

**Radiation Safety Committee
Control Functions and
Administrative Procedures**

UNIVERSITY
OF WYOMING

A) Rationale, Functions and Composition ([University Regulation 1-2](#), section 3.J.)

1) Rationale

The University, operating under a type A broad scope byproduct (radioactive materials) license, is required under the United States Nuclear Regulatory Commission (NRC) to appoint a radiation safety committee.

2) Functions

The Committee shall develop, administer and periodically review policies and procedures to assure control of procurement and use of radioactive materials, and enforce the radiation safety program by advising and directing personnel regarding the applicable policies and procedures of the NRC.

3) Composition

The Committee shall consist of the Associate Vice President for Research, the Radiation Safety Officer/Health Physicist, at least one administrative representative appointed by the Vice President and General Counsel, and at least one technical representative from each college, group or activity using ionizing radiation sources under the University's license. Appointments will be for a one-year term. Administrative responsibility is assigned to the Vice President and General Counsel.

a) A list of the current members of the Committee appears in Appendix A of the [Radioactive Materials Safety Plan](#).

4) Discussion

The NRC has issued the University of Wyoming a Type-A specific license of broad scope for byproduct material, as defined in 10 CFR Part 33. Broad scope licenses are intended for organizations involved in extensive radioactive material programs where there is demand for a variety of radionuclides and uses. This requires the control of a Radiation Safety Committee and a qualified Radiation Safety Officer (RSO). The Committee is authorized to establish, review and approve criteria for the authorization of uses of byproduct materials, so long as the uses are not excluded under 10 CFR 33.17(a). Any activities not authorized under the broad-scope license will require NRC review and license amendment.

5) Voting and Quorum

The voting membership empowered to act upon the use of ionizing radiation shall consist of the RSO, a chairperson designated by the Vice President of Administration (not the RSO) and the technical representatives. A quorum shall consist of at least the chairperson (or his/her designee), the RSO, one administrative representative (or his/her

alternate), a technical representative from the department/area from each are of use from which specific issues will be discussed, and any other committee member whose field of expertise is necessary to assure all safety aspects have been addressed. Business of the RSC is normally conducted in regularly scheduled meetings but special meetings, telephone, e-mail, facsimile or other methods may be used.

6) General duties

The duties and responsibilities of the Radiation Safety Committee shall include, but should not be limited to, the following:

- a) Meet as often as necessary to conduct business, but usually quarterly
- b) Review and approve permitted program and procedural changes prior to implementation.
- c) Implement program and procedural changes.
- d) Conduct periodic compliance audits of the radiation safety program and meet with senior administrative officials to discuss the overall radiation safety program.
- e) Take appropriate actions when noncompliance is identified, including analysis of the cause, corrective actions, and actions to prevent recurrence.
- f) Establish criteria for evaluating potential users and uses of ionizing radiation
- g) Develop procedures and criteria for training and testing each category of worker, and for evaluating the effectiveness of the training program.
- h) Maintain records of the committee's proceedings and safety evaluations of proposed users and uses of ionizing radiation.
- i) Periodically review and update the [Radioactive Materials Safety Plan](#) and other radiation safety information as necessary to ensure proper program implementation, good health physics practices and compliance with applicable regulations.

7) Roles, duties and responsibilities of the RSC chairperson

The person acting as chairperson of the Radiation Safety Committee (RSC) reports to the Vice President for Administration. The RSC chair has knowledge of radiation safety issues, good leadership abilities, the authority and credibility by virtue of their position within the facility, and a desire to serve. Additionally, the chairperson must have the time to devote to the position in addition to other responsibilities he or she might have within the facility.

a) Roles

- Serves as leader and administrative representative of the RSC
- Along with the RSO, serves as contact person for the committee
- In addition to representing his/her department constituents, the chairperson also represents an extension of facility management

b) Duties

- Attend regularly scheduled RSC meetings

- Conduct the RSC meetings according to Robert's Rules of Order
- Call special meetings of the RSC if needed
- Conduct the annual radiation safety program audit and present the audit findings to the Vice President of Administration and to the RSC.
- Designate an alternate chairperson when necessary

c) Responsibilities

- Administratively responsible for the radiation safety program within the University
- Responsible for ensuring that the meetings are held regularly with proper quorum of members
- Authority to consult with the RSO and make independent executive decisions for the RSC if necessary

