

Up-Side Radiological Survey , LLC

RADIOLOGICAL PROTECTION PROGRAM MANUAL

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1. PURPOSE¹

The Up-Side Radiological Survey, LLC, (USRS) Corporate Radiation Protection Program (RPP) defines the requirements and standards for protection against ionizing radiation when developing work site or job-specific Radiation Protection Programs or Procedures for contract activities conducted for the Department of Energy (DOE), Department of Defense (DoD), under a license issued by the Nuclear Regulatory Commission (NRC) or an Agreement State. This document includes the applicable provisions of 10 CFR 19, 10 CFR 20, 10 CFR 61, 10 CFR 835 and DOE Order 5400.5. These provisions are implemented through this document and specific USRS health physics procedures. It is intended to control the receipt, possession, use, transfer, and disposal of radioactive material in such a manner that the total dose to an individual is maintained As Low As Reasonably Achievable (ALARA) and does not exceed the standards for protection against radiation prescribed by applicable regulations.

It is important to note that licensed radioactive materials will always be under the ownership of the licensee who contracts with USRS to perform work.

¹**Criteria:** Requested radioisotopes must be used for purposes authorized by the Atomic Energy Act of 1954, as amended. Sealed sources and devices containing licensed material must be used only for the purpose for which they are designed and according to the manufacturer's (distributor's) instructions and recommendations for use as specified in the SSD Registration Certificate. Sealed sources or devices containing sealed sources that are intended for use solely under broad scope licenses, and that will not be transferred to another licensee, need not be evaluated by the NRC prior to use if the licensee is authorized to possess the requested quantity of radioactive material in unsealed form and the licensee performs its own safety evaluation. Applicants desiring activities disallowed by 10 CFR 33.17(a) should apply for specific authorization.

Discussion: The applicant should describe in general terms the purposes for which the licensed material will be used. New applicants should describe why a broad scope license is needed rather than amendments to an existing limited scope license. The uses should be consistent with prior licensed activities. Sufficient information should be provided to enable the reviewer to have a clear understanding of each use and to determine the potential for exposure of workers and members of the public to radiation and radioactive materials. The information provided regarding "Purpose of Use" is understood by the NRC staff as a self-imposed limitation contained within the application. If a broad scope licensee desires to initiate a use other than those described in its application and committed to in its license, the licensee must submit an amendment to the license to modify or expand the "purpose."

2. SCOPE

The policies and requirements set forth in this manual apply to all organizations (tenant, contractor, subcontractor), personnel (company employee, contractor, visitors), and activities assigned to or working at USRS licensed operations. Activities within the scope of this RPP are those that have the potential to result in the occupational exposure of an individual to ionizing radiation or radioactive material. This RPP applies to waste management, design, construction, operations, maintenance, decontamination, deactivation and decommissioning activities, for which USRS has radiation protection responsibilities. The limits of this RPP do not apply to exposure due to:

- background radiation,
- exposure of patients to radiation for the purpose of medical diagnosis or therapy,
- exposure from individuals administered radioactive material and released in accordance with 10 CFR 35.75,
- exposure from voluntary participation in medical research programs,
- consumer products emitting nominal amounts of radiation, or
- activities conducted under the Nuclear Explosives and Weapons Surety Program (relating to the prevention of accidental or unauthorized nuclear detonations).

Work conducted at another site or location where USRS does not have overall management responsibility for licensed radioactive materials must be conducted in accordance with the site's governing program, site specific RPP or license conditions, as long as the requirements of that program are at least as restrictive as those in this RPP. In all circumstances, on site's where multiple agencies and vendors possess NRC or Agreement State licenses, a Memorandum of Understanding (or equivalent) will be entered into effect to describe the specific activities that are to be performed under each specific license.

3. ORGANIZATION AND ADMINISTRATION

3.1 Policy

It is the policy of USRS to conduct its radiological operations in a manner that ensures the health and safety of all its employees, contractors, and the general public. In achieving this objective, USRS shall ensure that radiation exposures to its workers and the public and releases of radioactivity to the environment are maintained below regulatory limits and deliberate efforts are taken to further reduce exposures and releases in accordance with a process that seeks to make any such exposures or releases ALARA. USRS is fully committed to implementing a radiological control program of the highest quality that consistently reflects this policy.

