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Policy Procedures

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Content Description

Policy and Procedures related to radiological facilities for OIG audit in FY18.

Sandia National Laboratories

#4 – Policies and procedures for storage, maintaining, handling and transportation of material contained in radiological facilities.

Attached are:

A. Corporate policy for Nuclear Facilities – This is the new policy for Sandia and it outlines how the hazard categorization of nuclear facilities will be determined.

B. MN471016, *Radiological Protection Procedures Manual, Chapter 6, Control of Radioactive Material* – This Chapter provides direction for the procurement, receipt, control, handling, and shipping or transferring radioactive material.

C. TAV: *"Movement of Hazardous material"*—This procedure is specific to TAV where our three nuclear facilities are located.

ENVIRONMENT SAFETY & HEALTH

MN471022, ES&H Manual

Safety Basis: Nuclear Facilities

Contents

List of Figures

List of Acronyms

Acronym	Definition
ConOps	conduct of operations
DSA	documented safety analysis
HC	hazard category
NCS	nuclear criticality safety
PHS	primary hazard screening
SFO	Sandia Field Office
TSR	technical safety requirement
USQ	unreviewed safety question

Purpose

This chapter explains how Members of the Workforce can operate and maintain DOE nuclear facilities in a manner that adequately protects workers, the public, and the environment. These processes are performed as part of Sandia's Integrated Safety Management System infrastructure and to fulfill the requirements outlined in the DOE 10 CFR 830, *Nuclear Safety Management*.

1 Determine the Nuclear Facility Hazard Categorization

Line managers and the ES&H Planning Department manager are required to determine (or reaffirm) the DOE hazard category for all facilities, operations, and activities involving radiological material by developing primary hazard screening (PHS) documentation. Using the direction found in the *ES&H Manual*, "Primary Hazard Screening," Members of the Workforce are required to do the following unless specified otherwise:

- Define the scope of work to be performed.
- Create PHS documentation to determine the DOE-STD-1027 hazard category (HC) commensurate with the level of radiological hazards that may be present within the facility operational boundary.
  Note: The *facility operational boundary* is a defined facility, building, plant, storage unit, laboratory, area, and/or test range, etc. within an access-controlled (e.g., fenced or gated) operating area of a DOE- or contractor-controlled site.
  Note: If already developed, update the PHS annually or as required per the *ES&H Manual*, "Primary Hazard Screening."

If the PHS document results in a hazard category of < HC-3 (i.e., the PHS document identifies "Radiological Facility" for the Facility/Project Designator), then:

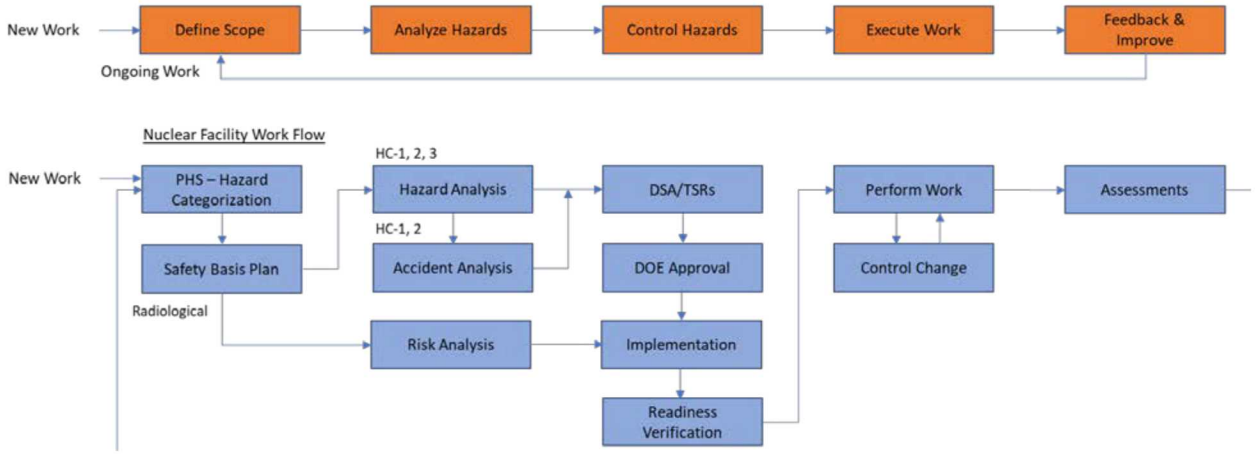
- A nuclear facility documented safety analysis (DSA) and technical safety requirements are **not** required. Develop and maintain safety basis documentation for radiological facilities commensurate with the facility hazard classification, as identified in Table 1 of the *ES&H Manual*, "Primary Hazard Screening."
- Line managers and the ES&H Planning Department manager are required to do the following:
  - Develop and implement a process for tracking radiological material inventory (e.g., use of software tools such as the Radioactive Inventory Tracking System, RadTrack, or the Device and Radioactive Source Tracking System) and ensure that the facility remains a radiological facility.
  - Ensure that personnel responsible for creating and implementing the tracking process understand the differences between DOE-STD-1027 hazard categories and Sandia safeguards and security categories so the proper methods are applied for tracking the radiological material inventory.
  - Implement and perform quality assurance (Section 4).
  - Verify readiness (Section 7) and complete a conduct of operations (ConOps) matrix as needed (Section 8).

If the PHS document identifies fissile and/or fissionable material exceeding 25 percent of the nuclear criticality safety threshold limits (or aggregate quantities exceeding 5 grams for isotopes of

concern as identified in the PHS document), implement the Sandia Nuclear Criticality Safety (NCS) Program as directed in NCS-PDD, *Nuclear Criticality Safety (NCS) Program Description Document.*

Note: Contact the chapter subject matter expert with any questions pertaining to these processes.

A flowchart of the nuclear facility safety framework is provided in Figure 1.



DSA = Documented Safety Analysis
HC = hazard category
PHS = Primary Hazard Screening
TSR = technical safety requirement

Figure 1. Nuclear facility safety framework

2 Develop and Maintain Safety Basis Documentation for a Hazard Category 1, 2, or 3 Nuclear Facility

Line managers are required to develop and maintain safety basis document for a HC-1, 2, or 3 nuclear facility as follows:

- Develop a new Safety Basis Plan (SBP) or update an existing plan for HC-1, 2, and 3 nuclear facilities using Form SF 2018-NF-SBP, *Nuclear Facility Safety Basis Plan.*
  Note: Update the hazards analysis and safety basis documentation annually. If an update involves no changes, a letter to the DOE Sandia Field Office (SFO) representative stating no substantial changes in the DSA is required.
- Eliminate hazards or reduce risk through design.
- Perform the hazards analysis and accident analysis (accident analysis for HC-1 and HC-2 facilities) consistent with safe harbor methods using the *Hazard and Accident Analysis for Hazard Category 1, 2, and 3 Nuclear Facilities supplement.* Deviation from this supplement requires concurrence from ES&H Planning Department personnel.
  Note: This concurrence can be provided via the development and approval of the Safety Basis Plan.
- Identify hazard controls.
- Prepare (or update) the DSA and technical safety requirements consistent with the safe harbor methods using the *Documented Safety Analysis and Technical Safety Requirements for Hazard Category 1, 2, and 3 Nuclear Facilities supplement.* Deviation from this supplement requires concurrence from ES&H Planning Department personnel.

Note: ES&H Planning Department concurrence can be provided via the development and approval of the Safety Basis Plan.
Note: A *safe harbor* refers to methods used in the DSA to implement safety basis requirements that are defined in Table 2 of 10 CFR 830 Subpart B, Appendix A, following which DOE approval of the methodology is **not** required. If the methods defined in Table 2 are not used, then DOE approval of the alternate methodology to be used **is** required.

- Perform a peer review and document the review using the *Hazard and Accident Analysis for Hazard Category 1, 2, and 3 Nuclear Facilities supplement* and the *Documented Safety Analysis and Technical Safety Requirements for Hazard Category 1, 2, and 3 Nuclear Facilities supplement.*
- Submit safety basis documentation for independent review.
  - Initiate SF 2018-NF-IRP, Nuclear Facility Independent Review Process.
  - Submit SF 2018-NF-IRP and safety basis documentation to ES&H Planning Department personnel for an independent review.
- Submit safety basis documentation to the SFO representative for review and approval. If no changes to the safety basis are required, submit a letter stating that there have been no substantial changes in the DSA since the prior submission.
- Receive SFO approval (i.e., a Safety Evaluation Report) and resolve any Conditions of Approval.
- Verify readiness to start or restart the nuclear facility, operation, or activity (see Section 7, Verify Readiness for a Nuclear Facility).
- Maintain the safety basis documentation.
  - Manage changes and maintain safety basis documentation using the unreviewed safety question (USQ) process (see Section 6, "Manage Change Using the Unreviewed Safety Question Process").
  - Annually review and update (if necessary) the safety basis documentation.

  Note: Update the hazards analysis and safety basis documentation annually. If an update involves no changes, a letter to the SFO representative stating no substantial changes in the DSA is required.

3 Develop and Maintain Safety Basis Documentation for < HC-3 Radiological Facilities

Line managers and the ES&H Planning Department manager are required to develop and maintain safety basis documentation for radiological facilities commensurate with the facility hazard classification, as identified in Table 1 of the *ES&H Manual*, "Primary Hazard Screening."

4 Develop and Implement a Quality Assurance Program

Line managers and the ES&H Planning Department manager are required to develop and implement a quality assurance program for HC-1, HC-2, and HC-3 nuclear and radiological facilities that contains the following criteria as required by 10 CFR 830.122.

Criterion 1. Management/Program

- Establish an organizational structure, functional responsibilities, levels of authority, and interfaces for those managing, performing, and assessing the work.

- Establish management processes, including planning, scheduling, and providing resources for the work.

Criterion 2. Management/Personnel Training and Qualification

- Train and qualify personnel to be capable of performing their assigned work.
- Provide continuing training to personnel to maintain their job proficiency.

Criterion 3. Management/Quality Improvement

- Establish and implement processes to detect and prevent quality problems.
- Identify, control, and correct items, services, and processes that do not meet established requirements.
- Identify the causes of problems, and include prevention of recurrence as a part of corrective action planning.
- Review item characteristics, process implementation, and other quality related information to identify items, services, and processes needing improvement.

Criterion 4. Management/Documents and Records

- Prepare, review, approve, issue, use, and revise documents to prescribe processes, specify requirements, or establish design.
- Specify, prepare, review, approve, and maintain records.

Criterion 5. Performance/Work Processes

- Perform work consistent with technical standards, administrative controls, and other hazard controls adopted to meet regulatory or contract requirements using approved instructions, procedures, or other appropriate means.
- Identify and control items to ensure proper use.
- Maintain items to prevent damage, loss, or deterioration.
- Calibrate and maintain equipment used for process monitoring or data collection.

Criterion 6. Performance/Design

- Design items and processes using sound engineering/scientific principles and appropriate standards.
- Incorporate applicable requirements and design bases in design work and design changes.
- Identify and control design interfaces.
- Verify or validate the adequacy of design products using individuals or groups other than those who performed the work.
- Verify or validate work before approval and implementation of the design.

Criterion 7. Performance/Procurement

- Procure items and services that meet established requirements and perform as specified.
- Evaluate and select prospective suppliers on the basis of specified criteria.
- Establish and implement processes to ensure that approved suppliers continue to provide acceptable items and services.

Criterion 8. Performance/Inspection and Acceptance Testing

- Inspect and test specified items, services, and processes using established acceptance and performance criteria.
- Calibrate and maintain equipment used for inspections and tests.

Criterion 9. Assessment/Management Assessment

- Ensure that managers assess their management processes and identify and correct problems that hinder the organization from achieving its objectives.

Criterion 10. Assessment/Independent Assessment

- Plan and conduct independent assessments to measure item and service quality, to measure the adequacy of work performance, and to promote improvement.
- Establish sufficient authority and freedom from line management for independent assessment teams.
- Ensure persons who perform independent assessments are technically qualified and knowledgeable in the areas to be assessed.
- Ensure that all work is adequately planned and executed in a safe manner based on the nature of the work and associated hazards and risks. Follow the guidance provided in Work Planning and Control for Safe Design and Operations.

Note: Additional information concerning development and maintenance of a quality assurance program can be found in DOE G 414.1-2B Chg 2, *Quality Assurance Guide*, and Sandia policy QA001, *Quality Assurance Policy*.

5 Implement a Nuclear Criticality Safety Program

For facilities with an amount of fissile material exceeding 25 percent of the fissile threshold (or aggregate quantities exceeding 5 grams for isotopes of concern as identified in the PHS document), Members of the Workforce are required to implement the Sandia NCS Program as dictated in NCS-PDD, *Nuclear Criticality Safety (NCS) Program Description Document*.

6 Manage Change Using the Unreviewed Safety Question Process

Line managers and the ES&H Planning Department manager are required to evaluate proposed physical, operational, or administrative modifications to HC-1, HC-2, and HC-3 nuclear facilities using an approved USQ process.

- For HC-1, HC-2, and HC-3 nuclear facilities, implement the USQ process consistent with the direction provided in GN470080, *Implementing the Unreviewed Safety Question (USQ) Process for Nuclear Facilities*.
- Develop and implement a process for determining whether a change is considered to be a major modification. Complete SF 2018-NF-MOD, Nuclear Facility Major Modification Evaluation, for the following situations:
  - New hazards introduced by the modification
  - A new or revised hazards analysis or accident analysis
  - New or revised controls
  - Technical changes to the safety basis

7 Verify Readiness for a Nuclear Facility

Line managers and the ES&H Planning Department manager are required to verify readiness for nuclear facilities as follows:

- HC-1, HC-2, and HC-3 nuclear facilities

- Prior to the initial start and subsequent restart of any HC-1, HC-2, or HC-3 nuclear facility, operation, or activity, verify readiness to start or restart by following the direction provided in GN470109, *Implementing the Startup and Restart Process for Nuclear Facilities, Activities, and Operations*.
- Complete 2018-NF-IVR, Implementation Validation Review, when implementing changes to an approved safety basis (typically after receipt of the Safety Evaluation Report).
- Prepare and submit quarterly Startup Notification Reports to SFO by the 10th of the month following each fiscal year quarter by following the direction provided in GN470109, *Implementing the Startup and Restart Process for Nuclear Facilities, Activities, and Operations*.

- Radiological facilities
  - Prior to the initial start or the subsequent restart of a standard industrial hazard or low hazard radiological facility, perform a walk-through of the space, and perform a Readiness Verification for Radiological (Less Than Hazard Category 3) Facilities/Operations/Activities. SF-2018-RV, *Readiness Review Program Supplement for Low and Standard Industrial Hazard Facilities and Operations,* provides information to aid in verifying readiness to start or restart standard industrial hazard and low-hazard facilities and operations.
  - Additional requirements may apply based on the level of nonnuclear hazards present. Refer to the *ES&H Manual*, "Safety Basis: Moderate-Hazard and High-Hazard Facilities" or "Safety Basis: Accelerator Facilities" as appropriate regarding readiness verification requirements if the PHS identifies the facility as either a moderate-hazard, high-hazard, or accelerator facility based on the level of nonnuclear hazards that may be present.

8 Complete a Conduct of Operations Matrix for a Nuclear Facility

Line managers and the ES&H Planning Department manager are required to prepare a ConOps matrix as follows:

- HC-1, HC-2, and HC-3 nuclear facilities
  - Complete the Nuclear Facility Conduct of Operations Matrix. The *Conduct of Operations Program Guide for Nuclear Facilities* provides information to help complete and maintain the matrix. Also see SF-2018-COP, Checklist Steps for Developing and Maintaining a Conduct of Operations Matrix.
  - Review the ConOps matrix when changes to the documentation referenced in the matrix occur, when new documents are created, and at least every three years; determine whether an update to the approved ConOps matrix is necessary; revise the ConOps matrix accordingly; and obtain approval of the revised ConOps matrix. If no revision is required, advise the ConOps procedure manager and SFO via memo of that fact.
- Radiological facilities
  - It is recommended (not required) to review the *Conduct of Operations Program Guide for Accelerator and Moderate and High-Hazard Industrial Facilities* and implement those elements of ConOps appropriate to the facility, operation, or activity.
- Additional requirements may apply based on the level of nonnuclear hazards present. These requirements are identified in Table 1 of the *ES&H Manual*, "Primary Hazard Screening."

Resources

Related Corporate Policies and Processes

- ESH001, *Environment, Safety, and Health Policy*
- ESH001.1, *Integrate Environment, Safety, and Health into Work Planning and Execution*

References

- 10 CFR 830, *Nuclear Safety Management*
- DOE G 414.1-2B Chg 2, *Quality Assurance Program Guide*
- *Conduct of Operations Program Guide for Accelerator and Moderate and High-Hazard Industrial Facilities*
- *Conduct of Operations Program Guide for Nuclear Facilities*
- MN471022, *ES&H Manual*
  - "Primary Hazard Screening"
  - "Safety Basis: Moderate-Hazard and High-Hazard Facilities"
  - "Safety Basis: Accelerator Facilities"
  - "Work Planning and Control"
- GN470080, *Implementing the Unreviewed Safety Question (USQ) Process for Nuclear Facilities*
- GN470109, *Implementing the Startup and Restart Process for Nuclear Facilities, Operations, and Activities*
- NCS-PDD, *Nuclear Criticality Safety (NCS) Program Description Document*
- *Readiness Review Supplement for Moderate Hazard Facilities and Operations*
- *Readiness Verification Program Supplement for Low and Standard Industrial Hazard Facilities & Operations*
- *Documented Safety Analysis supplement*
- *Technical Safety Requirements for Hazard Category 1, 2, and 3 Nuclear Facilities supplement*
- Quality Assurance Program Description

Forms and Templates

- Accelerator, Moderate- and High-Hazard Facility Conduct of Operations Matrix
- Nuclear Facility Conduct of Operations Matrix
- SF 2001-CRA, Checklist Readiness Assessment (RA) Form
- SF 2001-IQF, USQ Individual Qualification Form
- SF 2001-IRF, USQ Individual Requalification Form
- SF 2001-ORA, Operational Readiness Review (ORR)/Readiness Assessment (RA) Appraisal Form
- SF 2001-ORC, ORR/RA Criteria and Review Approach Document (CRAD) Form (Word/PDF)
- SF 2001-ORD, Operational Readiness Review (ORR)/Readiness Review (RA) Deficiency Form
- SF 2001-PEF, PISA Entry Form
- SF 2001-RCF, Readiness Criteria Form (RCF)
- SF 2001-SNR, Startup/Restart Notification Report (SNR) Form
- SF 2001-TMQ, Team Member Qualification (TMQ) Summary Form

- SF 2001-USQ, Unreviewed Safety Question Evaluation Worksheet
- SF-2018-COP, Checklist Steps for Developing and Maintaining a Conduct of Operations Matrix
- SF 2018-NF-HACHK, Nuclear Facility Hazard and Accident Analysis Preparation and Review Checklist
- SF 2018-NF-IRP, Nuclear Facility Independent Review Process
- SF 2018-NF-MOD, Nuclear Facility Major Modification Evaluation
- SF 2018-NF-SBAP, Nuclear Facility Safety Basis Annual Plan
- SF 2018-NF-SBP
- SF 2018-RF-IVR, Radiological Facility Implementation Validation Review
- SF 2018-RF-MSA, Radiological Facility Management Self-Assessment)
- SF 2018-RF-RR, Radiological Facility Readiness Review
- SF-2018-RF-RRC, Radiological Facility Readiness Review Criteria

Systems, Applications, and Websites

- Electronic Unreviewed Safety Question (eUSQ) System
- Primary Hazard Screening Application
- Sandia Nuclear Criticality Safety Program

Training

Role	Required	Recommended
Personnel with roles, as defined in NCS-PDD, which require training	NCS120, *Nuclear Criticality Safety* NCS220, *Advanced Nuclear Criticality Safety*	
USQ qualified evaluator (i.e., USQ evaluation preparer, reviewer, or approver)	Initial Training: USQ100, *USQ Initial Training: Implementing the USQ Process* Refresher Training: USQ100R, *USQ Refresher Training*	
Personnel who perform work peripheral to the USQ process[a]		USQ100A (in development)

Note: [a]Includes personnel such as directors, Technical Area V experimenters, Facilities Management and Operations Center personnel, work planning and control personnel, and those with read-only access to eUSQ.
Note: Line organizations developing/maintaining safety basis documentation for HC-1, 2, and 3 nuclear facilities shall have a training and qualification program, as required (e.g., DOE O 426.2).