B) Review, approval, implementation and audit of approved procedural changes

1) As specified above, the RSC has in its authority the flexibility to review, approve and implement program changes permitted under the University's NRC License. This flexibility is has been granted as long as:

- a) The proposed revision is documented. At a minimum, this documentation shall state the reason for the change and summarize the radiation safety matters that were considered prior to approval of the change.
- b) The program revision is reviewed and approved by the RSC in accordance with established procedures prior to implementation;
- c) The revised program is in accordance with regulatory requirements, will not change license conditions, and will not decrease the effectiveness of the Radiation Safety Program;
- d) The affected University of Wyoming staff is trained in the revised procedures prior to implementation; and
- e) An audit conducted within a year of the revision evaluates the effectiveness of the change and its implementation.

2) Specifically, the NRC has granted the RSC the flexibility to make program changes and revise procedures in the areas of:

- a) Training for individuals working in or frequenting restricted areas
- b) Audit program
- c) Radiation monitoring instruments
- d) Material receipt and accountability
- e) Occupational dose
- f) Safe use of radionuclides and emergency procedures
- g) Surveys

C) Schedule and criteria for conducting reviews and audits

- 1) The RSC shall periodically (annually, or within 2 years) devote sufficient time with the RSO and the RMSO staff reviewing records, reports from the RSO, results of NRC inspections, written safety procedures, and observing inspections performed by RMSO staff to ensure the adequacy of the university's management control systems. The program review shall include:
 - a) A review of the protocol, training and user permits issued by the committee.
 - b) A review of emergency response preparedness procedures, including training, signage, practice drills and letters of agreement with off-site emergency response agencies.
 - c) A review of procedures for controlling and maintaining inventories, procurement of radioactive material, individual user and University cumulative possession limits, transfer of radioactive materials within the institution, transfer of radioactive materials to other persons/licenses and the storage, decay and disposal of radioactive waste.
 - d) A review of results of user workplace inspections conducted by the RSO and the RMSO staff.
 - e) A review of the Radiation Safety Manual and other information distributed to authorized users to ensure safe handling of radioactive materials and compliance with NRC regulations and University license requirements.
- 2) A sample of how the annual audit might be conducted can be found in NUREG-1556, Volume 11, Appendix M. In addition to conducting its own reviews, the RSO and the Committee or its delegates shall meet at least annually with administrative officials outside the RSC (such as the Vice President for Administration) to review the performance and functions of the Radiation Safety Committee, RSO, RSO staff, and the overall radiation safety program.

D) Evaluations of potential users, facilities and uses of ionizing radiation

1) Introduction

Institutions operating under a Nuclear Regulatory Commission (NRC) Type A broad scope license are required to establish administrative procedures for evaluations of proposed uses and users of byproduct material. These safety evaluations should take into consideration "such matters as the adequacy of facilities and equipment, training and experience of the user, and the operating or handling procedures." (10 CFR 33.13)

2) Reviewing the Radioisotope Use Application Forms

- a) All applicants are required to complete an APPLICATION TO USE RADIOISOTOPES AT THE UNIVERSITY OF WYOMING for each isotope they

