

INSPECTION TECHNICAL PROCEDURE

I-147

SEALED SOURCE ACCOUNTABILITY AND CONTROL

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INSPECTION TECHNICAL PROCEDURE I-147, REV. 0 SEALED SOURCE ACCOUNTABILITY CONTROL ASSESSMENT

1.0 PURPOSE

This procedure provides guidance for assessing elements of the Contractor's Radiological Control Program (RCP) that address sealed source accountability and control. This guidance is based on the requirements in the Radiation Protection Program (RPP), Safety Requirements Document (SRD), and the Quality Assurance Manual (QAM).

This inspection procedure addresses the adequacy and effectiveness of the following:

- Sealed source accountability implementing procedures
- Receipt, labeling, and storage
- Inventory and control of sealed sources
- Leak testing of sealed sources
- Handling and disposal
- Records.

NOTE: At this time, the RPP is approved for design and construction. This procedure was written based on in-process revisions to the RPP and the QAM, and on anticipated revisions to several other authorization basis documents that were necessary to bring them in line with the new RPP. Upon update of these authorization basis documents, the requirements will be reviewed and appropriately updated.

2.0 OBJECTIVES

This procedure is used to verify the Contractor has developed and implemented an effective sealed source accountability and control program that will ensure: (1) radioactive sealed sources are used, handled, and controlled commensurate with the hazard, (2) accountable sealed radioactive sources are inventoried at required frequencies, (3) the sources are leak tested as required, and (4) records of sealed source use, inventory, and leak testing are maintained.

This inspection procedure is a component of the RCP inspection program. This and other inspection procedures will be used to provide assurance that sealed source accountability control activities are being conducted as required by the RCP, authorization basis commitments, and Contractor procedures. This procedure will be used throughout the life cycle of the River Protection Project Waste Treatment Plant (RPP-WTP). The entire inspection procedure may not be completed during any one inspection and/or every time the inspection procedure is used.

3.0 INSPECTION REQUIREMENTS

3.1 Adequacy and Effectiveness of Sealed Source Accountability Implementing Procedures

The inspector should verify the Contractor has prepared, reviewed, and approved procedures to ensure that sealed sources are received, labeled, stored, used, inventoried, tested, and disposed of safely. (RPP, Requirements 22, and 122 through 127; SRD, Safety Criterion (SC) 5.0-1; and QAM, Policies Q-0.5-1 and 0.6-1)

3.2 Adequacy and Effectiveness of Receipt, Labeling, and Storage

The inspector should verify the Contractor has received, labeled, and stored its sealed sources in accordance with its procedures and the authorization basis. (RPP, Requirements 51 through 54, 73 through 75, and 122; and SRD, SC 5.0-1)

3.3 Adequacy and Effectiveness of Inventory and Control of Sealed Sources

The inspector should verify the Contractor has performed an adequate and effective inventory of the accountable sealed sources at the required frequency. (RPP, Requirements 123 and 126; and SRD, SC 5.0-1)

3.4 Adequacy and Effectiveness of Leak Testing of Sealed Sources

The inspector should verify the Contractor has performed an adequate and effective leak test of accountable sealed sources at the required frequency. (RPP, Requirements 124 and 125; and SRD, SC 5.0-1)

3.5 Adequacy and Effectiveness of Handling and Disposal

The inspector should verify the Contractor handled and disposed of sealed sources in accordance with its RPP and RCP. (RPP, Requirements 122 and 127; and SRD, SC 5.0-1)

3.6 Adequacy and Effectiveness of Records

The inspector should verify the Contractor has adequately and effectively implemented its record system related to sealed sources. (RPP, Requirement 95; and SRD, SC 5.0-1)

4.0 INSPECTION GUIDANCE

Inspection guidance is provided to assist the inspector in addressing the inspection requirements set forth in Section 3.0 of this procedure. The inspector should review the applicable parts of the authorization basis and be familiar with the content of the documents listed in Section 5.0, "References." Further guidance can be found in DOE G 441.1-13, *Sealed Radioactive Source Accountability and Control Guide*. The requirements for sealed source accountability and control are found in RPP Requirements 95 and 122-127. In Section 6 of the RPP, the Contractor indicated the Waste Treatment Plant Radiological Control Manual (WTPRCM) forms the basis of the Radiological Control Program. Therefore, Articles 431 and 755 of the WTPRCM are applicable to this review.