In meeting this policy, USRS shall:

1. Establish and maintain a RPP that is reflective of the applicable federal and state radiation protection standards.
2. Ensure personnel responsible for performing radiological work are appropriately trained.
3. Ensure personnel responsible for implementing and overseeing the Radiological Controls Program are competent.
4. Conduct radiological operations in a manner that controls the spread of radioactive materials and reduces exposure to the work force and the general public and that utilizes a process that seeks exposure levels as low as reasonably achievable.
5. Incorporate dose reduction, contamination reduction, and waste minimization features into the design of new projects / facilities and significant modifications to existing projects / facilities in the earliest planning stages.

The requirements specified in this RPP are in direct support of the Nuclear Regulatory Commission (NRC) and/or other Agreement State Radioactive Material (RAM) licenses that may be issued to USRS.

3.2 Procedures

The USRS RPP is implemented through written procedures reflective of federal and/or state radiation protection standards and recommendations. In developing these procedures, consideration was given to the anticipated level and extent of the radiological hazards, the complexity of the measures required to achieve compliance, and the education, training and skills of the individuals who implement the procedures.

USRS procedures have been developed for all aspects of the RPP through the use of federal regulatory guidance documents and other applicable guidance documents. These procedures will

facilitate the control and minimization of radiation exposures, radioactive contamination, airborne radioactivity and waste generation. Attachment 1 provides a list of the USRS RPP procedures.

Administrative procedures define specific program functions and the methods to be used when carrying out each program function. All radiological job functions will be governed by the rules and regulations set forth in the administrative procedures.

Operational procedures define precise methods used to perform specific radiological job functions properly and safely. These operational procedures are governed by the program functions set forth by the administrative procedures. The methods vary according to each particular procedure but remain consistent in their methodical approach to each objective.

3.3 Responsibilities²

The USRS Radiological Safety Committee (RSC) supports line management and workers. To function effectively, the radiological control organization should be independent of the line organizational element responsible for production, operation, or research activities, and should have an equivalent reporting level. Radiological control organization function is discussed in detail in the RSC.

The USRS Radiation Safety Officer (RSO) and Project Manager at each project site are responsible for ensuring compliance with these requirements.

3.3.1 Specific Duties and Responsibilities of Executive Management

- Ensure that all radiological activities performed at USRS projects are in compliance with any applicable USRS RAM or NRC license and RPP.
- Assist in selecting the chairperson and members of the RSC and the RSO and define the role, duties and responsibilities of each.
- Attend RSC meetings and have an understanding of the results of periodic audits and the annual review of the licensed program.
- Maintain a current copy of the RAM license and amendments. The license copy may be physically maintained with the RSO.

² NUREG 1556 Vol. 11

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- Designate, in writing, a RSO to administer the RPP.
- Ensure sufficient resources and management oversight is maintained to adequately comply with all license and program requirements.
- Ensure radiological incidents and accidents are reported as prescribed in this manual.
- Represent USRS as needed in significant issues regarding the license and RPP to state and federal regulatory agencies
- Be available to facilitate effective and immediate action on behalf of management, the RSC and the RSO, particularly in the event of an emergency.
- Ensure that all individuals understand management's expectations regarding internal enforcement of program requirements and the consequences for non-compliance.

3.3.2 Specific Duties and Responsibilities of the RSO

- Be the license manager and program director.
- Ensure radiation safety policies and guidelines are established and maintained in accordance with the USRS RPP.
- Advise Executive Management and Project Managers on issues of radiation safety, unsafe work practices, noncompliance, and corrective actions to noncompliance items.
- Ensure copies of pertinent State and Federal regulations, licenses, RPP and Radiological Procedures are maintained and current.
- Ensure review of the RPP is conducted biannually.
- Ensure all incidents, accidents, and issues of noncompliance are investigated and reported as required by this RPP and the appropriate regulations.
- Provide technical guidance, support and training necessary to ensure radiological operations are conducted safely.
- Maintain a current inventory, updated at every six months, of radioactive materials stored at USRS sites and ensure quantities of radioactive material do not exceed authorized possession limits of the RAM license.
- Ensure activities involving radioactive materials are conducted in accordance with the RPP and RAM license.
- Discontinue operations of any activity involving radioactive materials or radiation producing devices which pose an immediate threat to health or safety.
- Review and approve qualifications for personnel assigned Radiation Protection duties at USRS licensed operations.
- Nominate Radiation Safety Officer Representatives (RSOR) as necessary.