- wish to use, along with four other forms, which will be discussed individually in these guidelines.
- b) Applications will be reviewed initially by the Radiation Safety Officer or assistant. Appendix A contains a checklist for the RSO or assistant to follow in the preliminary approval process. After an inspection on the proposed facilities, and after any discrepancies are properly addressed through discussions with the applicant, the RSO can grant the applicant temporary approval until the application is brought before the next regularly scheduled meeting of the RSC.
 - c) The applicant is invited to attend the RSC meeting if he/she so chooses. If any procedures or radionuclides proposed in the application fall outside the scope of the University's byproduct materials license, the application must be passed by the RSC and an amendment to the license must be approved by the NRC before it can be granted.
 - d) After the application receives final approval, a full copy, with amendments, comments from the RSC/RSO and a signature and date of approval is given to the Principal User to file. The original goes in the applicant's permanent file maintained by RMSO.
- E) Maintenance of committee proceedings and safety evaluations of proposed users and uses of ionizing radiation
- 1) Risk Management and Safety shall provide a recording secretary for Radiation Safety Committee meetings, and shall maintain record files on committee proceedings, safety evaluations of principal users and all other committee actions.
 - 2) RMSO will also maintain occupational exposure records, user training records and records of radioactive materials procurement, transfer, inventory and disposal in accordance with Table 1. RMSO also has copies of the current NRC regulations and the University's Broad Scope License.

Table 1. Record Maintenance Schedule from 10CFR20 Subpart L

Type of Record	How Long Record Must be Maintained
Radioactive material receipt	For as long as the material is possessed until 3 years after transfer or disposal
Radioactive Material transfer	For 3 years after transfer
Radioactive material disposal	Until NRC terminates the license
Records of the provisions of the Radiation Safety Program not otherwise specified	Until NRC terminates the license
Audits and reviews of Radiation Safety program content and implementation	For 3 years after the record is made
Individual monitoring results	Until NRC terminates the license
Doses to members of the public	Until NRC terminates the license
Planned special exposures	Until NRC terminates the license
NRC Form 4 or equivalent	Until NRC terminates the license
Important to Decommissioning	Until the site is released for unrestricted use
Results of surveys and calibrations	For 3 years after the record is made
Surveys, measurements, or calculations used to determine doses from external sources or intakes of radioactive material	Until NRC terminates the license
Measurements or calculations used to evaluate the release of radioactive effluents to the environment	Until NRC terminates the license

Appendix A

**Guidelines for Reviewing Applications to Use
Radioactive Materials at the University of Wyoming**

1. Principal User (Applicant) Information

- Has the applicant filled in his/her name, e-mail address, office address and phone information, along with a home phone number to be used in case of emergencies?

2. Radionuclide Usage Information

A separate form is required for each radionuclide.

- Is use of this radionuclide allowed under the current license? Isotopes and amounts that exceed the license require an amendment.
- Are the quantities used reasonable? Study the proposed use and consider other similar experiments.
- Is the possession limit reasonable, based on the amounts used, frequency of each experiment and radiological decay? Unnecessary limits invite accumulation and go against ALARA principles.
- Is the work area hazard ranking identified correctly (based on section II-E of the Radiation Safety Manual)? Is the usage area suitable for this classification?

3. Radionuclide Hazard Information

Applicants must demonstrate knowledge about the radionuclides for which they are applying. Even though some of this information is provided by the RSO, it helps the person reviewing the application to have it all listed in one place.

- Is the decay scheme correctly diagrammed, including intermediate radionuclides, metastable states and the types of radiation given off?
- Have the types and energies of radiation emitted all been identified, including intermediate radionuclides and metastable states?
- For the body parts which will be exposed, has shielding been properly addressed? Refer to question 5.c of the application.
- Has all the appropriate information been filled in for every radioisotope in the decay chain, including the units (maximum gamma exposure rate, uptake pathways,

critical organs, maximum permissible organ burden, annual limit on intake, derived air concentration, maximum permissible concentrations in air and water and the half-life)? This information is supplied to the applicant and reviewer in the application directions or by the RSO.

4. Chemical Hazard Information

Along with the radiation hazards, an applicant should be aware of the other chemical and physical hazards involved. The reviewer should keep these hazards in mind while considering lab design, waste disposal and protocol.

- Have all chemical compounds that are radioactively labeled been identified?
- For each physical or chemical hazard identified, has the applicant provided the proper safeguards, training and emergency preparations?

5. Exposure Control and Monitoring

A visit to the proposed work area may be necessary to verify information given in this section and to certify that the proposed space meets the work area classification requirements.