American National Standards Institute (ANSI) Standard ANSI/HPS N43.6-1997, *Sealed Radioactive Sources - Classification*, also provides useful information that can aid the inspector in evaluating a sealed source accountability and control program.

The guidance below includes suggested sample sizes of documents and records for review, and personnel for interview. The inspector may wish to choose a different sample size based on the life cycle of the facility, on the initial observations in any area, or on information provided in previous inspection reports. The samples should be of sufficient size to provide confidence the inspector can conclude if the Contractor has established and implemented an adequate and effective sealed radioactive source control program, and that records are being maintained as required.

4.1 Adequacy and Effectiveness of Sealed Source Accountability Implementing Procedures

To determine the adequacy and effectiveness of the sealed source implementing procedures, the inspector should perform the following:

- 4.1.1 If those procedures have not been reviewed pursuant to Inspection Technical Procedure (ITP) I-140, "RCP Programmatic Assessment," and found to contain all the required safety elements from the authorization basis, the inspector should verify the Contractor has developed and approved procedures that address the following:
 - 4.1.1.1 The responsibilities and authorities for those positions authorized to acquire sealed radioactive sources must be clearly defined. The procedure should establish the acquisition process and identify the authorities and responsibilities of the source custodian and source user.
 - 4.1.1.2 The procedure must address receipt inspection and monitoring. Specifically, prior to receipt, notifications of the radiation protection organization (RPO) must be made to ensure timely monitoring and receipt leak testing. (RPP, Requirements 51 through 54; and SRD, SC 5.3-3) The procedure should address notification of the source custodian and authorized user. Temporary storage provisions should be identified and actions to be

taken in the event contamination is discovered must be described. (RPP, Requirement 127)

4.1.1.3 Labeling of sources must be done in accordance with RPP, Requirement 73 and must include sufficient information for the individuals handling, using, or working in the vicinity of the source, its container, or storage location, to take precautions to avoid or control exposure. The sources may be excepted from the color specifications. (RPP, Requirement 74)

4.1.1.4 Criteria for storage of sealed sources should be clearly described. Storage rooms or cabinets should be isolated from occupied areas or located in radiological areas, must be fire retardant, not contain flammable or combustible material, be lockable, and provide adequate shielding. The procedure should ensure the storage location is properly posted, routinely surveyed, and access controlled to only authorized personnel.

4.1.1.5 The procedure must insure that sealed sources are not transferred to unauthorized individuals either within DOE, its contractors, unlicensed persons, or members of the public.

4.1.1.6 The responsibilities, authorities, frequency, and techniques to accomplish the required inventories must be specified. The procedure must provide elements that:

- Establish the physical location of each accountable source
- Verify the presence and adequacy of associated posting and labeling
- Establish the adequacy of storage locations, containers, and devices
- Ensure the inventory does not result in an exposure in excess of RPP limits and RCP administrative control levels, and is conducted with as low as is reasonably achievable dose (ALARA)
- Define which sources are located in areas unsafe for human entry or inaccessible, such that they need not be inventoried
- Describe what action must be taken to protect the workers and the public in the event a source is not found and ensure the loss reporting requirements expressed in DOE Manual 232.1-1A, *Occurrence Reporting and Processing of Operations Information*, are implemented.

4.1.1.7 The responsibilities, authorities, frequency, and techniques to accomplish required leak testing must be specified. The procedure must provide elements that ensure the following:

- Leak tests are conducted on receipt, when damage is suspected, and at intervals not to exceed six months

- Criteria is established to perform leak test such as when a source has been removed from service or is not subject to the inventory requirements
- Leak tests are capable of detecting the isotope of radioactive material leakage equal to or exceeding 0.005 microCuries
- Leak testing technique established do not result in exposure in excess of RPP limits, RCP administrative control levels, and is ALARA
- Action plan is established if leakage is detected.

4.1.1.8 Use of sealed sources must be clearly described to ensure RPP and RCP requirements are implemented. Radiation protection precautions, dose reduction methods, and special dosimetry requirements should be specifically identified. Actions to be taken in the event of loss, leakage, or unplanned dose need to be clearly stated for the user in the event these problems are not discovered in connection with inventories or leak testing which is routinely conducted by the source custodian and RPO.