Contacts

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Change History

Issue: A

- Effective date: August 31, 2018.
- This ES&H manual chapter describes how to implement the requirements that were previously presented in ESH100.2.SB.1, *Establish the Safety Basis of Operations*, ESH100.SB.2, *Nuclear Criticality Safety Program*, ESH100.2.SB.3, *Implement the Unreviewed Safety Question Process for Nuclear Facilities*, and MN71017, *Safety Basis Manual.*

MN471016, *Radiological Protection Procedures Manual*

CHAPTER 6

CONTROL OF RADIOACTIVE MATERIAL

This document is no longer a corporate process requirement. This document implements the requirements of Corporate Procedure ESH100.2.RAD.1, *Implement Radiation Protection Procedures.*

Important Notice: A printed copy of this document may not be the document currently in effect. The official version is located on the Sandia Restricted Network.

Sponsor: Michael W. Hazen, 4000
Subject Matter Expert: Dann C. Ward
MN471016, Issue L
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Table of Contents

List of Acronyms

Acronym	Definition
ALARA	as low as reasonably achievable
ASRS	accountable sealed radioactive source
DARTS	Device and Radioactive Source Tracking System
DOE	U.S. Department of Energy
DOT	Department of Transportation
HA	hazard analysis
HC	Hazard Category
MOW	Member of the Workforce
MSDS	material safety data sheet
NORM	naturally occurring radioactive material
NRC	Nuclear Regulatory Commission
PHS	primary hazard screening
PPE	personal protective equipment
RBA	radiological buffer area
RGD	radiation generating device
RP	Radiation Protection
RPPM	Radiological Protection Procedures Manual
RTWD	Radiological Technical Work Document
SDS	Safety Data Sheet
SNL	Sandia National Laboratories
SRS	sealed radioactive source
TED	total effective dose
TWD	technical work document

6.1 Purpose

The purpose of this chapter is to provide the controls for acquiring, receiving, using, handling, storing, and transporting radioactive material. It also provides guidance on the decision mechanism for disposing of radioactive or potentially radioactive material.

6.2 Scope

Requirements and guidance identified in this chapter apply to radioactive material (*Radiological Protection Procedures Manual* [RPPM] definition) used in activities conducted by Members of the Workforce (MOWs). Requirements are based on a graded approach and are dependent upon the category and quantity of radioactive material. Requirements and guidance identified in this chapter are intended to provide a workable framework for:

- The classification of radioactive materials for occupational radiation protection purposes
- The removal of items, material, equipment, and activated materials from areas controlled for radiological purposes
- Ensuring adequate surveys for on-site movement and off-site shipment of radioactive materials
- The initial steps regarding disposal of radioactive material
- Preventing the accidental introduction of radioactive materials into the scrap metal recycling process

This chapter does not apply to:

- Personnel contamination control; see Section 1.4.2.3.1, "Protective Clothing," in Chapter 1 of this manual for requirements and guidance on this issue
- Personnel frisking; see Section 8.4.6, "Personnel Frisking from Radiological Areas and Other Radiologically Posted Areas," in Chapter 8 of this manual for requirements and guidance on this issue

6.3 Responsibilities

6.3.1 Managers

Managers are responsible for ensuring that:

- Personnel under their supervision control radioactive material in accordance with this manual
- Adequate procedures and training (see Chapter 3, "Radiological Training Program") are provided to personnel under their supervision prior to assigning them to work with radioactive material
- Decontamination of material or areas contaminated with radioactive material, due to the operations of their organizations, is performed in accordance with approved technical work documents (TWDs)

- Their facilities are properly categorized in accordance with MN471017, *Safety Basis Manual*, based upon the quantities of radioactive material in use or storage
- The appropriate Radiation Protection (RP) Line Support Team is informed in advance regarding the acquisition of radioactive materials (except those in Attachment 6–2, the "Excepted Items List") so that adequate support planning can be initiated; additional actions may be required in accordance with sections 6.4.1.3 and/or 6.4.2.1 prior to purchasing materials
- Accountable sealed radioactive sources (ASRSs) are registered in the Device and Radioactive Source Tracking System (DARTS), as detailed in Chapter 9, "Control of Accountable Sealed Radioactive Sources (ASRSs) and Radioisotope Thermoelectric Generators (RTGs)," of this manual

Note: For non-ASRSs with regard to best practice and experience, see the second bullet under "Guidance" in Section 6.4.3.2.2, "Control of Radioactive Material Quantities Less Than One-Tenth of the Values Specified in RPPM Appendix E."

6.3.2 Members of the Workforce

MOWs shall:

- Control radioactive material in accordance with this manual
- Obtain necessary assistance from RP personnel to ensure proper radiological posting and labeling (see Chapter 2, "Posting and Labeling for Radiological Control," of this manual)
- Ensure that they have received training to work with radioactive material (see Chapter 3, "Radiological Training Program," of this manual)
- Obtain and follow approved TWDs as required by Chapter 1, "Radiological Work Management," of this manual

6.3.3 Radiation Protection Personnel

RP personnel are responsible for:

- Assisting line organizations with the control of radioactive material in accordance with this manual
- Conducting and documenting radiological surveys of record, as required, to support line operations
- Providing radiological advice for decontamination activities
- Providing radiological support for the disposition of facilities in accordance with formally established processes
- Establishing and maintaining a process for placing radioactive material and items in Attachment 6–2, "Excepted Items List," and in Attachment 6–3, "Conditionally Controlled Material List," in this chapter
- Maintaining the above-mentioned Attachment 6–2 and Attachment 6–3

6.3.4 Receiving/Mail & Material Movement Department and Storage/On-site HazMat Transportation Department

Sandia's Logistics departments—shipping, packing, storage, and mail; transportation and receiving, including on-site hazmat transportation—are responsible for:

- Ensuring packages containing radioactive material are received in accordance with this chapter
- Notifying RP and arranging for timely receipt surveys
- Transporting radioactive material in accordance with the requirements stated in SCM100.3.19, *Movement of Hazardous Material*
- Providing guidance to line managers on the requirements for on-site transportation of radioactive material that is consistent with SCM100.3.19, *Movement of Hazardous Material*

6.4 Procedure

6.4.1 Classification of Radioactive Materials for Occupational Radiation Protection Purposes

There are three categories of radioactive material:

- Excepted items
- Conditionally controlled material
- Controlled material

6.4.1.1 Excepted Items

All Sandia-controlled work locations are subject to the occupational radiation protection standards in 10 CFR 835. Per 10 CFR 835, an *exception* is allowed for: "consumer products containing nominal amounts of radioactive material or producing nominal amounts of radiation." Sandia's RP Program, in close coordination with the U.S. Department of Energy (DOE)/National Nuclear Security Administration/ Sandia Field Office, has evaluated this exception to determine what kinds of consumer products are involved. The result is documented in Attachment 6–2, "Excepted Items List."

The manufacture and distribution of the types of products identified in the Excepted Items List are regulated under Nuclear Regulatory Commission (NRC) authority and are considered "consumer products," meaning they contain nominal amounts of radioactive material or produce nominal amounts of radiation and are freely purchased by the general public without NRC license. These types of products are part of our everyday lives, vary from decorative to functional, and can include grinding wheels, polishing compounds, some electron tubes, watches, ceramics, and smoke detectors, to name a few. Each consumer product has safety features built into their design and/or the amount of radioactive material is limited to ensure public safety.

The purchase of Excepted Items is not quality significant from a radiological standpoint.

Per 10 CFR 835, such items, when used in accordance with the manufacturer's intended purpose, need not be controlled as radioactive material or items (i.e., use of these items is free from posting, labeling, and sealed radioactive source registration requirements, etc.). It is noted, however, that such items may fall under radioactive material disposal requirements at the end of their useful life. See Attachment 6–2 for additional guidance and a listing of items.

Note: Generally licensed items are excluded from the Excepted Items List.

Note: If a consumer product contains a sealed radioactive source with an activity greater than RPPM Appendix E limits, then the consumer product cannot be considered as an excepted item.

6.4.1.2 Conditionally Controlled Material

The requirements in 10 CFR 835, *Occupational Radiation Protection*, apply to all Sandia-controlled work locations. Per 10 CFR 835, the establishment of appropriate levels of control with regard to occupational radiation protection activities is required. Therefore, all radioactive material is "controlled" in some manner. However, 10 CFR 835 does allow for a graded approach when controlling various materials and equipment, specifying necessary training, requiring work control documents, applying identified graded controls, etc. (10 CFR 838.1102(a), 10 CFR 835.901(c), 10 CFR 835.1101(b)).

Attachment 6–3, "Conditionally Controlled Material List," was developed to establish a graded and uniform set of controls for a select number and type of materials and equipment that are frequently encountered at Sandia National Laboratories (SNL), while ensuring appropriate controls in accordance with 10 CFR 835. Items on the Conditionally Controlled Material List are therefore a subset of all controlled materials that the RP Program has evaluated, and this subset is approved as needing only the specified set of listed controls per item.

Items and materials appearing on the Conditionally Controlled Material List have radioactive material content less than or equal to the value listed in RPPM Appendix E for each isotope identified with relation to those materials and equipment listed. Commercially available radioactive material items that are identified in the Conditionally Controlled Material List shall be procured as quality-significant items. Also, any restrictions on the use, possession, or return of these items by the manufacturer or NRC shall be honored. It is the responsibility of the user to know and implement all such restrictions. If such restrictions are not already mentioned in this list, contact the appropriate RP support team and indicate that an update to this list is required. It is the responsibility of the user to ensure that all radioactive material, including quantities less than one-tenth of the values specified in RPPM Appendix E, not on the Excepted Items List (Attachment 6–2 of this chapter) is controlled to prevent exposure to workers or the public. The material must be accounted for in some manner (e.g., an inventory, a primary hazard screening [PHS], or a database) to identify the location for its handling, use, and storage.

Warning: Conditionally controlled material may require disposal as radioactive waste. See corporate procedures ESH100.2.ENV.23, *Manage Radioactive Waste at SNL*, and ESH100.2.ENV.24, *Manage Mixed Waste at SNL*, for information regarding waste determination and disposal.

6.4.1.3 Controlled Material

Use, handle, and store controlled material in accordance with the requirements of this chapter. Controlled material is material that meets one or more of the following criteria:

- Radioactive items, material, and sources not covered by Attachment 6–2, "Excepted Items List," or Attachment 6–3, "Conditionally Controlled Materials List"
- Items or material that become (or already are) activated or volume contaminated and do not meet the criteria of conditionally controlled material

  Note: Due to radioactive decay, items, sources, and material that have been activated or volume contaminated may eventually reach diminished activity levels such that they can qualify as conditionally controlled material or can even be released. Contact the appropriate RP Line Support Team project leader to release materials.
- Material with removable or total (fixed plus removable) surface contamination levels exceeding the limits specified in Attachment 6-1, "Radioactive Contamination Limits," of this chapter
- Soil with volumetric contamination levels exceeding the limits specified in Attachment 6-1

Controlled material requires disposal as radioactive material. See ESH100.2.ENV.23, *Manage Radioactive Waste at SNL*, and ESH100.2.ENV.24, *Manage Mixed Waste at SNL*, for information regarding waste determination and disposal.

Caution: There are five separate systems within SNL that are related to the control of radioactive materials. It is sometimes easy to confuse terms and requirements.

- Radiological controls related to worker protection and protection of the environment are the focus of the RPPM and are derived from requirements contained in 10 CFR 835, *Occupational Radiation Protection*, and DOE O 458.1 Admin Chg 3, *Radiation Protection of the Public and the Environment*. The term "accountable sealed radioactive sources" indicates that there are inventory and leak test requirements applicable to these sources and that they are subject to the requirements of Chapter 9, "Control of Accountable Sealed Radioactive Sources (ASRSs) and Radioisotope Thermoelectric Generators (RTGs)," of this manual.
- Requirements for managing "accountable nuclear material" are related to physical security issues and are contained in ISS100.2.10. *Manage Special Nuclear Material*, and ISS100.2.11, *Manage Other Accountable Nuclear Material*. Although not implemented through the RPPM, this system identifies three types of materials:
  - Special nuclear material
  - Source material
  - Other

  Additional security requirements apply for the procurement, receipt, storage, or movement of accountable nuclear material and are beyond the scope of the RPPM.

Consolidating inventory information for this type of material may reveal information that would be useful to an adversary for the purpose of sabotage or theft. Having inventory information reviewed by a derivative classifier or unclassified controlled nuclear information reviewing official, as appropriate, will minimize the potential for information being combined that could compromise security considerations.

- An accurate inventory of ASRSs and RTGs must be maintained for reporting to DOE. Transactions such as on- or off-site movement, source destruction, or disposal that involve Category 1 and Category 2 sources must be reported within three business days. For more information see Chapter 9 of this manual.
- DOE-STD-1027-92 defines the lower threshold criteria for categorizing a facility as either a Hazard Category 3 (HC-3) or Hazard Category 2 (HC-2) Nuclear Facility. Threshold criteria apply to the maximum inventory allowed within the facility. Actual on-hand quantities of radioactive material must not exceed the applicable threshold amount. Designation as either a HC-3 or HC-2 Nuclear Facility requires additional material handling and facility operational controls. One of the most important factors with regard to the categorization of SNL facilities is the maximum amount of radioactive material anticipated to be present at any time. This is why an inventory of all controlled and conditionally controlled material is required in a facility's PHS(s). This inventory information is compared against the HC-3 and HC-2 threshold limits. The categorization process applicable to all SNL facilities is described in MN471017, *Safety Basis Manual*.

  Note: Physical Security also uses the terms "Category 1, 2, 3, or 4 quantities of special nuclear material." An "HC-3" facility (DOE-STD-1027-92) is much different from a "Security Category 3" facility (DOE O 473.3, *Protection Program Operations*).
- The possession and use of fissile material (e.g., U-235, Pu-239) above certain quantity limits may require the imposition of criticality safety controls. Corporate procedure ESH100.2.SB.2, *Ensure Nuclear Criticality Safety*, describes Sandia's process for evaluating the potential hazards and determining the appropriate set of facility specific controls.

6.4.2 Planning Work with Radioactive Material (ISMS Function: Plan Work)

Note: Requirements and guidance in the following sections should be considered in the earliest phase of job planning to help ensure adequate work controls, compliance with occupational and environmental regulations, cost minimization, and efficient job planning.

6.4.2.1 Preparation

Requirements

Organizations working with radioactive material and/or sources must follow the work planning requirements in Chapter 1 of this manual and be able to answer the following questions:

- What radioactive material and/or sources are involved?
- How much radioactive material or how many sources are involved?
- Where will the radioactive material and/or sources be used and stored?
- What is the use?

- What are the applicable controls?
- What is the current disposal path?

Members of the Workforce shall:

- Prepare the appropriate documentation needed to work with radioactive material(s):
  - Prior to acquiring radioactive material, update the applicable PHS or hazards analysis (HA), in accordance with MN471017, *Safety Basis Manual*. In part, this is necessary to determine the effect on facility hazard categorization of adding the proposed radioactive material (Question Set #2 within the PHS). The "facility" may include other users in adjacent spaces. This will help ensure an accurate hazard categorization in accordance with DOE-STD-1027-92. The radioactive material inventory listed in the PHS becomes an upper bound with regard to the amount of material that can be possessed at any one time. This upper bound applies to controlled and conditionally controlled materials. Excepted material, as defined in Attachment 6–2, "Excepted Items List," is not included in this determination.

    Note: The designations used in Chapter 9, "Control of Accountable Sealed Radioactive Sources (ASRSs) and Radioisotope Thermoelectric Generators (RTGs)," of this manual, are a different set of terms and are not applicable to the material roll-up process used in the PHS.
  - Prior to working with radioactive material, develop the necessary TWDs in accordance with Chapter 1, "Radiological Work Management," of this manual and corporate procedure ESH100.2.GEN.3, *Develop and Use Technical Work Documents*.
- Develop and maintain an inventory of all radioactive material used in the work effort.

6.4.2.2 Radioactive Material Procurement

Requirements

MOWs shall:

- Ensure that the appropriate category is indicated in Box 4 on the purchase requisition (i.e., "Nuclear/Radioactive") when purchasing either radioactive or nuclear material
- Notify the appropriate RP Line Support Team project leader at SNL/NM or the ES&H Department at SNL/CA before radioactive material is procured and provide the following information:
  - Radioactive isotope
  - Quantity of material
  - Location of use and storage
  - Intended use of the material
  - Expected arrival date

Note: This will allow RP to assist the line organization with preparations to receive and use the material.

Note: Procurement of radioactive material is a quality-significant activity according to corporate procedure SCM100.2.11, *Acquire Quality Significant Items*.

6.4.2.3 Receipt of Radioactive Material (ISMS Function: Perform Work)

U.S. Department of Transportation (DOT) shipping regulations allow quantities of radioactive material (below Type A limits) to be shipped without external labeling that notes the radioactive content. When these containers are opened, all surveying, registering, posting, handling, etc., requirements of the RPPM become applicable.

Requirements

Managers shall ensure that:

- Facilities under their operational control are properly posted in accordance with the requirements of Chapter 2, "Posting and Labeling for Radiological Control," of this manual
- Upon receipt of ASRSs, requirements in Chapter 9, "Control of Accountable Sealed Radioactive Sources (ASRSs) and Radioisotope Thermoelectric Generators (RTGs)," of this manual are addressed
- Arrangements are made to satisfy one of the following criteria if packages containing quantities of radioactive material in excess of a Type A quantity are expected to be received from an off-site shipment:
  - Take possession of the package when the carrier offers it for delivery
  - Receive notification as soon as practicable after arrival of the package at the carrier's terminal (if not delivered directly to SNL) and take possession of the package within 8 hours after the beginning of the following working day
- Upon receipt of an off-site shipment:

  Note: Normally, these shipments are delivered to Shipping and Receiving located in Building 957. The following receipt survey requirements are performed in this facility. If unusual circumstances require that an item or material be delivered directly to another Sandia-controlled location, then special arrangements need to be made with the RP Line Support Team to perform any required receipt surveys.

  - The external surfaces of packages known to contain radioactive material are monitored if the package meets any of the following criteria:
    - Is labeled with a Radioactive White I, Yellow II, or Yellow III label (as specified in 49 CFR 172.436-440)
    - Has been transported as low specific-activity material (as defined in 10 CFR 71.4) on an exclusive use vehicle (as defined in 10 CFR 71.4)
    - Has evidence of degradation (e.g., packages that are crushed, wet, or damaged)
  - The required monitoring includes both of the following:
    - Measurements of removable contamination levels, unless the package contains only special form (as defined in 10 CFR 71.4) or gaseous radioactive material
    - Measurements of the radiation levels, if the package contains Type B quantity of radioactive material (as defined in 10 CFR 71.4) [**10 CFR 835.405(c)(2)**]
  - The required monitoring shall be completed as soon as practicable following receipt of the package, but not later than 8 hours after the beginning of the working day following receipt of the package

  - Monitoring of any other package of radioactive material shall be performed as soon as practicable after receipt of the package
  - For packages that have been received and monitored, and then require further movement on-site, additional monitoring at the new destination is not required if the package has remained under the continuous observation and control of a DOE employee or DOE contractor employee (Sandia MOW) who is knowledgeable of and implements required exposure control measures [**10 CFR 835.405(e)**]
- Receipt requirements for radioactive materials identified in corporate procedure SCM100.2.11, *Acquire Quality Significant Items*, are met
- In the case of ASRSs, source custodians shall maintain any pertinent documentation sent by the manufacturer (e.g., source calibration certificates, integrity test certifications, shipping documents, or special form certificates) and forward copies to the device and source registrar
- RP personnel are notified prior to, or upon, receiving controlled and conditionally controlled radioactive material from an off-site shipment, transfer, or movement
- RP personnel are notified, so that surveys can be performed, when packages known to contain radioactive material are initially opened

6.4.3 Work with Radioactive Material (ISMS Function: Perform Work)

6.4.3.1 Control of Radioactive Material

Requirements

Managers shall:

- Control radioactive material in accordance with the requirements in this chapter
- Have TWDs and radiological worker training at a level consistent with the known or anticipated radiation and contamination levels before accessing normally inaccessible radioactive material

Managers shall ensure that:

- If radioactive material becomes dissociated (i.e., falls, flakes, or rubs off) from an excepted or conditionally controlled item as a result of storage, use, handling, aging, damage, etc., the resulting contamination and the item shall be controlled in accordance with the requirements of this manual (see Section 6.4.3.3 of this chapter).
- RP personnel are notified:
  - Immediately upon the discovery of the loss or damage of any radioactive material; see also Chapter 11, "Radiological Incidents," of this manual
  - Of the procurement of any radioactive material or item containing radioactive material that is not on the Excepted Items List
- Documentation specified in Chapter 9, "Control of Accountable Sealed Radioactive Sources (ASRSs) and Radioisotope Thermoelectric Generators (RTGs)," of this manual is completed.