- Are the monitoring frequencies and methods for external and internal exposures appropriate for the type and amount of radionuclide used? Refer to the [Radioactive Materials Safety Plan](#), sections III.B-III.E and the [Radiation Monitoring Criteria Procedure](#).
- Are the protective apparel, shielding and criteria for their use appropriate for the radionuclide? Take into account the types and energies of the radiation, the handling procedures, chemical properties, etc. Lab coat, safety glasses and gloves are considered the minimum acceptable labwear.
- Has the issue of safety showers and eyewashes been satisfactorily addressed? Review the amounts used, chemical and physical properties and experimental procedures.
- Are written directions for experiments provided, or is the alternative justified? Written procedures can be a part of the documentation required for performance-oriented training.
- Is the need for hoods, etc. properly identified? (Refer to question 2.g and to the requirements of work areas in the [Radioactive Materials Safety Plan](#), section III.E.) If hoods, etc. are required, are they being used properly and under the right conditions?

- If hoods are used, have precautions been taken to protect the workers and public from airborne contamination? RMSO inspects fume hoods and provides charcoal filters for iodination hoods and training to ensure the proper use of fume hoods.
- Does the applicant have the proper monitoring equipment for personnel / work area surveys? Compare the make and model listed with catalogs or other sources to ensure the equipment will measure the type(s) of radiation being used (alpha, beta, gamma). Liquid scintillation is usually required for detecting tritium contamination. If the applicant is not in charge of the equipment, is it available nearby and is there written permission from the owner?

6. University Policies and Procedures

- Has the applicant read the [Radioactive Materials Safety Plan](#), and does he/she understand that all orders of radioactive materials are to be processed by RMSO?
- If radioactive materials are to be transferred out of the work area, will it be packaged properly to prevent accidents? Does the packaging fit the distance it will be transported, whether next door, across town or on the highway? (Transportation on public roads must meet DOT and NRC regulations) Will the materials being transported be properly labeled, taking into account UW, NRC and DOT regulations and the amounts being transported?
- Do the facilities have the proper security? (Is room locked when not occupied? Does the laboratory have stringent inventory control?)
- Are proper storage areas and containment provided for waste and other radioactive materials (security and spill control)? Waste containers must be approved by RMSO before being picked up.
- Are the procedures for maintaining accountability of radioisotope use adequate enough for strict and accurate inventory control? RMSO has radioisotope inventory sheets which can be used, or serve as an example, for recordkeeping purposes, but are not required. If the applicants wish to use their own system, it should be described adequately. Has training of personnel been addressed?
- Are the waste procedures correctly identified? Waste disposal other than by RMSO pickup must be approved by the RSO.
- Have all hazardous constituents of the waste been identified? Mixed wastes (wastes with radioactive and hazardous constituents) present special disposal problems.

- If use of radioactive materials on animals is proposed, have they addressed all the concerns in the [Radioactive Materials Safety Plan](#), section IV.H on Special Requirements for Administering Radionuclides to Animals? Has the University Animal Care Committee (IACUC) granted permission?

7 Forms

All forms provided with the application must be completely filled out and returned with the application. Copies of two of the forms must be posted in the work area.

a) Safety Regulations Related to Radioactive Materials

- Have they listed the protective equipment/apparel and monitors identified in section 5 of the application?
- Have they properly identified the frequency of the laboratory surveys, based on the work area classification (see [Radioactive Materials Safety Plan](#), sections III.E and III.F)?
- Have they listed the persons responsible for personnel dosimeters, work area surveys, record keeping and rule enforcement?
- Have they listed the locations where the survey logbook and inventory records will be kept?
- Have they listed all the authorized users and their classifications? Check this list against the training and exposure forms attached.

b) Radiation Survey Guidelines

- Have they filled in all the information at the top of the page, including user name, building, room number, isotopes used and survey frequency (refer to [Radioactive Materials Safety Plan](#) sections III.G and III.H)?
- Have they properly sketched the work area and indicated areas where radioactive materials and waste will be used and stored? It may be necessary to visit the work area to study the layout and identify items which may have been omitted (centrifuges, scintillation counters, etc.)
- Have they completed the table at the bottom of the page for survey locations and instruments?
- Are sufficient survey locations identified to properly monitor usage, storage and waste collection areas, and to cover areas small enough to locate contamination?