Note: Since radiography sources shall not be brought on-site by external organizations without prior approval, a procedure should clearly state how that approval will be granted and implemented.

4.1.1.9 How to dispose of obsolete, excess, or leaking sealed sources.

4.1.2 If previous I-140 "RCP Programmatic Assessment," related inspection reports describe the RCP sealed radioactive procedures as adequate, or if this procedure has been previously performed, then the inspector should review changes to the procedures to determine if the technical content remains consistent with the authorization basis commitment and perform the following:

4.1.2.1 Review the results of audits or assessments made since the last inspection to determine if changes to procedures were necessary to improve performance. Follow-up selected identified deficiencies to determine if corrective actions were implemented.

4.1.2.2 Determine based on observations from 4.2 through 4.6 that follow, if the procedures are adequate to ensure that sealed sources are controlled consistent with the authorization basis.

4.2 Adequacy and Effectiveness of Receipt, Labeling, and Storage

To determine the adequacy and effectiveness of the receipt, labeling, and storage of sealed sources, the inspector should perform the following:

4.2.1 From discussion with the RPM or designate (source custodian), review how sealed sources are approved for purchase, received at the facility, distributed to the authorized user or source custodian, labeled, and stored. Based on this information, select about five

accountable sealed radioactive sources, as defined in 10 CFR 835.2 (a), and perform the following:

- 4.2.1.1 Determine, based on record review, if the sources were purchased in accordance with procedural requirements.
- 4.2.1.2 Review the receipt records to determine if the package was received, inspected, surveyed if required, and transported to the authorized user or source custodian consistent with approved procedures. (QAM, Policy Q-0.5-1)
- 4.2.1.3 Verify by review of monitoring records, the source was surveyed and leak tested if the package was damaged. (RPP, Requirement 52)
- 4.2.1.4 Verify by record review, the source was entered into the source tracking system as an "accountable sealed source," the source labeling agreed with the source certification or shipping papers, and a source storage location was assigned. The tracking system should also include the date of the last leak test.
- 4.2.1.5 Inspect the storage location and verify that it is posted as required, located in the radiological area, or isolated from the occupied area if within a controlled area, free from flammable or combustibles in the immediate vicinity, and locked or under controlled access.
- 4.2.1.6 Discuss the precautions and ALARA considerations necessary to physically inspect the sources. Only the Contractor representatives should actually handle the sources in accordance with its procedures. If reasonable, verify each source is in its designated storage location and that each source is labeled as required. If the sources selected for review present an unnecessary dose (more than a few millirem) to make these observations, then verify the storage container is properly labeled and the Contractor has established a method to confirm the source is actually in its container.
- 4.2.1.7 Review monitoring records to determine if periodic surveys were performed to evaluate the radiation and contamination levels in the vicinity of the storage location.
- 4.2.1.8 Select three sealed sources not rising to the half-life or activity criteria necessary to be classed "accountable" and perform steps 4.2.1.1 through 4.2.1.7.
- 4.2.1.9 Based on the above, determine if any adverse observations made during the investigation were caused by failure to follow procedures, or possibly as a result of inadequate procedures.

4.3 Adequacy and Effectiveness of Inventory and Control of Sealed Sources

To determine the adequacy and effectiveness of the inventory, the inspector should perform the following:

- 4.3.1 Using the same five accountable sealed radioactive sources selected in 4.2.1 above, verify by review of the accountability records that information required by the procedure was recorded.
- 4.3.2 Determine by record review if the five sources were inventoried at the required frequency for the last two years, if possible.
- 4.3.3 Determine by record review, if the inventory established the physical location of each accountable sealed radioactive source, the presence and adequacy of associated posting and labeling; and the adequacy of storage locations, containers, and devices.
- 4.3.4 Review logbooks and key control to confirm that only authorized individuals had access to the source storage location.
- 4.3.5 Based on the above, determine if any adverse observations made during the investigation were caused by failure to follow procedures or possibly, as a result of inadequate procedures.

