



Radiation Safety

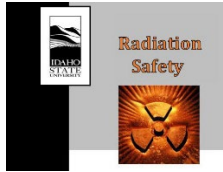


RADIATION PROCEDURES MANUAL **Procedure Cover Sheet**

Procedure Title: General Radioactive Material Handling
Procedure Number: RS-29 Rev.0
Effective Date: 11/30/2021

Approved By: Radiation Safety Committee

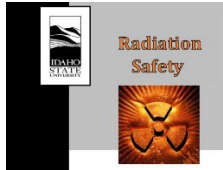
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Revision History

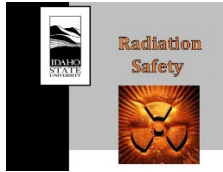
Revision Number	Author Name	Date	Approved by/date
RS 29.0	Mason Jaussi	11/30/21	RSC-11/30/21
RS 29.0	Kishor Paudel	12/4/23	RSC-11/30/21



Procedure #: RS-29 Rev.0
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Table of Contents

1. INTRODUCTION.....	4
2. PURPOSE.....	4
3. SCOPE	4
4. ROLES AND RESPONSIBILITIES.....	5
5. ACRONYMS/DEFINITIONS	5
6. REQUIRED MATERIAL(S)	5
7. REQUIRED TRAINING(S).....	6
8. PROCEDURE	6
8.1. General and Dispersible Radioactive Material Handling.....	6
8.1.1. Handling Steps	6
9. LIST OF FORMS	8
10. REFERENCES.....	8
11. CHANGE HISTORY.....	8
12. APPENDICES.....	8



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1. INTRODUCTION

Idaho State University radiation workers periodically handle general and dispersible radioactive materials. This procedure specifies procedural steps for safe handling of such materials.

2. PURPOSE

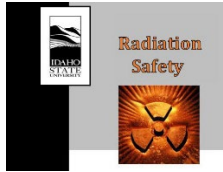
This procedure specifies the general safety measures that must be taken by personnel performing operations involving handling general and dispersible radioactive materials.

3. SCOPE

This procedure applies to all authorized users and radiation workers who perform operations handling radioactive materials other than sealed sources and not meeting any of the restrictions listed below.

The following operations require user specific procedures that will be reviewed and approved by the appropriate safety committee.

- Benchtop operations involving more than 200 ALI of dispersible material per day. The applicable ALI is the minimum inhalation ALI for the nuclide in 10 CFR 20 Appendix B. Liquids and particulates are dispersible materials. Solid materials such as solid uranium and thorium items and activated items are not dispersible but may have surface contamination. The authorized user shall use professional judgement to determine if 200 ALI of dispersible material is present. For multiple radionuclides, perform sum of the fractions calculations to determine the number of dispersible ALI being handled. If necessary, contact the Radiation Safety Department for assistance.
- Fume hood operations involving more than 2,000 ALI of dispersible radioactive material per day.
- Glove box operations involving more than 20,000 ALI of dispersible radioactive material per day.
- Operations that will create a Radiation Area (> 5 mrem/hr at 30 cm)
- Operations involving iodine isotopes in quantities greater than those listed in regulatory guide 8.20. <https://www.nrc.gov/reading-rm/doc-collections/reg-guides/occupational-health/rg/division-8/division-8-1.html>
- Operations involving radioactive gases
- Operations involving mechanical processing of radioactive material (e.g., sawing or grinding).



Procedure #: RS-29 Rev.0
Procedure Title: General Radioactive Material Handling
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- Operations that create radioactive material through activation.

Instructions for handling sealed sources that do not create radiation areas are given in procedure RS-19, Sealed Source Safety.

4. ROLES AND RESPONSIBILITIES

All Radiation Workers who perform operations with general and dispersible radioactive materials have the responsibility to read, understand, and follow this procedure.

The Authorized User ensures applicable radiation workers are trained in this procedure and that they appropriately implement the procedure.

The Radiation Safety Officer has the responsibility to oversee the radiation safety program and maintain this procedure.