- When radioactive material is transferred or shipped by their organization, staff follows the requirements located in Section 6.4.3.4, "Radioactive Material Transfer, Movement or Transportation (ISMS Function: Perform Work)," in this chapter.
- Sandia facilities receiving the radioactive material have the approved documentation required to receive and conduct work with the radioactive material.
- The PHS and local inventories for any operation receiving radioactive material have been updated to account for the change in inventory, use, or location. Organizations need to ensure that local inventories do not exceed the upper limit for on-hand radioactive materials established in the applicable PHS.

  Note: Maintenance of inventories may be complicated, for instance, when non-Sandia-owned equipment is brought into the facility or equipment containing radioactive materials is stored for other Sandia organizations. The total amount of radioactive materials within the facility (or segment, if appropriate per DOE-STD-1027-92) is the hazard being controlled. PHS limits apply to the total amount of material present (except for excepted materials as defined in Attachment 6–2, "Excepted Items List," of this chapter).
- The total radioactive material inventory anticipated for a facility has been entered into a PHS to account for material potentially received or transferred during operations and to ensure proper facility hazard categorizations in accordance with MN471017, *Safety Basis Manual*.
- In cases where facility occupancy and/or use is transferred and continued operation of the facility is anticipated, the facility will be remediated to Attachment 6-1 levels or the new occupant and/or user of the space must be informed and accept the current radiological conditions.
- In cases of final disposition, facilities meet authorized limits appropriate for the disposition path (such as Attachment 6-1 values, interagency agreement values, or waste acceptance criteria), and disposition documentation is completed prior to transfer of real property to a new owner or final demolition activities commence.
- Sealed radioactive sources are used, handled, and stored in a manner commensurate with the hazards associated with operations involving the sources. [**10 CFR 835.1201**]

Source custodians shall:

- Immediately notify the appropriate RP Line Support Team project leader (at SNL/NM) or ES&H Department manager (at SNL/CA) and the responsible department manager in the event of loss or damage of radioactive material (see also Chapter 11, "Radiological Incidents," of this manual)
- Notify RP personnel when radioactive material is procured and/or received
- Notify the device and source registrar of the ASRS database when ASRSs are purchased, moved, or transferred
- Contact RP before opening, modifying, or performing invasive maintenance on equipment containing normally inaccessible radioactive material

6.4.3.2 Material, Property, and Equipment Located in Radiologically Controlled Areas (ISMS Function: Control Hazards)

Requirements

Managers shall ensure that:

- Items and equipment in contamination areas, high contamination areas, and airborne radioactivity areas are not transferred to controlled areas unless **all** of the following criteria are true:
  - Removable surface contamination levels on accessible surfaces do not exceed the removable surface contamination authorized levels specified in Attachment 6-1 of this chapter
  - Total contamination levels (fixed plus removable) do not exceed the total authorized contamination levels found in Attachment 6-1
  - Prior use suggests that the removable surface contamination levels on inaccessible surfaces are unlikely to exceed the removable surface contamination authorized levels specified in Attachment 6-1
- Scrap metal coming from a radiological area is evaluated to ensure that disposition restrictions contained in corporate procedure ESH100.2.ENV.11, *Control Scrap Metal from a Radiological Area or Volumetrically Contaminated Metal*, are followed
- Material and equipment with removable surface contamination exceeding the values specified in Attachment 6-1 are conditionally released only for on-site movement if they meet all of the following conditions:
  - Material or equipment is appropriately monitored
  - Material or equipment is moved only from one posted radiological area for immediate placement in another posted radiological area
  - Appropriate administrative and physical controls for the movement are established and implemented (e.g., item is bagged or wrapped)
- Material and equipment with fixed contamination levels that exceed the total contamination values specified in Attachment 6-1 are released for use in controlled areas outside of the radiological areas if they **meet both** of the following conditions:
  - Removable surface contamination levels are below the removable surface contamination values specified in Attachment 6-1
  - The material or equipment is routinely monitored and clearly marked or labeled to alert personnel of the contaminated status
- Contamination exceeding Attachment 6-1 authorized limits that results from items listed in Attachment 6–2, "Excepted Items List," is handled in the following manner:
  - Contamination is controlled commensurate with the potential hazard (e.g., type of contaminant, level of radioactivity, area contaminated, or potential for spread)
  - Contamination is cleaned to the extent reasonably possible; consult RP personnel for decontamination guidance
  - The owning line organization has determined that occurrence reporting criteria applies and will make any necessary reports; for more information, see Chapter 13,

"Feedback and Improvement," in this manual and corporate procedures ESH100.4.RPT.3, *Report Occurrences*, and ESH100.4, *Feedback and Improve*

- The contamination is disposed of as radioactive waste; for information regarding waste, see corporate procedures ESH100.2.ENV.23, *Manage Radioactive Waste at SNL*, and ESH100.2.ENV.24, *Manage Mixed Waste at SNL*
- The item causing the contamination loses its status as an excepted item and must be handled as controlled radioactive material

- When unrestricted disposition of property or material is intended, one of the following processes is applied:
  - There is adequate, documented process knowledge (the property owner initiates the form SF 6951-RRF, *Radiological Process Knowledge Form*, and forwards it to the applicable RP Line Support Team project leader) for a conclusion that the property or material was never in an area where contamination or activation was possible (radiological surveillance is not required in this case).

    Or

  - **All** of the following are met:
    - There is a documented radiological survey(s) that residual radioactivity is below applicable limits
    - Inaccessible surfaces have been determined to be below applicable limits
    - There is no volumetric contamination present as determined by a radioactive material management area equivalent analysis of the material
    - Scrap metal is evaluated in accordance with ESH100.2.ENV.11, *Control Scrap Metal from a Radiological Area or Volumetrically Contaminated Metal*

  Note: See Attachment 6–5 of this chapter for a decision flowchart of the release and disposal decision process.

- Release of material that is potentially contaminated in depth (e.g., activated material, soils, or liquids) to uncontrolled areas is not specifically addressed by 10 CFR 835, *Occupational Radiation Protection*, or DOE O 458.1 Admin Chg 3, *Radiation Protection of the Public and the Environment*, and shall be handled on a case-by-case basis using the decision flowchart in Attachment 6–5, "Release and Disposal Decision Flowchart," of this chapter. Additional information about release and disposal requirements can be obtained from the appropriate RP Line Support Team project leader.

6.4.3.2.1 Storage of Radioactive Material (ISMS Function: Control Hazards)

Managers shall ensure that:

- TWDs are used for access to radioactive material storage areas if the storage of such material creates a radiological area; however, TWDs are required for radiological work in radioactive material areas whether or not there is a radiological area
- Radioactive material storage areas are posted or the items are labeled in accordance with the requirements of this manual (see Chapter 2, "Posting and Labeling for Radiological Control")

- Contaminated items are controlled in a manner that prevents the spread of contamination

Guidance

Managers should consider the following:

- Whenever possible, radioactive material should be stored in a locked cabinet or room with controlled access.
- Storage of nonradioactive material together with radioactive material should be minimized when practical.
- Storage of flammable or combustible material with radioactive material should be minimized when practical.
- Decontamination or disposal of radioactive material is the preferred alternative to long-term storage.
- Whenever possible, radioactive material should not be stored outdoors. If radioactive material must be stored outdoors, containers or wrapping material should be inspected routinely to ensure there has been no degradation (i.e., to prevent releases of radioactive material).

6.4.3.2.2 Control of Radioactive Material Quantities Less Than One-Tenth of the Values Specified in RPPM Appendix E

Requirements

Managers shall ensure that all radioactive material, including quantities less than one-tenth of the values specified in RPPM Appendix E (MS Word/PDF), not on the Attachment 6–2, "Excepted Items List," of this chapter, is controlled to prevent exposure to workers or the public.

- The material is accounted for in some manner (e.g., an inventory, a PHS, or a source database) to track the location for handling, use, and storage.
- The radioactive material is disposed of in accordance with the requirements of ESH100.2.ENV.23, *Manage Radioactive Waste at SNL*.

Guidance

Although an item or container is excepted from labeling if the quantity of radioactive material is less than one-tenth the values specified in RPPM Appendix E, MOWs should control radioactive material of quantities less than one-tenth of the values specified in RPPM Appendix E such that:

- Containers used to store numerous items of radioactive material that are each less than one-tenth the quantity limits in RPPM Appendix E are labeled as described in Chapter 2, "Posting and Labeling for Radiological Control," of this manual.
- Best work practices and experience indicate that sources less than one-tenth the values specified in RPPM Appendix E should be labeled and registered in DARTS to ensure adequate control of material and hazard communication. Owners are accountable for loss, spread of contamination, proper disposal (i.e., not in the sanitary waste stream), and as low as reasonably achievable (ALARA) practices.
- Radiation exposures are maintained consistent with the ALARA principles as stated in Chapter 7, "Facility ALARA Design Review," of this manual.

- MOWs are aware of the presence of radioactive material and can take appropriate precautions.
- There are proper controls to prevent a release of radioactive material to the public or the environment.

For further information, consult RP.

6.4.3.3 Control of Areas (ISMS Function: Control Hazards)

Requirements

Managers shall ensure that:

- RP is contacted, in a timely manner, for assistance in determining the potential impact and providing appropriate support when radioactive material or sources are brought on-site by subcontractors to carry out their work in an area that is owned or controlled by their organization. (Control of radioactive material and sources brought on-site by subcontractors to carry out their work is generally beyond the scope of the RPPM. See the Introduction and sections 2.1 and 2.3 in Chapter 2 of this manual.)
- Appropriate controls are maintained and verified to prevent the inadvertent transfer of removable contamination to locations outside of a radiological area under normal operating conditions.
- Facilities meet authorized limits appropriate for the disposition path (such as Attachment 6-1 values, interagency values, or waste acceptance criteria) and that disposition documentation is completed prior to transfer of real property to a new owner or final demolition activities commence.
- Any area in which contamination levels exceed the values specified in Attachment 6-1 are controlled in a manner commensurate with the physical and chemical characteristics of the contaminant, the radionuclides present, and the fixed and removable surface contamination levels.
- Areas accessible to individuals where the measured total surface contamination levels exceed, but the removable surface contamination levels are less than, the corresponding surface contamination values specified in Attachment 6-1 are controlled as follows when located outside of radiological areas:
  - The area is routinely monitored (Attachment 8-1, "Guidance for Establishing Radiological Survey Frequency," in Chapter 8 of this manual) to ensure the removable surface contamination level remains below the removable surface contamination values specified in Attachment 6-1.
  - The area is conspicuously marked [posted] to warn individuals of the contaminated status.
- Individuals exiting contamination, high contamination, or airborne radioactivity areas are monitored, as appropriate (e.g., whole body frisk), for the presence of surface contamination (Chapter 8, Section 8.4.6, of this manual).
- Protective clothing, as prescribed in the applicable TWD, is used for entry into areas in which removable contamination exists at levels exceeding the removable surface

contamination values specified in Attachment 6-1. (See Attachment 1-7 in Chapter 1 of this manual.)

- Step-off pads are used at access control points of contamination, high contamination, and airborne radioactivity areas.
- Containment devices (e.g., glove boxes or glove bags) receive routine inspection and testing (consult RP for further information).
- A soil contamination area is established whenever and wherever there are areas with contaminated soil that is not releasable in accordance with DOE O 458.1 Admin Chg 3, *Radiation Protection of the Public and the Environment* (consult RP for further information).
- An underground radioactive material area is established whenever and wherever there are underground items that contain radioactive material, such as pipelines, covered ditches, tanks, inactive burial grounds, and sites of known or suspected spills.
- The type of protective clothing required for entry into an area (radiological area, radioactive material area, fixed contamination area, soil contamination area, or underground radioactive material area) shall be prescribed in the applicable TWD.
- **Individuals do not** reach across radiological boundaries unless authorized to do so by the appropriate RP personnel or an approved TWD.
- **Individuals do not** eat, drink, chew, or apply cosmetics while in:
  - Airborne radioactivity areas
  - Radiological areas established for contamination control
  - Radiological buffer areas established for contamination control
  - Radioactive material areas
  - Soil contamination areas during performance of intrusive work

  Note: When performing intrusive work in soil contamination areas, drinking and applying skin or lip sunscreens are allowed in designated hydration break areas. Prior to drinking, hand washing is encouraged. Consult the appropriate RP personnel for assistance in establishing hydration break areas.

Guidance

Managers should use the following information to assist with control of areas:

- Choice of personal protective equipment (PPE) should be based upon considerations of contamination levels, chemical and physical form of the contaminant, activities to be performed, and area accessibility.
- Other area and activity hazards—such as heat, flame, hazardous chemicals, physical obstructions, electrical shock, and limited visibility—should be considered when prescribing protective clothing.
- When penetration of protective clothing by a contaminant is likely, such as during activities likely to induce heavy sweating or otherwise wet the individual, an additional layer of impenetrable clothing should be considered.

- For individuals exiting areas where the only contaminated areas are laboratory bench surfaces or fume hoods, or where contamination potential is limited to specific portions of the body, the frisking should concentrate on affected areas.
- If background radiation levels or other conditions at the exit point preclude performance of personnel frisking, the exit point should be relocated to an area of lower background levels.
- If relocation of the exit point is not practicable, individuals should proceed directly from the exit point to an appropriate area to perform a whole body frisk. The travel path should be monitored frequently for contamination spread during use and after the detection of any contamination at the frisking station.
- Necessary tools and equipment needed for work in contamination areas, high contamination areas, or airborne radioactivity areas should be available and serviceable. Boxes and packing material should be left in clean areas.
- Hoses, electrical cables, etc., should be properly secured to prevent movement of such items across boundaries of contamination, high contamination, and airborne radioactivity areas.
- Portable high-efficiency particulate air (HEPA) units may be used to provide ventilation to work areas or containments or as part of HEPA vacuum units. Contact the appropriate RP Line Support Team project leader for additional guidance.
- Areas of fixed contamination should be coated with two layers of a fixative coating, each with a different color.
- With regard to radiological buffer areas (RBAs):
  - An RBA may be established around a contamination area or airborne radioactivity area as a secondary boundary to minimize the spread of contamination.

  Note: Typically, equipment used for radioactive contamination monitoring is located within and at the exit point of the RBA.
- It is not necessary to establish an RBA around a high contamination area or an airborne radioactivity area that is completely contained within a contamination area. The RBA at the perimeter of the contamination should suffice.

6.4.3.4 Radioactive Material Transfer, Movement, or Transportation (ISMS Function: Perform Work)

Requirements

Managers shall ensure that:

- All on-site (with respect to packaging and transport) radioactive material transfers or movements are performed in accordance with the requirements of this chapter and SCM100.3.19, *Movement of Hazardous Materials*.

  Note: On-site transfers or movements are not conducted using DOT requirements. Sandia MOWs usually perform such tasks.
- The removable contamination limits specified in Attachment 6-1 of this chapter apply to all on-site radioactive material transfer or movement

Note: The terms "shipment" or "transportation" are used when items must leave the limits of "on-site" and eventually travel over public highways or roads controlled by DOT regulations (i.e., off-site).

- Transportation conveyances (e.g., trucks) that are either arriving from off-site or are being loaded for transport off-site are monitored in accordance with DOT regulations.

Guidance

Managers should consider the following when making transfers or movements of radioactive material:

- On-site transfers or movements should be performed in accordance with a TWD. The TWD should use a graded approach and if necessary should discuss the following:
  - Radiological monitoring
  - Radiological labeling (see Chapter 2 of this manual)
  - ALARA
  - Spill control and secondary containment
  - Notification to impacted personnel of the radioactive material movements
  - Description of movement route
  - Emergency procedures
- Before transfer or movement and upon receipt of radioactive material, a visual inspection of packages should be performed to ensure that packages are not damaged. The inspection should identify issues such as dents, flaking paint, debris, package orientation, and any indication of leakage.
- Before transfer or movement and upon receipt of radioactive material, a comparison of package count to the shipping manifest should be made to ensure accountability.
- Written procedures for safely opening packages should be developed and maintained. These procedures should include due consideration of the type of package and potential hazards present.

6.4.3.5 Radioactive Material Disposal (ISMS Function: Perform Work)

Requirements

Managers shall ensure that radioactive waste is disposed of in accordance with the requirements of corporate procedures ESH100.2.ENV.23, *Manage Radioactive Waste at SNL*, and ESH100.2.ENV.24, *Manage Mixed Waste at SNL*, and any applicable DOE directives.

Guidance

Managers should ensure that the following practices are evaluated and instituted, as appropriate, to support waste minimization:

- Restrict material entering RBAs to only that needed to perform work.
- Restrict quantities of hazardous material (e.g., paints, solvents, chemicals, cleaners, and fuels) entering RBAs and other areas surrounding radiological areas, and implement measures to prevent inadvertent radioactive contamination of such material.

- Substitute recyclable items in place of disposable ones and reuse equipment, chemical solvents, and cleaners when practicable.
- Select consumable material (e.g., protective coverings and clothing) that is compatible with waste-processing systems, volume reduction, and waste form acceptance criteria.
- Reserve an assortment of tools primarily for use in contamination, high contamination, or airborne radioactivity areas. Tools should be maintained in a designated storage or distribution area or in a contaminated tool crib. Controls should be established for tool issuance and use.
- Survey potentially contaminated material from radiological areas to separate uncontaminated from contaminated material.
- Segregate known uncontaminated waste from potentially contaminated waste.
- Segregate reusable items (e.g., protective clothing, respirators, and tools) at step-off pads.
- Minimize the number and size of radiologically controlled areas.
- Emphasize training in waste-reduction philosophies, techniques, and improved methods.

6.4.3.6 Scrap Metal Recycle (ISMS Function: Perform Work)

Requirements

MOWs shall comply with the DOE-imposed moratorium on the recycling of scrap metal as required by ESH100.2.ENV.11, *Control Scrap Metal from a Radiological Area or Volumetrically Contaminated Metal*.

6.4.3.7 Control of Open Wounds

An open wound is an exposed injury involving a break in the skin. The skin acts as a protective barrier, so an exposed wound is more susceptible than intact skin to the passage of radioactive materials into the body. Open wounds may occur accidentally or intentionally (e.g., from abrasions, punctures, shaving, piercings, tattoos, cuts, burns, or infections).

Requirements

MOWs shall not expose open wounds to radioactive contamination.

An MOW who has an open wound shall not enter a posted contamination area, high contamination area, airborne radioactivity area, or soil contamination area unless **all** of the following are true:

- Any open wound is covered by a bandage
- The bandage does not prevent the individual from wearing any item of PPE as required by the applicable TWD
- The open wound is not bleeding and the bandages are dry

MOWs shall stop work and seek medical care if any of the following conditions occur while working in a posted contamination area, high contamination area, airborne radioactivity area, or soil contamination area:

- The open wound becomes uncovered
- The open wound is found to be bleeding or the bandages have become wet
- The open wound or bandage becomes contaminated
- A new open wound is created

MOWs shall not attempt to decontaminate an open wound. Wound decontamination requires medical supervision.

Guidance

If an open wound becomes contaminated, have RP personnel evaluate the extent and levels of contamination on the individual so that medical personnel can be briefed.

6.4.3.8 Medically Prescribed Devices for the Administration of Medication

At times, radiological workers may need to wear medically prescribed devices (e.g., insulin pumps) to administer medication or for procedures such as dialysis. If any portion of such a device is located outside of the skin, then a potential for contamination of the device and/or the associated skin entry point exists. Portacath devices that are surgically implanted and completely covered by the skin are not of concern.

Requirements

MOWs shall not expose medically prescribed devices that are located outside of the skin and/or the associated skin entry point to radioactive contamination.

An MOW who has such a device shall not enter a posted contamination area, high contamination area, airborne radioactivity area, or soil contamination area unless **all** of the following are true:

- The device and the skin entry point are covered by PPE to prevent contamination of the device or the passage of contamination through the skin entry point
- The MOW does not have a medical work restriction prohibiting the entry or work

MOWs shall stop work, exit the area, and be surveyed for contamination if the following condition occurs while working in a posted contamination area, high contamination area, airborne radioactivity area, or soil contamination area:

- The medical device and/or skin entry point becomes uncovered or is otherwise suspected of having become contaminated

The device wearer shall determine whether decontamination of the device should be attempted and/or medical advice sought. If the skin entry point becomes contaminated, do not attempt decontamination; seek medical advice.

Guidance

If a medically prescribed device and/or skin entry point becomes contaminated, have RP personnel evaluate the extent and levels of contamination.