4.4 Adequacy and Effectiveness of Leak Testing of Sealed Sources

To determine the adequacy and effectiveness of leak testing, the inspector should perform the following:

- 4.4.1 Using the same five accountable sealed radioactive sources selected in 4.2.1, verify by review of records that leak testing was performed at the required frequency for the last two years, if possible.
- 4.4.2 Determine if the leak test methodology was consistent with the recommendations in DOE-G 441.1-13 and if it was able to detect radioactive material leakage equal to or exceeding 0.005 microcuries.
- 4.4.3 Review the results for the leak testing of the five sources to determine if any indication of leakage was found. If leakage in excess of 0.005 microcuries was detected, determine if the Contractor notified the radiation protection organization, removed the source from service, and controlled the source in a manner to prevent the spread of contamination.
- 4.4.4 Select two sources with activity less than “accountable,” as defined in 10 CFR 835, and verify that RCP and RPP procedures were implemented.
- 4.4.5 Based on the above, determine if any adverse observations made during the investigation were caused by failure to follow procedures or possibly, as a result of inadequate procedures.

4.5 Adequacy and Effectiveness of Handling and Disposal

To determine the adequacy and effectiveness of the handling and disposal of sealed sources, the inspector should perform the following:

- 4.5.1 Observe an inventory, leak testing, or use of sealed sources to confirm the RCP procedures are being followed.
- 4.5.2 Verify by record review and by direct observation, that radiological precautions used in handling radioactive sources were ALARA and consistent with the RCP.
- 4.5.3 Determine if the RCP procedures describing radiography sources or use of other licensed sealed sources by external organizations on site were implemented.
- 4.5.4 Determine from discussions with the RPO, if any accountable sealed radioactive sources have been disposed since the last inspection. If any disposals have occurred, confirm by record review they were made in accordance with RCP procedures.
- 4.5.5 Based on the above, determine if any adverse observations made during the investigation were caused by failure to follow procedures or possibly, as a result of inadequate procedures.

4.6 Adequacy and Effectiveness of Records

Periodic performance of inspection procedure I-151 and QAM inspections will routinely address the adequacy of the Contractor's radiological program records management system. During the conduct of this inspection, the inspector should confirm that documents, records, and reports reviewed, related to sealed source and accountability control, met the technical and regulatory requirements. No additional records need be reviewed to establish the effectiveness of the sealed source accountability and control records.

5.0 REFERENCES

10 CFR 835, "Occupational Radiation Protection," *Code of Federal Regulations*, as amended.

ANSI/HPS N43.6-1999, *Sealed Radioactive Sources - Classification*, American National Standards Institute (ANSI), 1997.

DOE G-441.1-13, *Sealed Radioactive Source Accountability and Control Guide*, U.S. Department of Energy, 1999.

DOE Manual 232.1-1A, *Occurrence Reporting and Processing of Operations Information*, as amended.

RL/REG-98-26, *Inspection Technical Procedures*, U.S. Department of Energy, Office of River Protection, 2001.

ITP I-140, "RCP Programmatic Assessment"

ITP I-151, "Document Control and Records Management Program"

Safety Requirements Document, 24590-WTP-SRD-ESH-01-001-02 Rev 0d , Bechtel National, Inc., 2001.

Radiation Protection Program for Design and Construction, BNFL-TWP-SER-003, Rev. 8, Bechtel National, Inc., 2001.

Quality Assurance Manual, 24590-WTP-QAM-QA-01-001, Rev. 0a, Bechtel National, Inc., 2001.

Waste Treatment Plant Radiological Control Manual, 24590-WTP-MN-ESH-01-001, Rev. 0, Bechtel National, Inc., 2001.

6.0 LIST OF TERMS

ALARA	as low as is reasonably achievable
ANSI	American National Standards Institute
BNI	Bechtel National Inc.
DOE	U.S. Department of Energy
HPS	Health Physics Society
ITP	Inspection Technical Procedure
OSR	Office of Safety Regulation
QAM	Quality Assurance Manual
RCP	Radiological Control Program
RPM	Radiation Protection Manager
RPO	Radiation Protection Organization
RPP	Radiation Protection Program
RPP-WTP	River Protection Project Waste Treatment Plant
SC	Safety Criterion
SRD	Safety Requirements Document
WTPRCM	Waste Treatment Plant Radiological Control Manual

Attachment: None

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