the Operational Services Supervising Health Physicist, or their designees immediately.

5.3.2 Obtain smear samples from source as follows:

- 5.3.2.1 Do not attempt to disassemble any device containing radioactive material.
- 5.3.2.2 Do not touch or smear accessible radioactive material on plated alpha emitting sources. Smear areas adjacent to plated surface using dry smear techniques only. For other types of sources, smears may be taken using disc or cotton swab media and wet or dry techniques as appropriate.
- 5.3.2.3 Take a sufficient number of smears to ensure that there is no leakage of radioactive material from the sealed source.

5.3.3 Complete appropriate sections of Form HP 12-1.

5.3.4 If leakage in excess of 0.005 microcuries is detected, the following shall apply:

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5.3.4.1 Immediately notify the Health Physicist or the Radiation Protection Supervisor, or designees, as appropriate, and take action to protect personnel and prevent spread of contamination.

5.3.4.2 Initiate an Incident Report.

5.3.5 If leakage is detected of >0.001 microcurie or greater but less than 0.005 microcurie, the following shall apply:

5.3.5.1 Document leakage based on smear activity analysis (actual activity in microcuries).

5.3.5.2 Notify Health Physics supervisory personnel (Health Physicist or above) immediately, so that appropriate actions may be initiated.

5.3.6 Enter in HP Task Schedule to indicate required Leak Test has been completed, and complete the Surveillance Report Form (HP 5-2).

5.4 If there is a limit as to the amount of activity that can be possessed, total the licensed sources to see that the limit has not been exceeded, calculating the decay of sources if needed. If limits have been exceeded notify HP Supervision.

5.5 Return all sources to their storage location, complete required forms. File or route the forms for review as appropriate. Place a note in the source file stating total activity on hand if this was calculated.

6.0 Acceptance Criteria

None

7.0 References

7.1 Texas Regulations for Control of Radiation, Parts 11, 21, 31, and 41

7.2 Title 10, Code of Federal Regulations, Parts 30, 31, 33 and 34

7.3 HP 10.010, Receipt of Radioactive Material

7.4 HP 6.067, Use of the RM-14 as a Smear Counter

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8.0 Forms

8.1 HP 12-1, Radioactive Material Record.

8.2 HP 5-2, Surveillance Report Form.

9.0 Addenda

Addendum 1 - By-product Licensing Agency Addresses

SURVEILLANCE REPORT FORM

City Surveyed _____ Surveyed by _____ Date _____

Documentation Used _____

Initial Posting Inspection and Conditions

Model/Serial No.	Date of Calibration

Test/Survey Results

Location	Source Type Model/Serial No.	Source Posit. Open Closed	Contact mR/hr and Location	1 foot mR/hr and Location	3 feet mR/hr and Location	Leak (Smear) Test Results

Summary Remarks/Recommendations: _____

Signature of Preparer _____

Reviewed By _____

Date _____

Addendum 1

By-product Licensing Agency Addresses

a. Texas State By-product Material License

Division of Occupational Health and Radiation Control
Texas Department of Health
1100 West 49th Street
Austin, Texas 78756
Attn: Chief, Compliance and Inspection
Radiation Control Branch

Telephone: (512)-458-7111

b. NRC By-product Material License

Director Region IV, USNRC
Office of Inspection and Enforcement
611 Ryan Plaza Drive
Suite 1000
Arlington, Texas 76012

Telephone: (817)-334-2841

With a copy to:

Director, Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

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