6.5 Records

Requirements

MOWs who generate occupational radiation protection-related records shall use the special units of curie, rad, roentgen, or rem, including multiples and subdivisions of these units, or other conventional units, such as dpm, dpm/100 cm^2, or mass units. The SI units—becquerel (Bq), gray (Gy), and sievert (Sv)—may be provided parenthetically for reference with scientific standards. [**10 CFR 835.4**]

Managers shall be responsible for ensuring that the following records, as applicable, are maintained to document compliance with Sandia's RP Program: [**10 CFR 835.701(a)**]

- An inventory of ASRSs as required by Chapter 9, "Control of Accountable Sealed Radioactive Sources (ASRSs) and Radioisotope Thermoelectric Generators (RTGs)," of this manual
- Documentation showing that on-hand quantities of radioactive materials do not exceed the upper limits established in the applicable PHS
- Completed copies of form SF 2001-RFC, *Request for Categorization as Excepted or Conditionally Controlled* [Word file/PDF]
- PHSs or HAs, as applicable
- Completed and approved copies of form SF 6951-RRF, *Radiological Process Knowledge Form*
- TWDs generated in accordance with Chapter 1 of this manual
- Purchase requisition forms generated for radioactive material or radiation-generating devices (RGDs)
- Inspection plans (and results) related to the receipt of radioactive materials or RGDs (required by quality-significant purchase rules)
- Pertinent documentation sent by the manufacturer (e.g., source calibration certificates, integrity test certifications, shipping documents, or special form certificates)

RP shall be responsible for ensuring that records, including but not limited to the following, are maintained to document compliance with Sandia's RP Program:

- Legacy radiological work permits
- Surveys of Record

Unless otherwise specified, records shall be retained for 75 years or until final disposition is authorized by DOE. **[10 CFR 835.701(b)]**

Unless otherwise authorized, the method for recording, storing, retaining, and archiving these records is in accordance with IM100.2.2, *Control Records*, and as specified in the Sandia Records Retention and Disposition Schedule maintained by Sandia's Customer Funded Records Center within the Recorded Information Management Department, filed under records series HE-130-207-000.

If using an alternate system (reviewed and authorized by the Recorded Information Management Department as capable of meeting the regulatory required retention period identified here) for

records maintenance, it is the responsibility of the individual organization to assure long-term retention of these records and to ensure that they are retrievable over their required storage lifetime, as identified here.

6.6 References

6.6.1 Requirements Source Documents

10 CFR 30, *Rules of General Applicability to Domestic Licensing of Byproduct Material*.

10 CFR 71, *Packaging and Transfer of Radioactive Material.*

10 CFR 835, *Occupational Radiation Protection*.

DOE O 458.1 Admin Chg 3, *Radiation Protection of the Public and the Environment*.

DOE-STD-1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*.

6.6.2 Related Documents

DOE G 441.1-1C Admin Chg 1, *Radiation Protection Programs Guide for Use with Title 10, Code of Federal Regulations, Part 835, Occupational Radiation Protection.*

DOE-STD-1098-2008, *Radiological Control*.

Sandia Corporate Procedures

ESH100.2.ENV.11, *Control Scrap Metal from a Radiological Area or Volumetrically Contaminated Metal*.

ESH100.2.ENV.23, *Manage Radioactive Waste at SNL*.

ESH100.2.ENV.24, *Manage Mixed Waste at SNL*.

ESH100.2.SB.2, *Ensure Nuclear Criticality Safety*.

ESH100.4, *Feedback and Improve*.

MN471017, *Safety Basis Manual*.

RPPM Chapter 1, *Radiological Work Management.*

RPPM Chapter 9, *Control of Accountable Sealed Radioactive Sources (ASRSs) and Radioisotope Thermoelectric Generators (RTGs).*

SCM100.3.19, *Movement of Hazardous Material*.

Attachment 6–1 Radioactive Contamination Limits

Surface Contamination Values[Note 1] in dpm/100 cm^2

Nuclide	Removable (Note 2 and 4)	Total (Fixed Plus Removable) (Note 2 and 3)	Soil (pCi/gram) (Note 9)
U-natural, U-235, U-238 and associated decay products	1,000 (Note 7)	5,000 (Note 7)	1,000
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	20	500 or 100 (Note 8)	20
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	200	1,000	200
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above. Includes mixed fission products containing Sr-90. (Note 5)	1,000	5,000	1,000
Tritium and STCs (Note 6)	10,000	N/A (Note 6)	10,000

Notes:

1. The values in this attachment, with the exception noted in footnote 6, apply to radioactive contamination deposited on, but not incorporated into the interior or matrix of, the contaminated item. Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for the alpha- and beta-gamma-emitting nuclides apply independently.
2. As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.
3. The levels may be averaged over one square meter provided the maximum surface activity in any area of 100 cm^2 is less than three times the value specified. For purposes of averaging, any square meter of surface shall be considered to be above the surface contamination value if (1) from measurements of a representative number of sections it is determined that the average contamination level exceeds the applicable value or (2) it is determined that the sum of the activity of all isolated spots or particles in any 100 cm^2 area exceeds three times the applicable value.
4. The amount of removable radioactive material per 100 cm^2 of surface area should be determined by swiping the area with dry filter or soft absorbent paper, applying moderate pressure, and then assessing the amount of radioactive material on the swipe with an appropriate instrument of known efficiency. (Note that the use of dry material may not be appropriate for tritium.) When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area shall be based on the actual area and the entire surface shall be wiped. It is not necessary to use swiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the limits for removable contamination.
5. This category of radionuclides includes mixed fission products with Sr-90 present in them. It does not apply to Sr-90 that has been separated from the other fission products or mixtures where the Sr-90 has been enriched.
6. Tritium contamination may diffuse into the volume or matrix of materials. Evaluation of surface contamination shall consider the extent to which such contamination may migrate to the surface in order to ensure the surface contamination value provided in this attachment is not exceeded. Once this contamination migrates to the surface, it may be removable, not fixed; therefore, a “Total” value does not apply. In certain cases, a “Total” value of 10,000 dpm/100 cm^2 may be applicable either to metals of the types from which insoluble special tritium compounds are formed, that have been exposed to tritium, or to bulk materials to which insoluble special tritium compound particles are fixed to a surface.
7. These limits apply only to the alpha emitters within the respective decay series.
8. Sandia added note: Per Response to Questions and Clarification of Requirements and Processes: DOE Order 5400.5, Section II.5 and Chapter IV Implementation (Requirements Relating to Residual Radioactive Material) and DOE 5400.5, *Radiation Protection of the Public and the Environment*, the value for unrestricted release of material is 100 dpm/100 cm^2; otherwise, the 500 dpm/100 cm^2 applies.
9. Sandia added note: Soil contamination existing as fine-grained soil-like material requiring “contamination area” level of controls and training. Radioactivity concentrations in this column do not apply to free release of soils.

Attachment 6–2 Excepted Items List

The following Excepted Items List presents consumer products identified in NRC-related documentation. This documentation describes consumer products that contain nominal amounts of radioactive material or that produce nominal amounts of radiation. Excepted items (consumer products) are freely purchased by the general public without any radiological restrictions. Entries in this list have been selected based upon operational experience and typical usage found throughout Sandia organizations.

The items in this list are excepted from the requirements of Sandia's RPPM subject to the following provisions:

- The item has not been modified or altered in a way prohibited or otherwise not intended by the manufacturer of the item
- The radioactive material in the item is not known to have been modified, technologically enhanced, concentrated, or isotopically altered
- Radioactive material has not become dissociated (i.e., falls, flakes, or rubs off) from an excepted item

The process for adding or removing items in this list is controlled by the RP Department. Questions regarding this list should be addressed to the appropriate RP Line Support Team.

Warning: Some excepted items may require disposal as radioactive waste. See ESH100.2.ENV.23, *Manage Radioactive Waste at SNL*, and ESH100.2.ENV.24, *Manage Mixed Waste at SNL*, for information regarding waste determination and disposal.

Static Elimination Devices
(10 CFR 30.15: Certain Items Use)

- Static elimination devices containing not more than 18.5 MBq (500 µCi) of polonium-210 per device
- Ion-generating tubes designed for ionization of air and containing not more than 18.5 MBq (500 µCi) of polonium-210 per device or a total of not more than 1.85 GBq (50 mCi) of hydrogen-3 (tritium) per device (10 CFR 30.15)

Radioluminous Products
(10 CFR 30.19: Self-luminous Product Use)

- Tritium gas tube light sources used to backlight liquid crystal displays (LCDs)
- Tritiated gun sights

Electron Tubes
(10 CFR 30.15: Certain Items Use)

Electron tubes (including spark gap tubes, power tubes, gas tubes including glow lamps, receiving tubes, microwave tubes, indicator tubes, pickup tubes, radiation detection tubes, and any other completely sealed tube that is designed to conduct or control electrical currents) provided that each tube does not contain more than one of the following specified quantities of byproduct material:

- 150 millicuries of tritium per microwave receiver protector tube or10 millicuries of tritium per any other electron tube
- 1 microcurie of cobalt-60
- 5 microcuries of nickel-63
- 30 microcuries of krypton-85
- 5 microcuries of cesium-137
- 30 microcuries of promethium-147

Electron tubes are used for voltage regulation, current surge protection, and as indicator lights. Spark gap tubes or glow lamps are used as starters for fluorescent lamps and in electric blanket thermostats and other specialty devices.

Gas and Aerosol Detectors
(10 CFR 30.20: Gas and Aerosol Detector Product Use)

Gas and aerosol detectors designed to protect health, safety, or property

Note: Items do not qualify as "excepted" if they contain one or more sealed radioactive source(s) with activities greater than RPPM Appendix E limits.

Glass and Ceramics
(10 CFR 40.13: Unimportant Quantities of Source Material)

The following items containing source material (natural uranium and/or thorium isotopes):

- Glazed ceramic tableware
- Piezoelectric ceramic (used in many consumer products that require an electromechanical coupling device)

The following is the RP Department's interpretation of types of excepted consumer products:

- Glassware containing source material
- Ceramic grinding wheels and polishing compounds
- Ceramic electric insulators
- Ceramic heating elements
- Commercially available ceramic materials used for mold making and molten metal processing
- Ceramic and porcelain tile, toilet bowls, tanks, urinals, and sinks

Unimportant Quantities of Source Material
(10 CFR 40.13)

Any source material in any chemical mixture, compound, solution, or alloy in which the source material is by weight less than one-twentieth of 1 percent (0.05 percent) of the mixture, compound, solution, or alloy. (See the product's safety data sheet [SDS] for specific item information.)

Products Containing Thorium
(10 CFR 40.13: Unimportant Quantities of Source Material)

Any quantities of thorium contained in:

- Incandescent gas mantles
- Vacuum tubes
- Welding rods
- Electric lamps for illuminating purposes (includes fluorescent lamp starters, per RP Program interpretation)
- Germicidal lamps, sunlamps, and lamps for outdoor or industrial lighting
- Rare earth metals and compounds, mixtures, and products containing not more than 0.25percent by weight of thorium, uranium, or any combination of these (consult the MSDS for the material)
- Personnel neutron dosimeters, provided that each dosimeter does not contain more than 50 milligrams of thorium
- Thorium or uranium contained in or on finished optical lenses and mirrors
- Any finished product or part fabricated of or containing tungsten or magnesium-thorium alloys, provided that the thorium content of the alloy does not exceed 4% by weight, and provided that chemical, physical, or metallurgical treatment or processing of any such product or part is prohibited
- Unrefined and unprocessed uranium or thorium ore samples
- Photographic film, negatives, and prints containing uranium or thorium

Attachment 6–3 Conditionally Controlled Material List

The process for adding or removing items in this list is controlled by the RP Department. Questions regarding this list should be addressed to the appropriate RP Line Support Team.

Index of Conditionally Controlled Materials

Table No. / Item No.	Description of Item
1	Ni-63 sources in gas chromatographs, explosive vapor detectors, microhounds, and portal monitors for operator use only—no maintenance or modification
2	Am-241 in explosive vapor detectors, microhounds, and portal monitors for operator use only—no maintenance or modification
3	Field test fire sets used to initiate explosive detonators containing <100 microcuries of Kr-85 or Ni-63
4	On-site use of individual manufactured sealed radioactive sources (SRSs) with activity ≤ 1/10 of the RPPM Appendix E values, not to exceed 100 mCi
5	Self-luminous products containing tritium (e.g., EXIT markers and floor lights) used in accordance with the manufacturers' guidelines. These items must be licensed by the NRC and may contain up to 25 Ci of tritium per item.
6	Complete unaltered functional weapon component neutron generator subassemblies and fully encapsulated or potted tube transformer assemblies (routine handling only: no alterations or functional testing that produces neutrons)

Table 1. Conditionally controlled item #1

Description	Ni-63 in gas chromatographs, explosive vapor detectors, microhounds, and portal monitors for operator use only—no maintenance or modification		
RPPM Appendix E Value	Ni-63: 1300 mCi	**Item Content**	Typically in the range of: 10–15 mCi
Radiological Training	GERT required for operation		
Technical Work Document	Follow RTWD or reference manufacturer's written guidelines for use of this equipment in an activity-level TWD		
Posting	Not required for operational use		
Labeling	• Ni-63 > 1/10 RPPM Appendix E threshold values (> 130 mCi) requires a radioactive materials label • For gas chromatographs, attach the label shown at the end of Attachment 6–3 to the outside of the unit		
Survey	• Upon receipt or return of item from non-Sandia custody • If damage is known or suspected		
Local Inventory	Ensure that the Ni-63 is controlled to prevent exposure to workers or the public by accounting for it in some manner (e.g., an inventory, a PHS, or a database) to identify the location for handling, use, and storage		
Personal Dosimetry	No personal dosimetry is required to operate this equipment		
Damage	Notify RP if equipment is known or suspected of being damaged		
Disposal	Dispose of Ni-63 or contaminated items in accordance with ESH100.2.ENV.23, *Manage Radioactive Waste at SNL*. DO NOT SEND TO REAPPLICATION.		

GERT Radiological Worker I Training

Table 2. Conditionally controlled item #2

Description	Am-241 in explosive vapor detectors, microhounds, and portal monitors for operator use only—no maintenance or modification		
RPPM Appendix E Value	Am-241: 72 µCi	**Item Content**	Typically in the range of: 20–50 µCi
Radiological Training	GERT required for operation		
Technical Work Document	Follow RTWD or reference manufacturer's written guidelines for use of this equipment in an activity-level TWD		
Posting	Not required for operational use		
Labeling	Am-241 > 1/10 RPPM Appendix E threshold values (>7.2 µCi) requires a radioactive materials label		
Survey	• Upon receipt or return of item from non-Sandia custody • If damage is known or suspected		
Local Inventory	Ensure that the Am-241 is controlled to prevent exposure to workers or the public by accounting for it in some manner (e.g., an inventory, a PHS, or a database) to track the location for handling, use, and storage		
Personal Dosimetry	No personal dosimetry is required to operate this equipment		
Damage	Notify RP if equipment is known or suspected of being damaged		
Disposal	Dispose of Am-241 or contaminated items in accordance with ESH100.2.ENV.23, *Manage Radioactive Waste at SNL*. DO NOT SEND TO REAPPLICATION.		

Table 3. Conditionally controlled item #3

Description	Field test fire sets used to initiate explosive detonators containing <100 microcuries of Kr-85 or Ni-63		
RPPM Appendix E Value	• Kr-85: 100 µCi • Ni-63: 1300 mCi	**Item Content**	< 100 µCi Kr-85 or Ni-63
Radiological Training	GERT required for operation		
Technical Work Document	Follow RTWD or line activity-level TWD for this equipment		
Posting	Not required, *unless* multiple field test fire sets are stored or used together and the sum of the activity for all Kr-85 or Ni-63 exceeds RPPM Appendix E threshold values, requiring posting as radioactive material areas		
Labeling	Radioactive material label required if activity > 1/10 RPPM Appendix E threshold values for K-85 or Ni-63 (> 10 µCi Kr-85 or > 130 mCi Ni-63, respectively)		
Survey	• Surveys of storage and use areas that are posted as radioactive material areas are required (see “Posting” above) • Survey individual units prior to all on-site movement • Survey requirements are not applicable for K-85 field test fire sets		
Local Inventory	Ensure that the Kr-85 or Ni-63 is controlled to prevent exposure to workers or the public by accounting for it in some manner (e.g., an inventory, a PHS, or a database) to track the location for handling, use, and storage		
Personal Dosimetry	No personal dosimetry is required to work with this equipment		
Damage	Notify RP if damage is known or suspected		
Disposal	Dispose of equipment in accordance with ESH100.2.ENV.23, *Manage Radioactive Waste at SNL*. DO NOT SEND TO REAPPLICATION.		

Table 4. Conditionally controlled item #4

Description	On-site use of individual sealed radioactive sources (SRSs) with activity ≤ 1/10 of RPPM Appendix E values, not to exceed 100 mCi		
RPPM Appendix E Value	See RPPM Appendix E for the threshold value for each radionuclide in question	**Item Content**	≤ 1/10 RPPM Appendix E to each radionuclide threshold value, not to exceed 100 mCi
Radiological Training	GERT training required		
Technical Work Document	Follow RTWD (see optional RTWD template in RPPM Attachment 6-6)		
Posting	Not required, *unless* multiple SRSs are stored or used together and the sum of individual fractions, for the aggregate amount, exceeds 1, requiring posting as radioactive material areas		
Labeling	• Not required for individual SRSs • If multiple SRSs are stored together, the total aggregate amount of material shall be considered with respect to labeling (i.e., sum of fractions based upon 1/10 of RPPM Appendix E amounts)		
Survey	• Upon receipt • If damage is known or suspected		
Local Inventory	Ensure that the SRS is controlled to prevent exposure to workers or the public by accounting for it in some manner (e.g., an inventory, a PHS, or a database) to track the location for handling, use, and storage		
Personal Dosimetry	No personal dosimetry is required to work with these SRSs		
Damage	Notify RP if damage is known or suspected		
Disposal	Dispose of SRSs in accordance with ESH100.2.ENV.23, *Manage Radioactive Waste at SNL*. DO NOT SEND TO REAPPLICATION.		