- Are the proper instruments being used for the types and amounts of radiation being used?
- Have they identified the person(s) responsible for surveys and records?

c) Training in Use of Radioactive Materials

The NRC requires persons working with radioactive materials to have training and experience which suits the classifications of the user (principal, independent, supervised) and work place (Types A, B or C, based on the levels and types of materials being used.) A training form must be filled out for each user listed on the Safety Regulations form. Review each form and evaluate the training of the proposed users, following the requirements in the [Radioactive Materials Safety Plan](#), sections II.C, III.E and IV.E.

- Is a training form completed for each authorized user on the Safety Regulations form?
- Has documentation been supplied for formal training courses?
- If the training was from UW-supplied courses, has completion of the course been verified?
- Are all the training requirements met for each person, based on the classifications of workplace and user?

d) Occupational External Radiation Exposure History

Records of cumulative radiation dose are required for any person who will likely receive an exposure for which monitoring is required. This exposure history will be added to any exposures received while the employee is at UW for their total lifetime cumulative dose. If a person is unsure of exposure history, the university can request it, with the user's permission, from the previous employer. Even if an authorized worker has no previous exposure history, the form NRC-4 must be completed to verify this. This form goes in the person's permanent exposure record file.

- Is a form completely filled out and signed by each person who will be issued a film badge?
- Check the age in full years. Is the person under the age of 18? If so, this person can only be admitted to a restricted area under certain circumstances. See the [Radioactive Materials Safety Plan](#), sections II.C and III.A.

8. Proposed Use of Radionuclide

Attached to the application should be a brief outline of the proposed use of the radionuclide, followed by a more detailed description of the procedures in which the radionuclide will be used. It is common for the applicant to provide copies of literature describing similar uses, but it is still necessary to have the individual's procedures spelled out for review and training purposes. Important points to consider while reviewing these procedures are:

- Has literature describing procedures similar to the ones being proposed been provided, or is it available?
- Is the proposed use in the mainstream of current research? Get the opinion of other members in the same department or field as the applicant if necessary.
- Have similar applications been approved at UW in the past? (How do the proposed radionuclides and amounts compare to other uses?)
- Has the applicant gained approval from his/her department, other standing committees such as the Animal Care Committee, or persons in charge of work areas or equipment to be used outside of the applicant's own workplace?

Appendix B

**STORAGE OF RADIOACTIVE MATERIALS FOR DECAY
PRIOR TO DISPOSAL AS NON-RADIOACTIVE WASTE**

If the need for decay-in-storage in areas other than the designated rooms at the RMMC has been demonstrated, the facilities and procedures must be approved in advance. The Radiation Safety Officer, using the following guidelines, can grant temporary approval of such facilities, with final approval given by the Radiation Safety Committee. These guidelines demonstrate the information and conditions required for such approval, based on NRC Information Notice No. 90-09 and Regulatory Issue Summary 2004-17, Revision 1.

A) Identification of Waste to be Stored

- 1) Because radioactive waste should be held for decay for a period of ten half-lives before disposal, Principal User radionuclide possession limits must be adequate, taking into account the amounts to be used and decay during the storage period. Only reasonable limits based on valid calculations will be accepted.
- 2) The maximum amount of waste in volume should also be calculated to ensure sufficient storage space is made available.
- 3) The following should be specified, and the waste should be classified and segregated by:
 - a) radionuclide (only those with half-lives less than or equal to 120 days can be decayed in storage)
 - b) physical form (solid, liquid, gas)
 - c) processing (e.g. waste minimization, compaction, treatment) and packaging
 - d) additional non-radiological properties (ex. chemical, biological hazards)
 - (i) If stored radioactive materials are mixed with RCRA hazardous waste, the amount by volume and mass of the mixed waste must not exceed limits for satellite storage areas (55 gallons) and/or conditionally exempt small quantity generators (1,000 kg).
 - (ii) If radioactive waste will also be a potential biological hazard, the application for decay in storage must identify a method to sterilize the waste in case it needs to be disposed before being decayed out.