5. ACRONYMS/DEFINITIONS

ALARA: As Low As Reasonably Achievable

ALI: Annual Limit on Intake

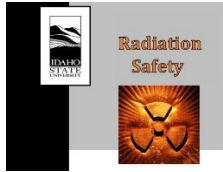
PPE: Personal Protective Equipment

RSM: Radiation Safety Manual

RSO: Radiation Safety Officer

6. REQUIRED MATERIAL(S)

- Long pants and closed toed/heeled shoes (No shorts, skirts, or open toed/heeled shoes)
- Safety Glasses or goggles
- Lab Coat
- Gloves (double gloves with inner pair taped to lab coat required for general and dispersible radioactive material use areas)
- Whole-Body Dosimeter if required by RSO in Accordance with Radiation Safety Manual, Section 15.1
- Appropriate radiation detection instrument(s) as specified in the Authorized Users permit



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Procedure Title: General Radioactive Material Handling
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7. REQUIRED TRAINING(S)

- ISU Radiation Safety Training
- Authorized User Program Specific Training

8. PROCEDURE

8.1. General and Dispersible Radioactive Material Handling

Radiological operations involving dispersible radioactive material less than the ALI limits specified in Section 3 may be performed in permitted user laboratories.

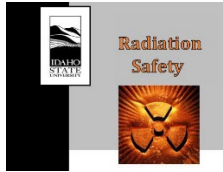
A specific procedure must be developed for operations involving dispersible radioactive material exceeding the limits of Section 3 and must include the appropriate PPE and Engineering Controls. In such cases, the worker(s) will be monitored in accordance with RS-11, Internal Dosimetry. At minimum, a lapel air sampler will be worn by the worker(s).

Work performed in contamination areas or in contaminated equipment (fume hoods or glove boxes) is required to be performed under an approved Radiological Work Permit or Contaminated Equipment Radiological Controls Form in accordance with RS-14, Radiological Work Permits.

Eating, Smoking, Drinking, and Chewing are strictly prohibited in Radioactive Use Areas (Material).

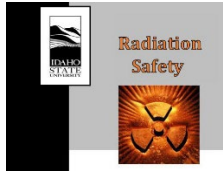
8.1.1. Handling Steps

- 8.1.1.1. Perform operations in a designated radioactive materials area. Utilize a radiological fume hood, biosafety cabinet, or glovebox whenever possible. Benchtop operations must be performed on absorbent pad demarcated with radiation safety tape. Radiological fume hoods and biosafety cabinets must have had the air velocity tested and certified within the last year. Radioactive materials that can become volatile are prohibited from being used in ductless fume hoods and in Class I, IIA, and IIB3 biosafety cabinets without special review and approval of the RSO and RSC. Gloveboxes must have had the gloves changed within the last year.
- 8.1.1.2. Gather required materials, stage the work area, ensure all instruments specified in the user permit are functioning properly, and don PPE.



Procedure #: RS-29 Rev.0
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- 8.1.1.3. Remote equipment (long-handled tools, remote pipettes, etc.) must be used when handling radioactive materials that produce a beta-gamma/x-ray radiation levels > 1000 mrem/hr on contact (RSM Section 13.8).
- 8.1.1.4. Apply appropriate ALARA controls while working with radioactive materials. Be cognizant of potentially contaminated items as you perform the job.
- 8.1.1.5. At the conclusion of the job, perform a whole-body frisk starting with the outer set of gloves. If gloves are contaminated, doff and dispose in radioactive waste container. Otherwise, dispose of as ordinary trash. Consult with the Authorized User on how to dispose PPE after handling tritium. Survey the lab coat and if contaminated notify the Authorized User. Doff the lab coat and survey whole body. Notify the Radiation Safety Department of any personnel contamination.
- 8.1.1.6. Manage radioactive waste in accordance with Procedure RS-09, Radioactive Waste Management.
- 8.1.1.7. At the end of the job, clean the area and return radioactive materials to appropriate storage containers.
- 8.1.1.8. Perform contamination surveys on the radioactive material containers and return the containers to proper storage location.
- 8.1.1.9. Perform immediate work area survey as specified in user permit and procedure RS-03, Radiological Surveys.
- 8.1.1.10. Perform a map survey of the area as specified in the user permit and procedure RS-03, Radiological Surveys.
- 8.1.1.11. Equipment that has been used with dispersible radioactive materials or potentially activated must be surveyed for release in accordance with the requirements of Radiation Safety Manual, Section 12.3 and RS-03, Radiological Surveys prior to service or release from the Radioactive Material Use Area.



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9. LIST OF FORMS

None.

10. REFERENCES

NUREG-1400, Air Sampling in the Workplace, September 1993.
Regulatory Guide 8.20, Applications of Bioassay for Radioiodine.

11. CHANGE HISTORY

Rev. 0 – Initial Version

12. APPENDICES

None.