Table 5. Conditionally controlled item #5

Description	Self-luminous products containing tritium (e.g., EXIT markers and floor lights) used in accordance with the manufacturer's guidelines. These items are under General License by the NRC and may contain up to 25 Ci of tritium per item.		
RPPM Appendix E Value	H-3: 150 Ci	**Item Content**	≤ 25 Ci of H-3
Radiological Training	GERT training required for placement and/or removal of products in addition to any manufacturer's written instructions		
Technical Work Document	Follow RTWD or reference manufacturer's written guidelines for use of these items in an activity-level TWD		
Posting	Not required		
Labeling	If the label from the manufacturer is clearly visible, no additional labeling is required. If the label is not visible, apply a radioactive materials label.		
Survey	If damage is known or suspected		
Local Inventory	Ensure that these items are controlled to prevent exposure to workers or the public by accounting for it in some manner (e.g., an inventory, a PHS, or a database) to track the location for handling, use, and storage		
Personal Dosimetry	No personal dosimetry is required to work with these items		
Damage	Notify RP if damage is known or suspected		
Disposal	Dispose of these items in accordance with ESH100.2.ENV.23, *Manage Radioactive Waste at SNL*. DO NOT SEND TO REAPPLICATION. or Return these items to the manufacturer.		
Additional Requirements or Restrictions	• Notify RP of the existence and location of these items when determined • Contact RP prior to removal of any of these items • Transport in accordance with the requirements of SCM100.3.19, *Movement of Hazardous Material*		

Table 6. Conditionally controlled item #6

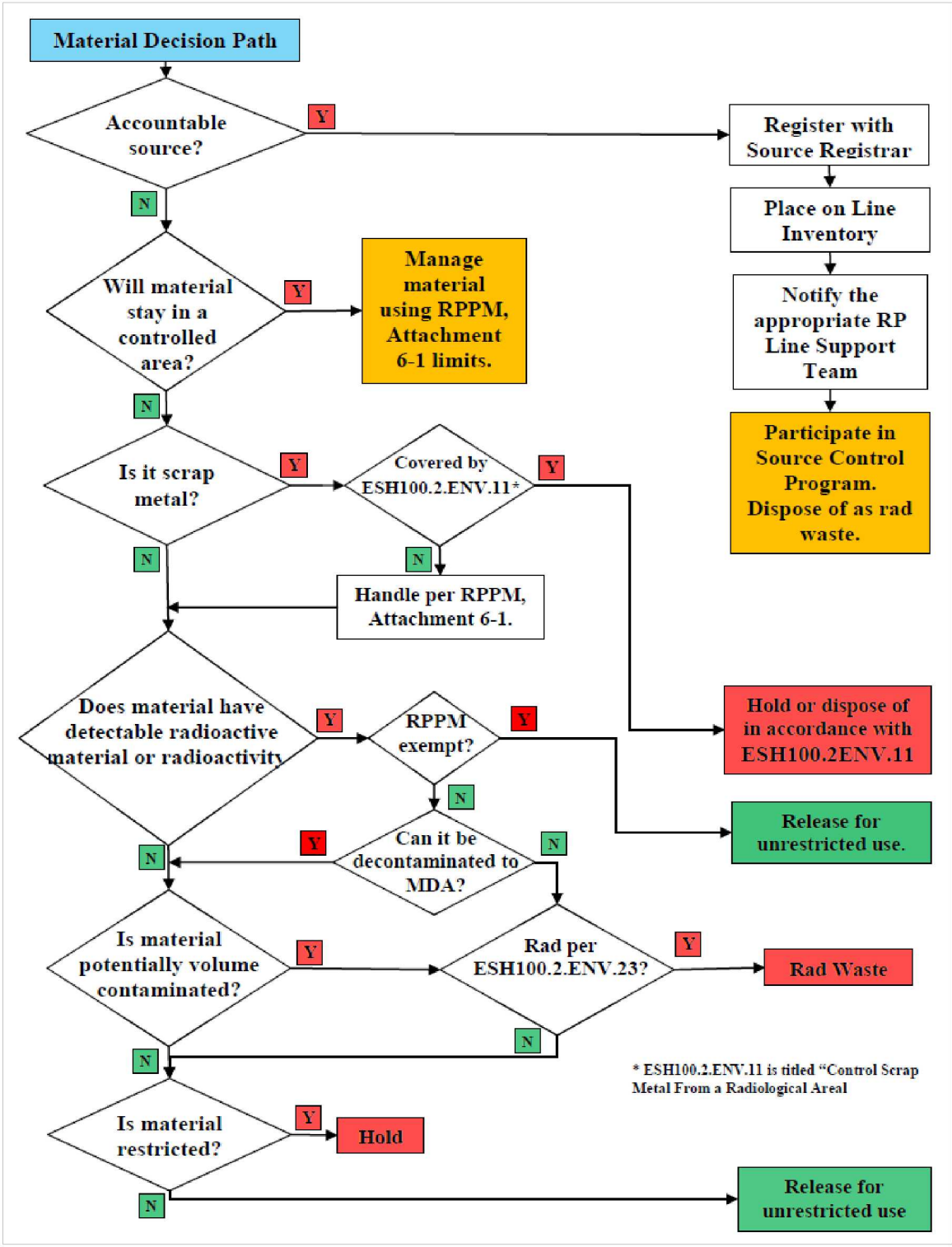
Description	Complete unaltered functional weapon component neutron generator subassemblies and fully encapsulated or potted tube transformer assemblies (routine handling only: no alterations or functional testing that produces neutrons)		
RPPM Appendix E Value	H-3: 150 Ci	**Item Content**	≤ 150 Ci
Radiological Training	GERT training required		
Technical Work Document	Follow RTWD		
Posting	Not required; recommended as a best practice		
Labeling	Not required; recommended as a best practice		
Survey	• Upon receipt • If damage is known or suspected		
Local Inventory	Ensure that these items are controlled to prevent exposure to workers or the public by accounting for it in some manner (e.g., an inventory, a PHS, or a database) to track the location for handling, use, and storage		
Personal Dosimetry	No personal dosimetry is required to work with these items		
Damage	Notify RP if damage is known or suspected		
Disposal	Contact Department 4144, Waste Management and Pollution Prevention, for information related to disposition of these items. DO NOT SEND TO REAPPLICATION.		
Additional Requirements or Restrictions	Transport in accordance with the requirements of SCM100.3.19, *Movement of Hazardous Material*		

The following label shall be placed on all gas chromatographs that contain radioactive material:

Attachment 6–4 Not Used at This Time

Reserved for Future Use

Attachment 6–5 Release and Disposal Decision Flowchart



Attachment 6-6 Optional Radiological Technical Work Document Template for On-Site Use of Individual Sealed Radioactive Sources (SRSs) with Activity ≤ 1/10 of the RPPM Appendix E Values (Not to Exceed 100 mCi)

Use of this RTWD template is optional.

Do not use this template for any other hazards aside from the on-site use of such SRSs. The use of any additional radioactive materials or the presence of other nonradiological hazards requires the generation of a new integrated RTWD as applicable (see RPPM Chapter 1, "Integrated Radiological TWD Template").

The Radiological Controls section of this template provides a complete listing of the controls necessary to perform on-site work using such SRSs. Fields written in red on the title page identify areas where additional information must be provided as applicable to complete the template.

ALARA reviews are completed for radiological work areas by assessing the following ALARA review conditions. Each condition has been preassessed to "not exist" for work pertaining to the identified SRS covered by this template:

- Highest individual dose is expected to be >100 mrem total effective dose (TED) to complete the work. ..... *NO*
- Collective dose is expected to be >500 person-mrem TED to complete the work. ..... *NO*
- Airborne radioactivity in the accessible work area is expected to routinely meet or exceed the criteria for an airborne radioactivity area. ..... *NO*
- Removable contamination in the accessible work area is expected to routinely meet or exceed the criteria for a high contamination area. ..... *NO*
- Hot particles are expected in the accessible work area. ..... *NO*
- General area dose rates in the accessible work area are expected to routinely meet or exceed the criteria for a high or very high radiation area. ..... *NO*
- Dose rates >50 µrem/hr are expected in occupied areas for a period >1 week. ..... *NO*

TWD Number:	Assign a unique control number to the TWD.
Organization:	Identify the organization that owns the TWD.
Effective Date:	Provide procedure effective date.
Expiration Date:	Provide procedure expiration date.
TWD Type:	Specify either General Use or Controlled Activity TWD.

Radiological Technical Work Document

Radiological Technical Work Document Title

Work Planner Signature _____ Date _____

Developed by (Enter Name) _____ Date _____

Work Planner _____

RP Project Leader Signature _____ Date _____

Concurred by (Enter Name) _____ Date _____

RP Project Leader _____

Department Manager Signature _____ Date _____

Approved by (Enter Name) _____ Date _____

Department Manager _____

Radiological Technical Work Document Title

Introduction

1.0 Work Scope and Purpose

Provide a complete description of the work to be performed, including where the work will be performed, why it is being performed, the organizations involved (including work performance and direct support organizations), and work performance responsibilities.

This RTWD is only for the on-site use of individual sealed radioactive sources (SRSs) with activity ≤ 1/10 of the RPPM Appendix E values to 10 CFR 835 threshold values (not to exceed 100 mCi). Off-site uses of such SRSs require additional permissions; check with the RP Project Lead before commencing such operations. No adjacent operations should be affected by the radiological hazards presented by the use of the identified SRSs. This RTWD does not allow for work in radiation or contamination areas.

2.0 Hazards and Conditions

2.1 Radiological Hazards and Conditions

- Identification of each SRS in use
  - Radionuclide(s) present and activity
- Expected radiological conditions for SRS identified
  - No contamination is expected
  - Exposure rates less than 0.1 mR/hr general area and < 0.5 mR/hr contact
  - Highest individual dose estimate: less than 10 mrem
  - Collective dose estimate (work group): less than 10 mrem

2.2 Radiological Controls

- Engineered controls: *None required*
- Administrative controls:
  - Internal and external dosimetry: *None required*
  - Dose tracking: *None required*
  - Monitoring
    - Receipt surveys are required upon receipt of new SRSs
    - Transportation surveys are required for on-site movement of SRSs in vehicles (i.e., not required for hand carrying)
    - Contamination surveys must occur if damage is known or suspected for SRS
    - Routine surveys are performed in accordance with RPPM Chapter 8
  - Posting
    - None required *unless* multiple SRSs are stored or used together and the sum of the individual fractions, for the aggregate amount, exceeds 1, requiring posting as a radioactive material area

- Administrative entry controls
  - None required *unless* multiple SRSs are stored or used together and the sum of the individual fractions, for the aggregate amount, exceeds 1
- Required labeling
  - None required *unless* multiple SRSs are stored together such that the total aggregate amount of material must be considered with respect to labeling (i.e., the sum of the fractions based upon 1/10 of RPPM Appendix E amounts)
- Inventory
  - Ensure that the SRS is controlled to prevent exposure to workers or the public by accounting for it in some manner (e.g., an inventory, a PHS, or a database)
- Storage
  - No special storage instructions are required *unless* multiple SRSs are stored together and the sum of the individual fractions, for the aggregate amount, exceeds 1, requiring storage requirements specified by a radioactive material area
- Disposal
  - Disposal of SRSs must be in accordance with ESH100.2.ENV.23, *Manage Radioactive Waste at SNL*. Do not send *any* SRS to Reapplication.
- Training
  - GERT training is required for all SRS users
- Protective clothing
  - *None required* (the use of gloves when handling any SRS is considered best practice)

2.3 Other Hazards and Conditions
No other hazards allowed.

2.4 Other Hazard Controls
No other hazards; no other controls needed.

3.0 Equipment and Materials
SRS specified in 2.1; no other equipment and materials needed.

4.0 Procedure
SRSs will be used in their original, intended design with no modification or alterations.

5.0 Records
No records will be generated as result of performing the work directed by this RTWD.

6.0 References
No references are necessary for this RTWD.

7.0 Attachments
RTWD Attachment 1, "Authorized User List for Technical Work Document Title."

RTWD Attachment 1 Authorized User List for Technical Work Document Title

I have read this technical work document, and I will comply with the requirements herein.

Date	Name (Printed)	Signature	Sandia ID

Change History

May 12, 2016

Substantive Changes

Phase 1 revisions to RPPM Chapter 6 are part of the corporate response to NTS-SS-SNL-NMSITE-2015-0002, *Loss of Ionizer Containing Po-210.*

Within the body of RPPM Chapter 6:

- Section 6.4.1.1 was completely rewritten, and the section name was changed from "Exempted Items" to "Excepted Items."
  - The phrase "Exempted Items" was changed to Excepted Items"
  - Verbiage was added to indicate:
    - The Excepted Items List is based on 10 CFR 835 exceptions, the list focuses on consumer products that contain nominal amounts of radioactive material.
- Section 6.4.1.2 was completely rewritten.
  - Verbiage was added to indicate that conditionally controlled materials are a subset of controlled materials, a graduated approach to radiological controls is used, and this approach is consistent with 10 CFR 835.

Additional Changes

- The following title was corrected to: ESH100.2.ENV.11, *Control Scrap Metal from a Radiological Area or Volumetrically Contaminated Metal*
- The title of Chapter 9 was corrected to: "Control of Accountable Sealed Radioactive Sources (ASRSs) and Radioisotope Thermoelectric Generators (RTGs)"
- The title of Chapter 1 was corrected to: "Radiological Work Planning and Controls Management"
- References were updated.
- Hyperlinks were updated.
- The acronym "ARS" was changed to "ASRS" to match RPPM Chapter 9.

Attachment 6-2 and Attachment 6-3 needed to be update; the basis was not clear and appeared inconsistent with 10 CFR 835 requirements.

Attachment 6-2

- The name was changed from "Exempted Items List" to "Excepted Items List."

  "Exempted" is not correct, per the Legal Department; "excepted" is the correct term. Items can be excepted per 10 CFR 835 if they fall under the definition of "Background." meaning radiation from something (e.g., consumer products containing nominal amounts of radioactive material or producing nominal amounts of radiation).

The NRC has provided a yardstick for "nominal amounts" with regards to 10 CFR 835 in 10 CFR 30, *Rules of General Applicability to Domestic Licensing of Byproduct Material*, and 10 CFR 40, *Domestic Licensing of Source Material.*

- The list was reviewed to eliminate items not consistent with 10 CFR Parts 30 and 40.
- Verbiage was added to Attachment 6-2, "Excepted Items List," which states: "The process for adding or removing items in this list is controlled by the RP Department. Questions regarding this list should be addressed to the appropriate RP Line Support Team."

Attachment 6-3

- The Conditionally Controlled Material List was reviewed to eliminate items that were no longer present at SNL or should be controlled material; as a result, the list was reduced from 14 items to 6 items
- The six remaining items are presented in individual tables
- The notice was reworded from "this device contains a radioactive source" to "this device contains radioactive material."
- Verbiage was added to Attachment 6-3, "Conditionally controlled Material List," which states: "The process for adding or removing items in this list is controlled by the RP Department. Questions regarding this list should be addressed to the appropriate RP Line Support Team."

Attachment 6-6

A new attachment was added: Attachment 6-6, "Optional Radiological Technical Work Document Template for On-Site Use of Individual Sealed Radioactive Sources (SRSs) with Activity ≤ 1/10 of the RPPM Appendix E Values (Not to Exceed 100 mCi)."

December 10, 2014

Administrative Changes

Chapter 6

Updated the records section in the following chapters: Introduction, 1, 2, 3, 4, 5, 6, 8, 10, 11, 12, 14. All other chapters are currently undergoing a substantive change process and the records section will be updated during that process.

Added the following text:

- Unless otherwise specified, records shall be retained for 75 years or until final disposition is authorized by DOE. **[10 CFR 835.701(b)]**
  Unless otherwise authorized, the method for recording, storage, retention, and archival of these records is in accordance with IM100.2.2, *Control Records, and* as specified in the Sandia Records Retention and Disposition Schedule maintained by SNL's Customer Funded Records Center within the Recorded Information Management Department, filed under records series HE-130-207-000.
  If using an alternate system (reviewed and authorized by the Recorded Information Management Department as capable of meeting the regulatory required retention period identified above) for records maintenance, it is the responsibility of the individual organization to assure long-term retention of these records and to ensure that they are retrievable over their required storage lifetime, as identified above.

Deleted the following text:

- Unless otherwise specified, records shall be retained as specified in the Sandia Records Retention and Disposition Schedule maintained by SNL's Records Management Program typically filed under records series HE-140-257-000 or HE-140- 258-000 (http://rim.sandia.gov/retention/nsretentionSchedule.htm), or until final disposition is authorized by DOE. **[10 CFR 835.701(b)]**

July 31, 2014

Administrative Changes Only

Throughout the document and attachments:

- **Added**:
  - Headers and page numbers
  - List of acronyms
  - Acronym definitions at first appearance and acronyms after first appearance
  - Table captions and table references
  - Links to corporate dictionary terms
  - The word "team" to line support/customer support callouts to read as follows: "…RP Line Support team…/…RP Customer Support team…"
- **Deleted**:
  - Acronyms only used once
  - Acronym definitions after first appearance
  - References to inactive and cancelled procedures, documents, departments, and websites
- **Corrected**:
  - Punctuation
  - Misspellings
  - Titles and numbers of references
  - Hyperlinks to forms and references
- **Changed:**
  - "the appropriate division ES&H team"/"division ES&H team" **to** "RP"
  - The word "percent" to the symbol "%"

Section 6.6:

- **Adde**d the following reference: DOE G 441.1-1C Admin Chg 1, Radiation *Protection Programs Guide for Use with Title 10, Code of Federal Regulations, Part 835, Occupational Radiation Protection.*

Attachment 6–2:

- **Added** the word "their" to read as follows: "…(may contain uranium/thorium and their daughters…)"

March 27, 2014

Substantive Changes

The following changes were made:

- Updated the table of contents to reflect the added sections.
- Added the following two sections and text:

6.4.3.7 Control of Open Wounds

An open wound is an exposed injury involving a break in the skin. The skin acts as a protective barrier, so an exposed wound is more susceptible than intact skin to the passage of radioactive materials into the body. Open wounds may occur accidentally or intentionally (e.g., from abrasions, punctures, shaving, piercings, tattoos, cuts, burns, and infections).

Requirements

MOWs shall not expose open wounds to radioactive contamination.

An MOW who has an open wound shall not enter a posted contamination area, high contamination area, airborne radioactivity area, or soil contamination area unless all of the following are true:

- Any open wound is covered by a bandage.
- The bandage does not prevent the individual from wearing any item of PPE as required by the applicable TWD.
- The open wound is not bleeding and the bandages are dry.

MOWs shall stop work and seek medical care if any of the following conditions occur while working in a posted contamination area, high contamination area, airborne radioactivity area, or soil contamination area:

- The open wound becomes uncovered.
- The open wound is found to be bleeding or the bandages become wet.
- The open wound or bandage becomes contaminated.
- A new open wound is created.

MOWs shall not attempt to decontaminate an open wound. Wound decontamination requires medical supervision.

Guidance

If an open wound becomes contaminated, have RP personnel evaluate the extent and levels of contamination on the individual so that medical personnel can be briefed.

6.4.3.8 Medically Prescribed Devices for the Administration of Medication

At times, radiological workers may need to wear medically prescribed devices (e.g., insulin pumps) for the administration of medication or for procedures such as dialysis. If any portion of such a device is located outside of the skin, then a potential for contamination of the device and/or the associated skin entry point exists. Portacath devices that are surgically implanted and completely covered by the skin are not of concern.

Requirements

MOWs shall not expose medically prescribed devices that are located outside of the skin and/or the associated skin entry point to radioactive contamination.
An MOW who has such a device shall not enter a posted contamination area, high contamination area, airborne radioactivity area, or soil contamination area unless all of the following are true:

- The device and the skin entry point are covered by PPE to prevent contamination of the device or the passage of contamination through the skin entry point.
- The MOW does not have a medical work restriction prohibiting the entry or work.

MOWs shall stop work, exit the area, and be surveyed for contamination if the following condition occurs while working in a posted contamination area, high contamination area, airborne radioactivity area or soil contamination area:

- The medical device and/or skin entry point becomes uncovered or is otherwise suspected of having become contaminated.

The device wearer shall determine if decontamination of the device should be attempted and/or medical advice sought. If the skin entry point becomes contaminated, do not attempt decontamination and seek medical advice.

Guidance

If a medically prescribed device and/or skin entry point becomes contaminated, have RP personnel evaluate the extent and levels of contamination.

March 4, 2014

Administrative Changes Only

Updated hyperlink throughout the chapter for the following forms:

- SF 2001-RFC
- SF 6951-RRF

January 9, 2014

Administrative Changes Only

In section 6.4.3.2, Requirements, Bullet 6, Sub-bullet 1:

- **Changed**: SF 6951-RRF, Clearance – Radiological Process Knowledge **To**: SF 6951-RRF, Process Knowledge Form for Radiological Clearance, **Updated** hyperlink

In section 6.5, Requirements, Paragraph 3, Bullet 5:

- **Changed**: SF 6951-RRF, Clearance – Radiological Process Knowledge **To**: SF 6951-RRF, Process Knowledge Form for Radiological Clearance, **Updated** hyperlink

September 18, 2013

Administrative Changes Only

In Section 6.2 SCOPE added the following final bullet to complete the correct information.

- "• Personnel frisking. See Section, 8.4.6, Personnel Frisking from Radiological Areas and Other Radiologically Posted Areas, in Chapter 8 of this manual for requirements and guidance on this issue."

In Section 6.4.2.1, Preparation, deleted this "A Radiological Work Permit, as applicable, according to Chapter 1 of this manual." because RWPs are no longer used at Sandia.

For clarification, **in Section 6.4.3.3 Control of Areas (ISMS Function: Control Hazards), Guidance, changed** this:

- "With regard to radiological buffer areas (RBAs):
  - RBAs are established around contamination areas and airborne radioactivity areas as a secondary boundary to minimize the spread of contamination."

To:

- "With regard to radiological buffer areas (RBAs):
  - RBAs may be established around contamination areas and airborne radioactivity areas as a secondary boundary to minimize the spread of contamination."

January 29, 2013

Administrative Changes Only

The following administrative changes have been made to reflect recent previous changes made to chapters 1 and 10, as well as to update terminology and cited references, remove redundancy, make notations consistent, and link terms to their definitions.

1. In Section 6.2 SCOPE

- To **correct** the referenced section, changed this:
  "This chapter does not apply to:
  Personnel contamination control. See section 1.4.3, chapter 1 for requirements and guidance on this issue."
  To:
  "This chapter does not apply to:
  Personnel contamination control. See Section 1.4.2.3.1 in Chapter 1 of this manual for requirements and guidance on this issue."

2. In Section 6.3.1 Managers, the fifth bullet

- Because devices containing radioactive materials are no longer considered to be radiation-generating devices, as reflected in the changes made to Chapter 10 of this manual, **deleted** the reference made to RGDs.

  Changed from this:
  "The appropriate Radiation Line Support Team is informed in advance regarding the acquisition of radioactive materials (except those on the Exempt Items List) or Radiation-Generating Devices (RGDs), so that adequate support planning can be initiated..."
  To:
  "The appropriate Radiation Line Support Team is informed in advance regarding the acquisition of radioactive materials (except those on the Exempt Items List), so that adequate support planning can be initiated...."

3. In Section 6.3.1 Managers, the sixth bullet

- **Linked** the ARS definition to the RPPM Glossary.

4. In Section 6.3.1 Managers, the note after the sixth bullet

- **Added** the word "sealed" and linked the term "non-accountable sealed radioactive sources" to the RPPM Glossary.