B) Description of Storage Area.

- 1) A diagram of the storage area must be submitted showing where the waste will be stored and how it will be accessible for inspection (preferably from at least two sides). If applicable, the diagram should also show locations of any processing equipment, effluent filters and air monitoring stations.

- 2) The maximum capacity for waste storage in the room must be calculated, and this amount must not be less than the volume of stored waste projected in question A.2. above.
- 3) The building in which the storage room is located must provide protection at all times from any foreseeable conditions, including adverse weather conditions or any other natural or man-made disasters.
- 4) Exposure of the waste to extreme temperatures or humidity should be avoided.
- 5) The storage area should have adequate ventilation and fire protection systems.
- 6) Access to the waste storage area shall be controlled in order to provide a reasonable amount of security for the waste and protection from exposure to humans.
- 7) Signage on the storage room must be in accordance with the [Radioactive Materials Safety Plan](#).

C) Container Integrity, Labeling and Inspections

- 1) The containers to be used for storage must be sturdy enough to maintain integrity during the entire period of storage, and must be compatible with their contents. Secondary containment should be used if possible. If containers are to be re-used, their projected storage life should be known.
- 2) All containers shall be properly labeled with the radiation warnings, isotope, owner and date the package went into storage. These labels shall be removed or defaced before disposal as non-radioactive waste.
- 3) Regular inspections shall be conducted by the user on a schedule dependent on the classification of the storage space. The inspection shall include both visual inspections on the integrity and conditions of the stored containers and a radiation exposure and contamination survey using the proper survey or counting equipment. The exposure in millirem, 30 centimeters from the packages with the highest readings, will determine the signage that must be placed at the entrance to the room. See the [Radioactive Materials Safety Plan](#) for workplace classification, contamination limits and proper signage.
- 4) In addition to user inspections, RMSO will conduct regular inspections and contamination surveys on a schedule based upon the classification of the storage area.

D) Plans for Final Disposal

- 1) Radioactive waste put into storage should be held until the radiation exposure rate cannot be distinguished from background radiation levels before being disposed as non-radioactive waste.
- 2) Before disposal as non-radioactive, the waste must be sufficiently monitored in a low-background area with the appropriate, calibrated instrument set on its most sensitive scale and with no interposed shielding. Any waste having significant counts above background must be held for re-evaluation in the future.
- 3) Prior to disposal, all radiation labels must be removed or obliterated.
- 4) Records of each disposal in this method must be retained for 3 years. The record must include the date of disposal, the date on which the radioactive material was placed in storage, the radionuclides disposed, the survey instrument used, the background dose rate, the dose rate measured at the surface of each waste container, and the name of the individual who performed the disposal.
- 5) No waste shall be stored for longer than three years from the date the container was first put into storage.

E) Radiation Protection

- 1) Before approval of applications for decay in storage, the above information supplied by the applicant shall be reviewed by the RSO, keeping in mind the University's policy to keep exposures as low as reasonably achievable.
- 2) Evaluations shall be made of projected exposure rates, needs for shielding and any changes in personnel monitoring which will be required as a result of waste storage.
- 3) Existing plans for emergency response (fire, police, medical) should be reviewed and adapted to meet any new requirements as a result of the waste storage.
- 4) Adequate procedures for keeping records of inventories, inspections, surveys, waste storage and disposal shall be in place to assure accountability.

F) Training

- 1) In addition to the Radiation Safety Training required for all users of radioactive materials, persons responsible for packaging, handling, placement, inspections, inventory, surveying, or disposal of the waste shall be trained in the duties, precautions, recordkeeping requirements and emergency response related to waste storage. This training shall be properly documented.