5. In Section 6.3.4 Receiving/Mail & Material Movement Department and Storage/Onsite HazMat Transportation Department, third and fourth bullets

- **Updated** the name of corporate policy procedure SCM100.3.19 name from "Move Non-Waste Hazardous Material Onsite and Offsite" to "Movement of Hazardous Materials."

6. In Section 6.4.1.3 Controlled Material, first bullet

- **Added** a link to Attachment 6-2.

7. In Section 6.4.1.3 Controlled Material, the note after the second bullet

- **Deleted** the word “free.”
- **Deleted** the reference to PLA94-40 because this document has been superseded and it is a radiation protection document.
- **Deleted** the phrase “if you have questions.”

Changed this:
“Note: Due to radioactive decay, items sources and material that have been activated or volume contaminated may eventually reach diminished activity levels such that they can qualify as Conditionally Controlled Material, or can even be free released in accordance with requirements contained in PLA94-40, Program Plan for Radioactive Material Management Areas (RMMAs). Contact the appropriate Radiation Protection Line Support Team Project Leader to release materials if you have questions.”
To:
“Note: Due to radioactive decay, items sources and material that have been activated or volume contaminated may eventually reach diminished activity levels such that they can qualify as Conditionally Controlled Material, or can even be released. Contact the appropriate Radiation Protection Line Support Team Project Leader to release materials. “

8. In Section 6.4.1.3 Controlled Material, the fifth bullet

- **Updated** the reference—5400.5 has been superseded by 458.1
- **Linked** the term “accountable sealed radioactive sources” to the glossary.
- **Added** the word “sealed” to make the terminology uniform.

“Changed this:
“Radiological controls related to worker protection...and are derived from requirements contained in 10 CFR 835 and DOE Order 5400.5. The term “accountable radioactive sources” indicates that there are inventory and leak test requirements applicable to these sources and that they are subject to the requirements of RPPM, Chapter 9, “Control of Accountable Radioactive Sources .”
To:
“Radiological controls related to worker protection and the protection of the environment, are the focus of the RPPM and are derived from requirements contained in 10 CFR 835 and DOE Order 458.1 . The term “accountable sealed radioactive sources “ indicates that there are inventory and leak test requirements applicable to these sources and that they are subject to the requirements of RPPM, Chapter 9, “Control of Accountable Sealed Radioactive Sources .”

9. In Section 6.4.1.3 Controlled Material, the sixth bullet

- **Updated** the reference.

Changed “MN471018, Work Planning and Control Manual “ to
*“*ISS100.2.1, *Manage Accountable Nuclear Materia l”.*

10. In Section 6.4.1.3 Controlled Material, the sixth bullet

- **Replaced** the paragraph to clarify it.

Changed this: "A DOE mandate presented in DOE Notice 234.1 has established a DOE Central Data management system to which all radiological sealed sources > 10 CFR 835 Appendix E quantities, RTGs (Radioisotope Thermoelectric Generators) and high hazard sources require reporting. In the case of the high hazard sources, transactions such as transfer of ownership, source destruction, disposal, etc., also need to be declared. The high level sources are lumped into Category 1 and Category 2, the thresholds (in activity) being dependent on the specific nuclide. This is apt to cause confusion as these are categories based on IAEA (International Atomic Energy Agency) values and are not synonymous with existing nuclear or hazard classification values. Since so many organizations are affected by these requirements it was deemed sensible to have a corporate level reporting system. At this time, contact the Device and Source Registrar (see RPPM Chapter 9) with questions related to this process. "
To:
"An accurate inventory of accountable sealed radioactive sources and RTGs (Radioisotope Thermoelectric Generators) must be maintained for reporting to DOE. Transactions such as on or off site movement, source destruction, disposal, etc., involving Category 1 and Category 2 sources must be reported within three business days. See RPPM chapter 9 for more information."

11. In Section 6.4.1.3 Controlled Material, the note after the sixth bullet

- **Deleted** unnecessary material "This has caused much unnecessary confusion."

Changed this:
Note: "Physical Security also uses the terms "Category 1, 2, 3 or 4 quantities of Special Nuclear Material." This has caused much unnecessary confusion as a "Hazard Category 3" facility (DOE-STD-1027-92) is much different than a "Security Category 3" facility (DOE M 470.4-2, *Physical Protection*)."
To:
Note: "Physical Security also uses the terms "Category 1, 2, 3 or 4 quantities of Special Nuclear Material." A "Hazard Category 3" facility (DOE-STD-1027-92) is much different than a "Security Category 3" facility (DOE M 470.4-2, *Physical Protection*)."

12. In Section 6.4.1.3 Controlled Material, the seventh bullet

- To make the notations consistent, **changed** 235U to **U-235** and changed 239Pu to **Pu-239**.

13. In Section 6.4.2.1 Preparation

- **Updated** the name of Chapter 1of the RPPM in two sub-bullets.

Changed "RPPM Chapter 1, "Radiological Work Planning and Control" to "RPPM Chapter 1, Radiological Work Management."

14. In Section 6.4.2.3 Receipt of Radioactive Material (ISMS Function: Perform Work), second bullet

- **Added** the word "sealed" to make the terminology uniform.
- **Linked** the term "accountable sealed radioactive sources" to the glossary.

15. In Section 6.4.2.3 Receipt of Radioactive Material (ISMS Function: Perform Work), third bullet

- **Linked** the term "Type A quantity" to Table A-1 in in 10 CFR 71.4.

16. In Section 6.4.2.3 Receipt of Radioactive Material (ISMS Function: Perform Work), third bullet from the end of this section

- **Added** the word "sealed" to make the terminology uniform.
- **Linked** the term "accountable sealed radioactive sources " to the glossary.

17. In Section 6.4.3.1 Control of Radioactive Material

- **Added** the word "sealed" to make the terminology uniform.
- **Linked** the term "accountable sealed radioactive sources" to the glossary

18. In Section 6.4.3.2 Material, Property, and Equipment Located in Radiologically Controlled Areas (ISMS Function: Control Hazards), final bullet in the section

- **Updated** the name of the references—
  - ESH100.2.ENV.11
  - ESH100.4
  - DOE O 458.1 .
- **Replaced** "RMMA evaluation process" with "Release/Disposal Decision flowchart" because RMMAs no longer exist.
- **Added** "release/disposal" for clarity.

19. In Section 6.4.3.3 Control of Areas (ISMS Function: Control Hazards), Requirements, sixth, seventh and eighth bullets

- **Updated** the names of RPPM chapter and section, and DOE reference.

20. In Section 6.4.3.4 Radioactive Material Transfer, Movement or Transportation (ISMS Function: Perform Work), Requirements, first bullet

- **Updated** the reference name for SCM100.3.19.

21. In Section 6.4.3.4 Radioactive Material Transfer, Movement or Transportation (ISMS Function: Perform Work), Requirements, second bullet

- To correct an error, **deleted** "and any radioactive material shipment offsite."

22. In Section 6.4.3.6 Scrap Metal Recycle (ISMS Function: Perform Work), Requirements

- **Updated** the name of the reference ESH100.2.ENV.11.

23. In Section 6.5 RECORDS, Requirements, first bullet

- **Added** the word "sealed" to make the terminology uniform.
- **Linked** the term "accountable sealed radioactive sources" to the glossary.
- **Deleted** unnecessary material "In addition an inventory of non-accountable radioactive sources is considered as a good business practice."

24. In Section 6.5 RECORDS, Requirements, second to the last bullet

- **Added** the word "Legacy" because RWPs are being phased out and a few are still active, but no new RWPs are being generated.

25. In Section 6.6.1 Requirements Source Documents

- **Added** the references
- 10 CFR 71, Packaging and Transfer of Radioactive Material

- DOE O 458.1*,* Radiation Protection of the Public and the Environment.

26. In Section 6.6.1 Requirements Source Documents

- **Deleted** the reference PLA 94-40, *Program Plan for Radioactive Material Management Areas (RMMAs),* which has been superseded.
- **Updated** the name of reference ESH100.2.ENV.11, *Control Scrap Metal From a Radiological Area.*
- **Added the references**
  - ESH100.2.ENV.24, Manage Mixed Waste at SNL.
  - ESH100.4, *Feedback and Improve*.

Attachment 6-3 Conditionally Controlled Material List

27. In Notes, **added** item #3 "Source Custodians (primary and alternate) are required to complete RAD218 "*Radioactive Source Control for Source Custodians*" IAW RPPM Chapter 3 ." This was done to make it clear that registering even non-accountable sealed radioactive sources will trigger the training requirement for RAD218. Some customers have erroneously believed that if they had non-accountable sealed radioactive sources, the training was unnecessary.
28. In the second-to-the-last row, beginning **"Items, sources and materials"**

Changed this:

- A/VCs shall meet the criteria for free release from SNL in accordance with PLA 94-40, Program Plan for Radioactive Material Management Areas (RMMAs)

To:

- Activated or volumetrically contaminated materials shall meet SNLs release criteria .

Attachment 6-4 Table of Radioactive Material Controls

29. In both the third- and second-to-the-last rows in the far right column, **added** the word "sealed" and **added** as a reference Chapter 9.

Changed this:

- Required for accountable radioactive sources. Recommended for non-accountable sources

To:

- Required for accountable sealed radioactive sources. See RPPM Chapter 9. Recommended for non-accountable sources

Attachment 6-5 Release Disposal Decision Flowchart

30. **Update** the reference by replacing "PLA 94-40" with "Rad per ESH100.2.ENV.23."

August 6, 2012

Administrative Changes Only

In Section 6.4.3.3 Control of Areas (ISMS Function: Control Hazards), Requirements

- **Added** these final bullets and Note:
- "Individuals **Not** reach across radiological boundaries unless authorized to do so by the appropriate RP personnel or an approved TWD.
- Individuals **Not** eat, drink, chew, or apply cosmetics while in:
  - Airborne radioactivity areas.
  - Radiological areas established for contamination control.
  - Radiological buffer areas established for contamination control.
  - Radioactive material areas.
  - Soil contamination areas (SCAs) during performance of intrusive work.

    Note: When performing intrusive work in soil contamination areas, drinking and applying skin/lip sunscreens are allowed in designated hydration break areas. Prior to drinking, hand washing is encouraged. Consult the appropriate RP personnel for assistance in establishing hydration break areas."

May 4, 2010

Administrative Changes Only

Attachment 6-2, Exempted Items List
Attachment 6-3, Conditionally Controlled Material List

Added	• Attachment 6-2 (RPPM Requirements Exemption List)
	  • **Added:** Radioactive material becomes dissociated (i.e., falls, flakes or rubs off) from an exempt item.
	• Attachment 6-3 (Under "Individual Manufactured Radioactive Sources")
	  • Added:
	  • Notes:
	  1. Any area within a controlled area, accessible to individuals in which items or containers of radioactive material exist and the total activity of radioactive material exceeds the applicable values provided in Appendix E must be posted as a Radioactive Material Area. Note that the sum of the factions rule applies in making this determination.
	  2. Where a combination of radionuclides in known amounts of involved, derive the value for the combination as follows: Determine for each radionuclide in the combination, the ratio between the quantity present in the combination and the lesser of the Appendix E values. If the sum of such ratios for all radionuclides in the combination exceeds one tenth.

Modified	• Attachment 6-2
	From: total effective dose equivalent (TEDE)
	To: total effective dose (TED)
	• Attachment 6-3 (Under "Individual Manufactured Radioactive Sources")
	From: Individual manufactured radioactive sources with an activity less than or equal to the lesser of
	  • 1/10 of the RPPM Appendix E values
	  • 10 CFR 30.71 (Schedule B) values See Notes
	To: Individual manufactured radioactive sources with the lesser activity of
	  • 1/10 of the RPPM Appendix E values
	  • 10 CFR 30.71 (Schedule B) values See Notes
	• Attachment 6-3 (Under "Individual Manufactured Radioactive Sources")
	From: If multiple sources are stored together, consider the total aggregate amount of material with respect to labeling (compare aggregate amount to Appendix E).
	To: No – for an individual source however, if multiple sources are stored together, consider the total aggregate amount of material with respect to labeling (compare aggregate amount to 1/10 of Appendix E).

Reason for Change	Changes made to ensure accuracy of information within both attachments 6-2 and 6-3.

March 24, 2010

Administrative Changes Only

Modified	Records Section: • Modified verbiage **to**: Members of the Workforce who generate occupational radiation protection related records shall use the special units of curie, rad, roentgen, or rem, including multiples and subdivisions of these units, or other conventional units, such as, dpm, dpm/100 cm2 or mass units. The SI units, becquerel (Bq), gray (Gy), and sievert (Sv), may be provided parenthetically for reference with scientific standards. **[10 CFR 835.4]** • Chapter 9 SME Changed Chapter 9 SME **from** Luke Paulus **to** Nathan Elliott.
Reason for Change	Certain Records section passages were modified in order to eliminate variation in wording relating to the usage of radiological units.

November 4, 2009

Administrative Changes Only

Added	• 6.6.2 Related Documents **Added**: PLA 94-40, *Program Plan for Radioactive Material Management Areas (RMMAs)*
Modified	• Attachment 6-3 **From:** Chapter 19 of the ES&H Manual **To:** ESH100.2, Analyze and Control Hazards • Attachment 6-5 **From:** Chapter 10U of ES&H Manual **To:** ESH100.2.ENV.11 • Attachment 6-5 **From:** Chapter 19 of the ES&H Manual **To:** ESH100.2, Analyze and Control Hazards
Reason for Change	Chapters of the ES&H Manual have been deleted and replaced by ESH Corporate procedures. Chapter 19D has been replaced by PLA 94-40. These changes are being reflected in this document and its attachments.

August 3, 2009

Substantive Changes

This chapter has changed by 75% or more and should be read in its entirety. This chapter was modified in order to comply with requirements from 10 CFR 835.

Dann Ward replaces Bob Miltenberger as the SME for Chapter 6.

Under Section 6.2, "Scope"

- **Changed:** Discussion of Material Categories is now in Section 6.4.1.
- **Added:** Verbiage emphasizing that Chapter 6 requirements and guidance will help the line with disposal, reapplication and recycling issues.

Under Section 6.3, "Responsibilities"

- **Added:** "Inform RPLST, in advance, of purchase of Rad Material."
- **Added:** "Accountable Sealed Radioactive sources are registered in DARTS as required by Chapter 9."

Under Section 6.4, "Procedure"

- **Added:** New Section 6.4.1, "Classification of Radioactive Materials for Occupational Radiation Protection Purposes."

Under Section 6.4.1.1, "Exempted Items"

- **Added:** The Radiation Protection program determines that the dose to an individual from the item is likely to result in 100 mrem total effective dose (TED) or more in a year.
- **Added:** Warning: Some exempt items may require disposal as radioactive waste. See CPR400.1.1/MN471001, ES&H Manual, Section 19B, "Radioactive Waste Management," and Section 19C, "Mixed Waste Management," for information regarding waste determination and disposal."

Under Section 6.4.1.2, "Conditionally Controlled Material"

- **Added:** Warning: Some exempt items may require disposal as radioactive waste. See CPR400.1.1/MN471001, ES&H Manual, Section 19B, "Radioactive Waste Management," and Section 19C, "Mixed Waste Management," for information regarding waste determination and disposal.

Under Section 6.4.1.3 "Controlled Materials"

- **Added:** New information in the form of a Caution Statement: "There are 5 separate systems related to the control of radioactive materials within SNL...."

Under Section 6.4.2 "Planning Work With Radioactive Material"

- **Changed:** Several revisions to verbiage in the section were made to help clarify existing material.

Under Section 6.4.3, "Control of Radioactive Material"

- **Changed:** Several revisions to verbiage in the section were made to help clarify existing material.
- **Changed**: Table 4.1 "Radioactive Material Controls" was moved out of the body of Chapter 6 and became Attachment 6-4.

- **Added:** Guidance for transportation surveys.

Under Section 6.4.3.2 “Material, Property & Equipment...”

- **Added:** Instructions for the use of SF 6951-RRF (Process Knowledge Form) when unrestricted disposition of property or material is intended.

In Section 6.4.3.2.2 “Control of <0.1 Appendix E Values”:

- **Added:** Guidance about best work practice regarding labeling and registration of < 0.1 Appendix E sources.

In Section 6.5 “Records”:

- **Added:** Identified Line originated records and RP originated records that must be retained.

In Attachment 6-1 “Radioactive Contamination Limits”

- **Added:** Included new information required by changes to 10 CFR 835.

In Attachment 6-2 “Exempted items List”:

- **Added:** “Warning: Some exempt items may require disposal as radioactive waste. See CPR400.1.1/MN471001, ES&H Manual, Section 19B, “Radioactive Waste Management,” and Section 19C, “Mixed Waste Management,” for information regarding waste determination and disposal.”

In Attachment 6-3 “Conditionally Controlled Materials List”:

- **Added:** Split Ni-63 sources into two categories and included requirements for both categories.
- **Added:** Changed labeling requirements for gas chromatograph sources.
- **Added:** New label for gas chromatograph sources.
- **Added:** Reformatted columns to enhance readability.

In new Attachment 6-4 “Table of Rad material Controls”:

- **Changed:** Old table 4-1 is now attachment 6-4.
- **Added:** Guidance for when movement surveys are required.
- **Added:** New Attachment 6-5 “Release/Disposal Decision Flowchart” was the old Attachment 6-4.
- **Changed:** Minor editorial changes were made to the flowchart.

April 1, 2008

Administrative Changes Only

Update the Table of Contents in the chapter to reflect all numbered paragraph headings (i.e., all section headings and subordinate paragraph headings).

March 11, 2008

Administrative Changes Only

- Renumber all section headings to include the chapter number.
- Update all section references within in the chapter to reflect the renumbering.
- Verify and update all section reference links.

September 7, 2007

Administrative Changes Only

Delete: Tom Laiche as Co-SME of the chapter. Robert Miltenberger remains as the SME

June 6, 2007

Administrative Changes Only

Add: Optical Glass Containing ≤5% by Wt. of Uranium to the conditionally controlled materials list in Attachment 6-3.

September 22, 2006

Substantive Changes

Under the topic "4.2.1, Control of Radioactive Material":

- **Add:** Requirement for Managers to ensure that, sealed radioactive sources are: used, handled, and stored in a manner commensurate with the hazards associated with operations involving the sources. **[10 CFR 835.1201]**

June 21, 2006

Substantive Changes

Under the topic, "4.1.3, Receipt of Radioactive Material (ISMS Function: Perform Work)":

- **Add:** Requirement for managers to ensure that all Department of Transportation (DOT) shipping papers, source certificates, and any special form certificates (e.g., ANSI and NIST) are maintained in accordance with Section 5.0 Records of this chapter and that copies are forwarded to the Device and Source Registrar.

Under the topic, "4.2, Work with Radioactive Material (ISMS Function: Perform Work)":

- **Delete:** RWP from table 4.1 in the conditionally controlled material column for the TWD control requirement category. RWPs have been disengaged from TWDs per Chapter 1 of the Radiological Protection Procedures Manual.

December 15, 2005

Administrative Changes Only

Under the topic, "4.2.4, Radioactive Material Transportation":

- **Clarify**: That Onsite transfers or movements should be performed in accordance with written procedures. The procedures or other measures should use a graded approach and if necessary should discuss the following:
    - Radiological monitoring.
    - Radiological labeling.
    - ALARA.
    - Spill control/Secondary containment.
    - Notification to impacted personnel of the radioactive material movements.
    - Description of movement route.

July 12, 2004

Substantive Change

Under Section, 2.1, "Exempted Items":

- **Add.** Reference to RPO-01-14, *Procedure for the Review and Categorization of Radioactive Materials by the Radioactive Material Controls Committee*.

Under Section, 2.2, "Conditionally Controled Material":

- **Add.** Activated or volume contaminated material meeting the criteria of the Conditionally Controlled List to the list of example conditionally controlled material.
- **Add.** Reference to RPO-01-14, *Procedure for the Review and Categorization of Radioactive Materials by the Radioactive Material Controls Committee*.

To the topic, "References":

- **Add** to the subtopic, "Requirements Source Documents," 10 CFR 30 that pertains to consumer products.

To Attachment 6-2, "Exempted Items List":

- **Add.** The subtopic, "ES&H Samples."

To Attachment 6-3, "Conditionally Controlled Material List":

- **Add.** Rows to the table for:
    - Self-luminous products containing tritium.
    - Items, sources and materials that have been activated or volume contaminated below the stated limits.

June 18, 2003

Administrative Changes Only

Attachment 6-3, "Conditionally Controlled Material List," was revised to:

- **Change:**
    - Restore the list content to that prior to the December 12, 2002, administrative change. Only the last row prior to the "Notes" is affected. This change was made in violation of the Conditionally Controlled Material List process, and was authorized at an inappropriate level. Following further investigation, the content of this change will be reworded and submitted through the change process. [RPSC Requirements Subcommittee, June 17, 2003]

March 31, 2003

Substantive Changes

- **Add.** To the Section 1.0, "Purpose," that the section now also provides guidance on the decision mechanism for disposing of radioactive or potentially radioactive material.
- **Add.** To the Section 2.0, "Scope," clarification that radioactive material is defined by the limits in Attachment 6-1.
- **Change.** In the Section 2.1, "Exempted Items," a new bullet to the list that overrides an exemption for "SNL radiological material is added intentionally or accidently, or if the item/material has become activated due to SNL activities."
- **Change**. In Section 2.1, "Exempted Items" and Section 2.2, "Conditionally Controlled Material," move the statement "If radioactive material becomes dissociated from a conditionally controlled item as a result of storage, use, handling, aging, damage, etc., the contamination shall be controlled in accordance with the requirements of this manual (see Section 4.2.3)," and reword it into a manager requirement in Section 4.2.1, "Control of Radioactive Material."
- **Add.** To the Section 2.3, "Controlled Material," add the following bullets to the examples of controlled material:
  - Items, sources, or material that is activated or volume contaminated and a "note" regarding an exclusion for items that were once activated or volume contaminated, but now meet RMMA requirements.
  - Material exceeding the Attachment 6-1 levels to the fourth bullet, clarify that inaccessible radioactive material or radiation sources "(not in excess of Appendix E values)."
- **Change**. In Section 2.3, "Controlled Material," delete the imbedded definition and add two bullets to the list of criteria that define "controlled material."
- **Add.** In Section 2.3, "Controlled Material," add a second "note" about certain SNM inventories being classified and consolidating inventory information may reveal information that would be useful to an adversary and advising that inventory information be reviewed by an Authorized Derivative Classifier (ADC).
- **Change.** In Section 3.1, "Managers," third bullet, that decontamination ... is performed in accordance with "approved technical work documents."
- **Change.** In Section 3.1, "Managers," move several imbedded manager requirements to Section 4.2.1.
- **Change.** In Section 3.2, "SNL Personnel," move two imbedded personnel requirements to Section 4.2.1.
- **Change.** In Section 3.3, "Radiation Protection Personnel," the second bullet that surveys of record are conducted and documented to support line operations."
- **Add.** To Section 3.3, "Radiation Protection Personnel," a new fourth bullet that RP personnel are responsible for "providing radiological support for the disposition of facilities..."
- **Change:** In Section 3.4, "Receiving/Mail & Material Movement Department (10263) and Corporate Storage & Shipping (10268)," list both departments (and update organization

names and numbers) because the responsibilities that were previously listed have been divided between these departments.

- **Add:** To Section 3.4, "Receiving/Mail & Material Movement Department (10263) and Corporate Storage & Shipping (10268)," a fourth bullet stating that these departments are responsible for "providing guidance to line managers on the requirements for onsite transportation..."
- **Change**. In Section 4.1.3, "Receipt of Radioactive Material, Requirements," a note that RPPM requirements apply to a limited quantity radioactive material even though current shipping regulations allow it to be shipped without an external radioactive material label.
- **Change.** In Section 4.1.3, "Receipt of Radioactive Material, Requirements," a simplified statement that "managers shall ensure that facilities under their operational control are properly posted in accordance with the requirements of Chapter 2, "Posting and Labeling for Radiological Control."
- **Change**. In Section 4.2.1, "Control of Radioactive Material, Requirements," include some requirements that were previously obscured in the "Responsibilities" section under the lead-in, "managers shall ensure that..." In addition, the following revisions were made:
- **Change.** In Table 1, "Radioactive Material Controls," delete RAD102 from the first row, last column to be consistent with the official training requirements in Chapter 3, "Radiological Training Program."
- **Change.** When accountable radioactive sources are transferred ... the ""documentation specified in Chapter 9, 'Control of Accountable Radioactive Sources,' is completed within 60 days."
- **Add.** "In cases where facility ownership is transferred and continued operation of the facility is anticipated, the facility must be remediated to Attachment 6-1 levels or the new owner must be appraised and accept the current radiological conditions."
- **Add.** "In cases of final disposition, facilities must meet the authorized limits appropriate for the disposition path (such as Attachment 6-1 values, interagency agreement values, or waste acceptance criteria) and disposition documentation must be completed prior to transfer of real property to a new owner or final demolition activities commence."
- **Add.** "Written guidance is obtained from the appropriate division ES&H team as it relates to a specific line-owned process."
- **Change**. In Section 4.2.1, "Control of Radioactive Material," some requirements for SNL personnel that were previously obscured in the "Responsibilities" section.
- **Add.** To Section 4.2.1, "Control of Radioactive Material," three requirements that were moved from "Responsibilities."
- **Change.** Rename Section 4.2.2 to "Control of Material, Property, and Equipment," and combine with the previous Section 4.2.2, "Storage of Radioactive Material" and Section 4.2.3, "Control of Material and Equipment."
- **Add.** To the renamed Section 4.2.2, "Control of Material, Property, and Equipment," content that covers the scrap metal moratorium, volumetric contamination, and release of material.

- **Change.** To Section 4.2.2, "Control of Material, Property, and Equipment," the first bullet that all of the following sub-bullets must be true.
- **Add.** In Section 4.2.2, "Control of Material, Property, and Equipment," to the first bullet, a sub-bullet that adds to the criteria for material transfer.
- **Add.** In Section 4.2.2, "Control of Material, Property, and Equipment," the requirement that "scrap metal coming from a radiological area is evaluated to ensure that *E&SH Manual*, Chapter 10U, "Scrap Metal from a Radiological Area or Volumetrically Contaminated Metal,"" disposition restrictions are followed.
- **Change.** To Section 4.2.2, "Control of Material, Property, and Equipment," move the bullet "contamination that results from Attachment 6-2, "Exempted Items List are handled..." and all sub-bullets from "Guidance" to "Requirements."
- **Change.** To Section 4.2.2, "Control of Material, Property, and Equipment," include as requirements some of the guidance statements previously under the old Section 4.2.3, "Control of Material and Equipment, Guidance."
- **Change.** To Section 4.2.2, "Control of Material, Property, and Equipment," sub-bullets, refer to RPPM, Chapter 13, and *ES&H Manual*, Chapters 18 and 22 for more information about occurrence reporting
- **Change**. To Section 4.2.2, "Control of Material, Property, and Equipment," sub-bullets, clarification of the criteria for unrestricted release for disposition and a callout to the new Attachment 6-5, "Release/Disposal Decision Flowchart."
- **Change**. To 4.2.2.2, "Control of Radioactive Material Quantities Less Than One-Tenth of the Values Specified in Appendix E, Guidance" clarify the applicability of the guidance.
- **Change**. Renumber the remaining 4.2.2 subsections (e.g., 4.2.2.2 to 4.2.2.1, 4.2.2.3 to 4.2.2.2).
- **Change**. Rename Section 4.2.3, to "Control of Areas."
- **Change.** Combine all of the statements under the first "Guidance" into "Requirements." The second "Guidance" remain as "Guidance." [For some reason, this section had two "guidance" sections.]
- **Add**. To Section 4.2.3, "Control of Areas, Requirements," managers shall ensure that:
  - "The appropriate division ES&H team is contacted, in a timely manner, for assistance in determining the potential impact of, and providing..."
  - "Facilities meet the authorized release criteria (Attachment 6-1) and that release surveys are documented prior to transfer of real property to a new owner..."
  - "Radiological buffer areas are established around contamination areas 'and airborne contamination areas' as a secondary boundary to minimize..."
- **Add.** To Section 4.2.3, "Control of Areas, Requirements," a "note" about how to obtain an exemption to step-off pads at access control points of contamination, high contamination, and airborne radioactivity areas to cover areas such as fumehoods.
- **Change**. In Section 4.2.3, "Control of Areas, Guidance," in the third bullet, delete "10 times" the values in Attachment 6-1.

- **Change**. In Attachment 6-1, "Radioactive Contamination Limits," the removable and soil contamination limit for tritium and tritiated compounds to 10,000 to agree with 10 CFR 835, Appendix D.
- **Add**. New Attachment 6-5, "Release/Disposal Decision Flowchart."

December 12, 2002

Administrative Changes Only

- **Add:** To Attachment 6-3, "Conditionally Controlled Material List," items from Section 2.2, "Conditionally Controlled Material," in the chapter to make both lists agree. The added items are:
  - Individual items, including sealed radioactive sources, with activity levels less than one-tenth the applicable limit in Appendix E.
  - Generally or specifically licensed commercially available products.
  - Exempted items that no longer meet the exclusions listed in Section 2.1.
  - Inaccessible radioactive material or radiation sources.

July 17, 2002

Administrative Changes Only

- **Add:**
  - To Attachment 6-3, "Conditionally Controlled Material List," information for "Inline Ionizers containing up to 10 mci of Po-210."

March 4, 2002

Administrative Changes Only

- **Add:**
  - To Attachment 6-3, "Conditionally Controlled Material List," information for "ADAM Mine Parts containing 0.096g DU in an epoxy matrix weighing 417g."

January 29, 2002

Administrative Changes Only

- **Add:**
  - A new Section 4.2.7, "Scrap Metal Recycle," that links to the scrap metal recycling requirements in the *ES&H Manual*, Section 10U, "Scrap Metal From a Radiological Area or Volumetrically Contaminated Metal."

January 25, 2001

Substantive Changes

- **Add:**
  - A new Section 4.2.2.1, "Control of Radioactive Material Quantities Less Than One-Tenth of the Values Specified in Appendix E," giving requirements and guidance for control of small quantities of radioactive material.

October 12, 2000

Administrative Changes Only

- **Add:**
  - "Radiation deflector housing on Radiation and Physical Pallet (RPIP)" to Attachment 6-3, "Conditionally Controlled Material List.

August 2, 2000

Administrative Changes Only

- **Change:** the following to attachments to Chapter 6 and adjust attachment links throughout the chapter:
  - Exempted Items List to Attachment 6-1.
  - Conditionally Controlled Material List to Attachment 6-2.

July 12, 2000

Administrative Changes Only

- **Change:**
  - update the Exempted Items List and the Conditionally Controlled Material List.

January 11, 2000

Substantive Changes

Add:

- Requirements for "Exempted Items."
- Requirements for "Conditionally-Controlled Material."
- Form for requesting exempt or conditionally-controlled designation.
- Responsibilities for managers and SNL personnel.
- Requirements for "Control of Material and Equipment."
- Requirements for "Receipt of Radioactive Material."
- Requirements for "Storage of Radioactive Material."
- Requirements for "Radioactive Material Transportation."

Movement of Hazardous Material

Revision 5

A TA-V Operating Reference Use Procedure

Date Effective: 10/21/2016

Document Author: Michael A. Torneby, Operations Management Program

Document Approver: Michael T. Spoerner, Operations Management Program

On-the-Spot Changes ONLY

Approver:

Signature

Date Approved:

Information Management Program controlled copy

[Signed Name], IMP member Date

REVISION SUMMARY

Revision Number	Revision Description	Affected Sections/Pages	DCR/CR/CA Number(s)
Rev 5	Incorporated on-the-spot change, added two non-facility storage locations. Added provisions for excluding items with HC ≤0.0001 from tracking.	Section 1.2 Section 3.2	1532

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Purpose

The purpose of this procedure is to provide guidance for:

- Movement of hazardous material onsite between Technical Area V (TA-V) locations
- Movement of hazardous material onsite between technical areas
- Storage of radioactive material at TA-V locations.

The term "TA-V location" as used in this procedure means a TA-V facility or an approved non-facility storage area. The term "TA-V facility" means a Nuclear Hazard Category 2 (HC-2) or 3 (HC-3) facility within TA-V, a below HC-3 (radiological) facility within TA-V or a below HC-3 (radiological) facility under TA-V control located in TA-III, e.g., Low Dose Rate Irradiation Facility (LDRIF).

The provisions for movement of radioactive material apply to those items that have not been designated to be waste. For an item intended for disposal as waste, this procedure allows for its movement prior to designating it as waste, i.e., the placement in the waste containers in the waste accumulation areas and tracking via Waste Addition Logs. According to the corporate procedure SCM100.3.19, *Movement of Hazardous Material* (Ref. 1), waste movements are performed exclusively by hazardous waste management organizations at Sandia (WMPPD). Management of radioactive and mixed waste at TA-V is addressed in TAV-AP-022, *Radioactive/Mixed Waste Management* procedure (Ref. 2).

This procedure also provides a mechanism for tracking quantities of radioactive material (waste and non-waste) at non-facility storage areas and quantities of material moved between storage areas and facilities to ensure that hazard category thresholds are not exceeded.

1.2 Scope

This procedure provides guidance for:

(1) Movement of hazardous material between TA-V locations, i.e., the facilities and/or non-facility storage areas (movement onsite within technical area)
(2) Movement of hazardous material from TA-V to another technical area at Sandia National Laboratories (movement onsite between technical areas)
(3) Tracking and maintaining inventory of radioactive material stored in the non-facility storage areas
(4) Estimating the HC fraction or sum of fractions for contaminated/activated material, equipment or components
(5) Applying a *De Minimis* level to contaminated/activated material, equipment and components (M&E) to evaluate M&E for exclusion from tracking and inventory requirements.

The term hazardous material refers to both non-radioactive and radioactive material.

The following facilities are located within TA-V or are under its control:

- Annular Core Research Reactor Facility (HC-2), internal and external locations
- Sandia Pulse Reactor Facility (HC-2), internal and external locations

- Auxiliary Hot Cell Facility (HC-3)
- Gamma Irradiation Facility (below HC-3)
- Low Dose Rate Irradiation Facility (below HC-3, located in TA-III)
- Radiation Metrology Laboratory (below HC-3).

The non-facility storage locations include the following:

- Building 6591 12A
- Transportainer #451879.

Only the quantities of non-radioactive hazardous material that are exempt from placarding requirements per 49 CFR 172.500 (Ref. 3) can be moved from TA-V to another SNL technical area (movement onsite between technical areas) under this procedure. The quantities requiring placarding must be moved by Packaging and Transportation (P&T) organization.

The quantities of radioactive materials that can be moved within TA-V (movement onsite within technical area) under this procedure are below the HC-2 threshold (Ref. 4). For movement of material whose quantity is equal to or greater than the HC-2 threshold amount, a separate technical work document (TWD) shall be developed.

The quantities of radioactive materials that can be moved from TA-V to another technical area at SNL (movement onsite between technical areas) cannot exceed *Radiological Protection Procedures Manual* (RPPM) (Ref. 5), Appendix E values AND the dose rate on contact at the surface of the outer packaging cannot exceed 2 mrem/hr. The quantities exceeding the RPPM Appendix E value(s) OR the dose rate provided above must be moved by Packaging and Transportation (P&T) organization.

The quantity of radioactive material that can be stored at a TA-V location is ultimately controlled by that location's limits on radioactive material. The limits for individual facilities are provided in the facility authorization basis. The limit for the non-facility storage area is the HC-3 threshold fraction of 0.8. The HC-2 and HC-3 threshold quantities for individual radionuclides used to implement this limit are provided in *Hazard Categorization Calculations Using ICRP 68 and 72* (Ref. 4). Material, property and equipment that meet the *De Minimis* criteria, as defined in Section 4.8, are exempt from the requirements of this procedure and do not count against the inventories for the facility or non-facility storage areas. Additional provisions for calculating the HC fraction for a storage location are provided in Appendix B.

Requirements and controls associated with technical safety requirements, criticality safety, accountable quantities of radioactive material (MC&A), material balance area (MBA), security, explosives, and classified material are not addressed in this procedure. The hazard analysis and TSR requirements for movement of radioactive material within TA-V, where the point of origin or the destination is a nuclear facility, is addressed in the facility-specific safety basis. As a result, for movements involving nuclear facilities, this procedure must be used in conjunction with facility operating procedures for the transfer of radioactive material.

1.3 Applicability

This procedure applies to the onsite movement, motorized or otherwise, and storage of hazardous material (that has not been designated to be waste) as follows:

- The storage and tracking (inventory) provisions of this procedure for radioactive material are only applicable to the non-facility storage areas. Management and inventory of radioactive material within the facilities is governed by facility-specific procedures.
- The hazardous material movement provisions of this procedure are only applicable to onsite movements, i.e., within technical area (i.e., TA-V and TA-III facility under TA-V's control) and between technical areas, excluding the movement within TA-V facilities.
  NOTE: Movements between TA-V and TA-III are considered movements "within a technical area" per corporate procedure SCM100.3.19 (Ref. 1).
- The hazardous material movement provisions of this procedure are not applicable to movement between technical areas of quantities of non-radioactive hazardous materials that require placarding per 49 CFR 172.504 or quantities of radioactive materials that exceed RPPM, Appendix E quantities OR that produce the dose rate on contact at the outer packaging in excess of 2 mrem/hr. These items must be moved by Packaging and Transportation (P&T) organization.
- The hazardous material movement provisions of this procedure do not apply to radioactive material listed on the exempted items list in RPPM, Chapter 6, Attachment 6-2, if the item meets all of the criteria for an exempted item. These requirements do not apply to radioactive material which meets exempted consignment or exempted concentration activity limits specified in 49 CFR 173.436.
- This procedure applies to hand-carrying radioactive materials between locations within TA-V, e.g., neutron activation foils transferred from ACRR to RML for analysis. Other examples of radioactive materials that can be hand-carried within TA-V are fission foils and wires, activation foils, activated sulfur pellets, and environmental media.
- The hazardous material movement provisions of this procedure do not apply to the suppliers of subcontracted services (e.g. construction services, and the delivery and pickup of gas cylinders), who comply with DOT regulations and requirements, unless specifically stated otherwise in an agreement (contract) between Sandia and the supplier.
- The hazardous material movement provisions of this procedure do not apply to movements of hazardous, radioactive, or mixed waste. Waste movements are performed exclusively by hazardous waste management organizations at SNL/NM.

This procedure applies to any member of the TA-V work force who has signed into this procedure as an authorized user. Other SNL organizations may move hazardous material within TA-V only under their own, approved TWD.

Responsibilities

The **TA-V Hazardous Material Handler** is responsible for moving hazardous material in accordance with this procedure. Any member of the TA-V work force who has signed into this procedure as an authorized user (Appendix A) can perform the function of a Hazardous Material Handler. Conversely, any person performing movements of hazardous material in TA-V is required to be an authorized user of

(see Appendix A) and follow this procedure, except when: specifically exempted by this or other corporate procedure, when covered by another TA-V approved TWD, or when tracking is not required.

TA-V Radioactive Material Storage Administrator:

- Is responsible for tracking the quantities of radioactive material in non-facility storage locations, when material movements are taking place to or from the non-facility storage locations, and for ensuring that limit for the non-facility storage locations is not exceeded.
- Is responsible for maintaining the Radioactive Material Activity Log and ensuring that radioactive material movement entries are made timely into the Log, as specified in this procedure.
- Assists the TA-V Hazardous Material Handler with the characterization of new radioactive M&E, as necessary.
- Performs periodic reviews of the inventory of radioactive material stored in the non-facility storage areas, as specified in this procedure.

1.4 Flow-Down of Requirements

This procedure implements the requirements of corporate procedure SCM100.3.19, *Movement of Hazardous Material* (Ref. 1), for onsite hazardous material movement, i.e., within TA-V and TA-III site boundaries, and between TA-V and other technical area at SNL by means of motorized vehicles. **NOTE:** Movements between TA-V and TA-III are considered movements "within a technical area" per SCM100.3.19.)

The activities described in this procedure are also subject to the requirements in corporate procedure ESH100.2.RAD.1, *Implement Radiation Protection Procedures* (Ref. 6).

Provisions included in the following tables are applicable to hazardous material movement covered by this procedure:

- SCM100.3.19, Table A, *Onsite Movement Requirements for Non-Radioactive Materials*
- SCM100.3.19, Tables B-2, B-3, or B-4, *Onsite Movement Requirements for Radioactive Materials*
- SCM100.3.19, Table C, *Additional Restrictions for Movement of Packages Containing Multiple Hazards and Multiple Packages*
- SCM100.3.19, Table D, *Classes and Divisions of Materials of Trade*
- SCM100.3.19, Table E, *Quantity Limits for Hazardous Materials Moved as Materials of Trade*.

This procedure also implements the requirements for maintaining inventory of radioactive materials to ensure that the quantities of radioactive material at the TA-V locations remain below the applicable HC limits (Ref. 7).

2.0 HAZARDS, PRECAUTIONS AND LIMITATIONS

2.1 Hazards

Equipment or components may contain varying amounts of hazardous material listed below:

Hazard Class	Controls for Movement
Class 2.1: Flammable Gas	Secure cylinder during transport, assure safety cap is in place, assure acetylene cylinders are stored in an upright position
Class 2.2: Nonflammable Gas	Secure cylinder during transport, assure safety cap is in place
Class 6.1: Toxic Substances	Gloves, safety glasses, strong tight packaging, wash hands after handling if there is any indication of spill/breakage
Class 7: Radioactive Material	Controls specified in radiological TWD (RTWD)
Class 8: Corrosives	Gloves, safety glasses, strong tight packaging, wash hands after handling if there is any indication of spill/breakage
Class 9: Miscellaneous	Gloves, safety glasses, strong tight packaging, wash hands after handling if there is any indication of spill/breakage

2.2 Hazard Control

See table in Section 2.1.

2.3 Precautions and Limitations

This procedure cannot be used for motorized movement of radioactive materials with quantities equal to or greater than HC-2 threshold.

3.0 PREREQUISITE ACTIONS

3.1 Planning and Coordination

TA-V facility supervisors (FS), or radioactive material storage administrator (RMSA) for non-facility storage areas, plan and coordinate motorized movement of hazardous materials with a TA-V Hazardous Material Handler.

Movement of radioactive materials constitutes radiological work, which requires an RTWD. Refer to the approved RTWD for the required radiological controls, including RCT notifications.

Radioactive material transfer restrictions may include applying a standoff distance for any combustible/ flammable materials, and transfer route planning.

3.2 Documentation

The hazardous material must be identified during movement. Acceptable forms of identification can be a marking, label, a Safety Data Sheet (SDS), or a transfer document which clearly identifies the name of the hazardous material.

Radioactive Material Activity Log is used to document radioactive material inventory at non-facility storage locations and any radioactive material movement (additions or subtractions) to and from storage at a given storage location. The log is maintained by the TA-V Radioactive Material Storage Administrator. The link to the Radioactive Material Activity Log form for a non-facility storage area is provided in Section 8.

When moving radioactive material, the inventories of the shipping and receiving locations are updated using an appropriate HC fraction or a quantity of radioactive material. For materials that are currently tracked under this procedure (for the non-facility storage areas), the existing HC fraction of record is used, as documented in the current Radioactive Material Activity Log. For new items, the item is characterized and the HC fraction is calculated as provided in Appendix B. Because of their negligible contribution to the sum of HC fractions, the items with the HC fraction of 0.0001 or less are not required to be included in the storage location inventory. Additional justification for excluding the items with the HC fraction of ≤0.0001 from the inventory at the storage locations is provided in Reference 8.

3.3 Tools, Equipment, Parts, and Supplies

For material movement, special tools and equipment include:

- Any government owned, motorized vehicle or other non-motorized means of transport
- Packing material, if needed
- Labeling.

3.4 Specialized Training

- PKX050, *Site-Specific Packaging and Transportation of Hazardous Materials Training*, is required for members of the workforce who, in the course of employment, are directly involved in the movement of hazardous material classified as materials of trade.
- PKX050, *Site-Specific Packaging and Transportation of Hazardous Materials Training*, and

  PKX100, *Basic Hazardous Material Transportation Training*, are required for members of the workforce who, in the course of employment, are directly involved in the handling, packaging, shipment, receiving, or transportation of hazardous material (other than materials of trade).
- PKX111, *Basic Radioactive Materials Transportation Training*, is required for members of the workforce who, in the course of employment, are directly involved in the handling, packaging, shipment, receiving, or transportation of radioactive material.
- FKL153, *Forklift Operator and Hands-On Training*, is required for members of the workforce who use a forklift [for transporting hazardous materials].
- Training requirements for the movement of radioactive material are specified in the RTWD.

3.5 Definitions and Acronyms

CIS	chemical information system
FS	facility supervisor
HC	hazard category
LDRIF	Low Dose Rate Irradiation Facility
MAR	material-at-risk
MBA	material balance area
MC&A	material control and accountability
M&E	material, equipment, or component
P&T	Packaging and Transportation organization
RCSC	Radiological / Criticality Safety Committee
RCT	radiological control technician
RMSA	radioactive material storage administrator
RP	Radiation Protection (organization)
RPPM	Radiological Protection Procedures Manual
RTWD	radiological technical work document
SDS	safety data sheet
SPRF	Sandia Pulsed Reactor Facility
TA-V	Technical Area V
TWD	technical work document

Measurable radioactivity – Radioactivity that can be quantified using known or predicted relationships developed from historical information, process knowledge or measurements.

Movement – Physical relocation of a hazardous material from one geographic location to another; may or may not include a change in ownership.

Strong/tight packaging – Packaging that provides protection against the unintentional release of its contents under conditions normally incident to its transport (e.g., a closed plastic bag would be adequate to transport material which would not be expected to damage the bag while in transport).

Transfer – Change in ownership of a material, with or without physical relocation.

3.6 Field Preparations

When using a forklift or motorized cart, conduct a pre-use inspection and document the inspection results, as required, on the Pre-Use Inspection Form which is normally attached to or located with the vehicle. Consider use of a spotter for radioactive material movements to reduce the likelihood of mechanical impacts. For movements involving quantities of radioactive material whose HC-3 sum of fractions is greater than or equal to 1, shall be performed as critical lifts.

- Use only government forklifts for the movement of hazardous material.
- Do not use forklifts for the movement of hazardous material between technical areas.

3.7 Approval and Notifications

The TA-V Hazardous Material Handler responsible for movement of material obtains concurrence from radiological protection personnel and the authorization from the FS or RMSA of the shipping facility/storage area and the FS or RMSA of the receiving facility/storage area. The TA-V Hazardous Material Handler also notifies shipping FS/RMSA and receiving FS/RMSA prior to movement. The FS may assign facility delegates for approvals and notifications.

4.0 MOVEMENT OF HAZARDOUS MATERIAL AND STORAGE OF RADIOACTIVE MATERIAL

4.1 General Requirements for Motorized and Non-Motorized Movement of Hazardous Material

The following general requirements apply to motorized movement of hazardous material in TA-V:

- For motorized movement of hazardous material, use only government vehicles, not private vehicles.
- Secure hazardous material within a vehicle or other mode of transport in a manner that prevents its movement.
- Placarding is not required for movement within the Technical Area; the movement to another technical area under this procedure is only allowed for the quantities of hazardous materials that are exempt from placarding requirements.
- Strong/tight outer packaging is required for radioactive and non-radioactive material movement. A strong tight container is one that is designed to survive normal handling and is leak-tight. If necessary, secondary containers may be used. Sealed plastic bags may meet the definition of strong tight containers depending on the material being packaged.
- If a single package contains multiple hazard classes (e.g., Class 6 and Class 7), the more restrictive of the applicable packaging requirements must be followed.
- Separate and segregate incompatible chemicals.
- Minimize the presence of transient combustibles.

4.2 Movement of Non-Radioactive Hazardous Material (Other than Hand-Carrying)

Step No.	Action
NOTE:	*Placarding is not required for transfer within the technical area and for transporting exempt quantities onsite to other technical areas at SNL.*
1	Use strong outer packaging, at a minimum.
2	Identify the material being transferred by using marking, labeling, SDS, and/or transfer documentation.
3	Document movement of chemicals in SNL Corporate CIS database.
NOTE*:*	*Different hazard classes may be mixed as long as they are not incompatible.*
4	If moving materials between technical areas, apply DOT labels per 49 CFR 172.400.
5	Do not mix chemically incompatible materials in the same package.
6	Prior to conducting the movement, obtain authorization from the FS/responsible person from the receiving facility/storage area.

4.3 Movement of Radioactive Hazardous Material (Other than Hand-Carrying)

Step No.	Action
NOTE 1: **NOTE 2:**	*Placarding is not required for transfer within a technical area or between technical areas.* *The HC fraction for the item to be moved can be: (1) determined and documented by the facility, (2) currently tracked in Radioactive Material Activity Log, or (3) for new items complete a New Material Data Sheet and assign a HC fraction.*
1	If moving radioactive materials between technical areas (other than TA-V and TA-III), ensure that the quantities of radioactive materials do not exceed RPPM, Appendix E values AND that the dose rate on contact at the outer packaging does not exceed 2 mrem/hr.
2	Ensure that the HC fraction for the item to be moved is available.
3	**IF** the item has not been previously characterized, **THEN** complete the New Material Data Sheet (Section 8), assign a HC fraction, and label the item using guidance provided in Section 4.5.
4	Prior to conducting the movement, obtain authorization from the FS/RMSA or the responsible person in the receiving facility/storage area.
NOTE:	*The total HC fraction in the non-facility storage area must remain below 0.80 based on the HC-3 threshold. The total HC fraction for the facility is controlled by the facility procedures.* *For the non-facility storage areas, if the total HC-3 fraction is ≥ 0.80, the movement **cannot be** performed without RCSC review and management approval.*
5	**FS/RMSA:** Ensure that the limits for the facility and non-facility storage locations are not exceeded.
6	Ensure the RTWD requirements are implemented.
7	Package radioactive material in strong/tight outer package, as appropriate.
8	Label the outer package in accordance with RP directions.
9	Ensure that appropriate transfer documentation accompany the material, if required (e.g., SDS, and/or transfer documentation).
10	Secure the material to prevent falling or release, as appropriate for the method of transport.
NOTE:	*If the movement involves a TA-V facility, updating the MAR inventory for that facility is the responsibility of the FS and is outside the scope of this procedure.*
11	Update the Radioactive Material Activity Log for the applicable location(s), as appropriate (see Section 4.4 for guidance).
12	Verify that the weather is adequate to allow the movement.
13	Move the item.
15	Ensure radiological postings, if necessary, are correct before and after movement.

4.4 Updating the Radioactive Material Activity Log

Step No.	Action
NOTE:	*The Radioactive Material Activity Log is maintained for each TA-V non-facility storage area. The link to Radioactive Material Activity Log form is provided in Section 8.*
1	Update the following information in the Radioactive Material Activity Log for every move of the radioactive material: • Radioactive material log number. **NOTE:** *For items in storage that are currently tracked, the number is available from the Radioactive Material Activity Log. The radioactive material number for new items is assigned as part of item characterization (Section 4.5).* • Date moved. • RP movement survey number and date. • Item moved from/to. **NOTE 1:** *Only one (to or from) is applicable for log-keeping at a given storage location.* **NOTE 2:** *For movements from/to outside TA-V, write "Offsite" in the [Item Moved From/To] box. For new material, write "NEW" in the [Item Moved From] box.* • Physical location (e.g., room #/shelf) in this storage area (optional). • HC-3 fraction for the item. **NOTE:** *For items in storage that are currently tracked, the HC fraction is available from the Radioactive Material Activity Log. The HC fraction for new items is assigned as part of item characterization, as described in Section 4.5.* • Total HC fraction for the storage area. **NOTE:** *Items with HC fraction ≤0.0001 are not required to be included in the inventory for the purpose of demonstrating compliance with the HC limits.* • Total number of items at this storage area that are tracked.

4.5 Hand-Carrying Radioactive Materials between TA-V Locations

Step No.	Action
1	Prior to conducting the transfer, notify the FS/RMSA of the receiving facility/ storage area.
2	Ensure the RTWD requirements are implemented.
3	Ensure that the packaging for the radioactive material is appropriate.
4	Affix "Caution Radioactive Material" label to the package.
5	Ensure that appropriate documentation accompany the material, if necessary (e.g., SDS, and/or transfer documentation).
6	Move the item.

4.6 Characterization of New Radioactive Material

Step No.	Action

Step No.	Action
NOTE:	*New radioactive material that was not previously tracked is characterized to permit proper storage and inventory. New material data sheet template is provided in Section 8.*
1	Perform evaluation of the new material using guidance provided in Appendix B.
2	Obtain new Radioactive Material Log Number from the TA-V Radioactive Material Storage Administrator.
3	Document the following information about the new material using the form in Section 8: • Radioactive Material Log Number • Estimated HC fraction (see Appendix B for guidance) • Material owner information • Material description including physical and chemical characteristics, as appropriate • Material history and potential sources of contamination based on process knowledge • Point of contact for process knowledge • Radiological characterization, including identification of radionuclides present, dose rates, estimated activities • Radiological characterization methods used, such as radiological surveys, sampling and analysis, if available • Information about the person completing the form.
NOTE:	*Labeling of individual materials may not always be practicable; in those cases, these items should be identified near the material's storage location.*
4	Label the new material with the following: • Owner name and organization, • Radioactive Material Log Number, • Item description • HC-2 or HC-3 fraction (specify which it is on the label).

4.7 Annual Inventory of Radioactive Material in Non-Facility Storage Areas

Step No.	Action
1	Conduct inventory of radioactive materials in non-facility storage area at least annually to ensure Radioactive Material Activity Log is correct. **NOTE:** *Items with HC fraction ≤0.0001 are not required to be included in the inventory for the purpose of demonstrating compliance with the HC limits.*
2	Document the results on the Radioactive Material Activity Log.
3	Any discrepancies that cannot be corrected on the spot should be entered in the TA-V Condition Reporting system.

4.8 *De Minimis* Level of Radioactive Material

Material, property and equipment that meet criteria for unrestricted disposition with regard to radiation levels are excluded from the requirements of this procedure. Request that RP conduct a radiological survey for clearance of property and materials.

Item may meet release clearance criteria if:

- Gross dose rate ≤ 20 µrem/hr on contact (background must be 10 µrem/hr or less), and
- Total removable contamination levels are less than RPPM Chapter 6, Attachment 6-1 values
- There is no volumetric contamination.

Note: Due to radioactive decay, items sources and material that have been activated or volume contaminated may eventually reach diminished activity levels such that they can qualify as conditionally controlled material, or can even be released. Contact the appropriate RP Line Support Team project leader to release materials. (RPPM, Section 6.4.1.3)

4.9 Emergency Response

For emergencies during movement of hazardous material occurring within the TA-V facility, personnel are required to follow the directions provided in *TA-V Emergency Action Plan* (Ref. 9), which states that emergency response duties for TA-V personnel are limited to calling for assistance from the corporate emergency management organization, implementing directed protective actions, achieving personnel accountability, and assisting the fire department as directed by the Incident Commander.

Operational events in each TA-V facility are handled in accordance with facility-specific procedures. Emergencies in other facilities (such as support facilities or other non-operational facilities within the TA-V fence) are handled by initiating an alarm and/or following directed protective actions.

5.0 POST PERFORMANCE ACTIVITY

5.1 Testing

None.

5.2 Restoration

None.

5.3 Results

None.

6.0 RECORDS

- Movements of hazardous chemicals (non-radioactive) are recorded in the CIS tracking system.
- Movements and inventory of radioactive materials are recorded as provided in this procedure using the Radioactive Material Activity Log when moving material to/from a non-facility storage

area. Note: Movement and inventory of radioactive materials within the facilities are tracked using facility TWDs.

7.0 REFERENCES

1. Corporate Procedure SCM100.3.19, *Movement of Hazardous Material.*
2. TA-V procedure TAV-AP-022, *Radioactive/Mixed Waste Management*.
3. 49 CFR 192. Title 49 CFR Part 192, Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, Training Requirements, and Security Plans.
4. *Hazard Categorization Calculations Using ICRP 68 and 72*, Calculation SBDC-013-01, Revision 1, Sandia National Laboratory, 2013.
5. *Radiological Protection Procedures Manual*, current version.
6. ESH100.2.RAD.1, *Implement Radiation Protection Procedures.*
7. NSA Supplemental Guidance NA-1 SD G 1027, *Guidance on Using Release Fraction and Modern Dosimetric Information Consistently with DOE STD 1027-92, "Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports, Change Notice 1.*" 2011.
8. Memo of Record, *Tracking of Hazard Category Fraction (Sum of Fractions) for Radioactive Materials at any TA-V Facility or Non-Facility Storage Location*, August 2016.
9. *TA-V Emergency Action Plan*, current revision.
10. U.S. Nuclear Regulatory Commission/U.S. Department Of Transportation, NUREG-1608/RAMREG-003 Categorizing & Transporting Low Specific Activity Materials & Surface Contaminated Objects, July 1998.
11. Technical Basis for Characterizing Contaminated Material and Equipment to Determine Hazard Category Fraction for Radioactive Contamination. Calculation Report No. TAV-CAL-004, 2013.

8.0 TEMPLATES, FORMS, AND GUIDES

All templates, forms, and guides are treated independent from this procedure to allow flexibility to make minor changes not affecting the process or intent of this procedure. Changes to the templates, forms, and guides must be evaluated for entry into the USQ process.

Radioactive Material Activity Log

New Material Data Sheet

9.0 APPENDICES

Appendix A: Authorized Users List

Appendix B: Calculation of Hazard Category Fraction.

APPENDIX A: AUTHORIZED USERS LIST

By my signature below, I affirm that I have read and understood this operating procedure and all references called out in procedural steps, and I agree to operate within the stated constraints.

Name	Signature	Organization or Company	Date

APPENDIX B: CALCULATION OF HAZARD CATEGORY FRACTION

This appendix provides guidance for evaluating hazard category fraction of M&E contaminated with radioactive material or volume activated.

Calculating HC Fraction for M&E that Has Been Fully Characterized

For M&E that has been fully characterized, and the amount of radioactive contamination is known, HC fraction is calculated by dividing the activity of each radionuclide by the HC-2 or HC-3 threshold quantity appropriate for the storage location and adding the resulting fractions to obtain HC-2 or HC-3 sum of fractions (e.g. see Appendix A of calculation report *Technical Basis for Characterizing Contaminated Material and Equipment to Determine Hazard Category Fraction for Radioactive Contamination*).

Determining HC Fraction for M&E that Has Not Been Previously Characterized

For M&E that has not been previously characterized, the following guidance is provided to help with the characterization activities. Radiation Protection Sample Diagnostics (RPSD) may provide expertise and assistance with the characterization activities.

- Perform initial assessment – collect and evaluate information and historical knowledge (history of prior use, i.e., process knowledge) about M&E
- Perform visual inspection.
- Request radiological survey and/or sample diagnostics.
- Consider the following:
    - What is the likely source of contamination, e.g., is M&E contaminated with reactor fuel material, single radionuclide or multiple radionuclides? Has M&E been irradiated in the reactor?
    - Can activity be measured directly? Can surrogates be used for measurement?
    - Is the radioactivity accessible? How is it distributed (surficial, volumetric, location on M&E)?
    - Is the activity removable or fixed?
- Determine requirements for the M&E characterization survey, based on the available information, including process knowledge:
    - Are radionuclide-specific measurements needed?
    - What will be measured (alpha, beta, photons)?
    - What instrument and method will be used? (e.g., canning with a hand-held instrument, in-situ measurements, e.g., gamma spectroscopy, smears, sample analysis in the lab, other).
- Request assistance from RP and/or RPSD as necessary to conduct in-situ measurements, collect smears, and interpret the results (e.g., a 10% swipe collection efficiency is typically assumed to calculate total surface contamination (NUREG 1608/RAMREG-003) (Ref. 10); this is usually conservative and results in an overestimate of the contamination level.)
- Perform measurements, as appropriate, e.g., perform scan survey with an appropriate hand-held instrument or in-situ survey, e.g. gamma spectroscopy; use one or several measurements, as appropriate, to determine radioactivity level (or concentration) for the item. Survey measurement should be performed in the environment absent of interferences.

- Additional considerations may include:
  - Determining uncertainty of the measurement
  - Determining minimum detectable concentration for the survey methods used
  - Evaluating surface area of contamination (using measurement grid).

Maintain data and records from M&E characterization.

After the radioactive contamination has been characterized, i.e., the radionuclides and their quantities have been estimated, calculate HC fraction by dividing the activity of each radionuclide by the HC-2 or HC-3 threshold quantity appropriate for the storage location and adding the resulting fractions to obtain HC-2 or HC-3 sum of fractions.

Determining HC Fraction for M&E Contaminated with Reactor Fuel

If the type of contamination can be traced to reactor fuel, a conservative estimate of HC fraction can be estimated based on the gamma exposure rate as provided in table below (Ref. 11).

Unshielded Gamma Exposure Rate on Contact with M&E	HC-3 Fraction	HC-2 Fraction
Up to 10 mR/h	0.0001	0.000001
From 10 to 100 mR/h	0.001	0.00001
From 100 to 1,000 mR/h	0.01	0.0001
From 1 to 10 R/h	0.1	0.001
From 10 to 100 R/h	1.0	0.01
From 100 to 1000 R/h		0.1

Determining HC Fraction for M&E Contaminated with Gamma Emitters

The table presented above can also be used to evaluate HC fraction for M&E contaminated with gamma-emitting radionuclides. However, this method should not be used if Na-22 or K-40 is suspected (this is due to relatively small difference between the HC-2 and HC-3 threshold quantities for these radionuclides. Furthermore, this method should not be used if low-energy gamma emitters are suspected, such as I-125. Other method should be used instead.