3.3.3 Specific Duties and Responsibilities of the RSOR

The USRS RSO may, in some cases, delegate site specific radiation protection management and oversight responsibilities to a person designated as the RSOR for a specific site, location, office, or project. This RSOR is responsible for the maintenance, oversight and implementation of radiation protection programs and procedures specific to the site or project.

3.3.4 Specific Duties and Responsibilities of Project Managers

- Ensure that all radiological operations are performed in compliance with the applicable USRS RAM license and the RPP.
- Ensure radiological incidents and accidents are reported as indicated in this manual.
- Ensure adequate resources and management oversight is maintained.
- Represent USRS in the absence of the RSO in significant issues regarding the license and RPP to regulatory agencies.
- Maintain a current copy of the applicable RAM license (NRC or State) and amendments for the project.
- Advise the USRS RSO on actions affecting radiological operations to ensure compliance with the RAM license and the RPP.
- Report to the RSO as necessary to communicate radiological policy concerns or activities affecting the license or overall RPP.
- Discontinue operations of any activity involving radioactive materials or radiation producing devices which pose an immediate threat to health or safety.
- Maintain a current inventory, updated at least quarterly, of radioactive materials stored at USRS sites and ensure quantities of radioactive material do not exceed authorized possession limits of the RAM license

3.3.5 Specific Duties and Responsibilities of Waste Brokers

- Act as the RSO's agent and program administrator at the Project Site, responsible to ensure RPP policies and guidelines are complied with in accordance with this manual and all applicable Standard Operating Procedures (SOPs).
- Maintain a current copy of the USRS NRC or State RAM license and amendments.
- Advise the Project Manager and RSO on issues of radiation safety, unsafe work practices, noncompliance, and corrective actions.
- Ensure copies of pertinent State and Federal regulations, licenses, and SOPs are maintained and current at the Project Site.
- Continuously monitor USRS Project radiological operations and notify the RSO whenever there is a major change in operating procedures or conditions. Report any anomalies to the Project Manager and RSO.
- Ensure all incidents, accidents, and issues of noncompliance are reported as required.

- Provide technical guidance, support and training necessary to ensure radiological operations on the USRS Project are performed safely.
- Maintain a current inventory of all radioactive materials and radiation producing devices used at the site.
- Maintain a current list of all approved radiation workers at the site.
- Ensure the proper issuance, storage and usage of personnel dosimetry as required.
- Ensure radiation protection records and documentation is maintained in accordance with the NRC or State RAM license, RPP and SOPs.
- Ensure USRS operations involving radioactive material are conducted in accordance with the RPP and the RAM license.
- Direct issues involving USRS radiological health policy to the RSO for resolution.
- Discontinue operations of any activity involving radioactive materials or radiation producing devices which pose an immediate threat to health or safety.
- Maintain a current list of all authorized radiological areas.
- Maintain a current inventory, updated at least quarterly, of radioactive materials stored at USRS sites and ensure quantities of radioactive material do not exceed authorized possession limits of the RAM license

3.3.6 Specific Duties and Responsibilities of Radiation Protection Technicians

- Conduct radiological surveillance in accordance with the RPP and SOPs.
- Inform the RSO or Project Manager of unsafe work practices and noncompliance.
- Ensure a current copy of applicable SOPs is available at their work site.
- Perform surveys in accordance with the RPP and SOPs.
- Maintain applicable logs, records, inventory, and documentation as required by the SOPs.
- Issue personnel dosimetry, if required and authorized by the RSO.
- Initiate Radiation Work Permits (RWPs), if required and authorized by the RSO.

3.3.7 Specific Duties and Responsibilities of Radiation Workers

- Adhere to the RPP and SOPs, and obey all radiological postings and verbal instructions from Radiation Protection Technician personnel concerning radiological activities.
- Maintain personal exposure ALARA.
- Wear personnel dosimetry as required by Work Plan, RWP, SOPs or the RSO. Report lost or off scale dosimetry to the RSO immediately.
- Thoroughly understand, sign acknowledgement and maintain compliance with RWPs.
- Not to smoke, eat, drink, chew, apply cosmetics or loiter in RAM areas.
- Wear protective clothing as required by Work Plan, RWP, SOPs, or the RSO.

- Use proper personal monitoring techniques in accordance with the RPP, Work Plan, RWP, SOPs, or RSO.
- Notify the RSO of all known or possible radioactive spills or suspected skin or clothing contamination and minimize the potential for spread of contamination.
- Report the presence of open wounds or skin disorders to the RSO prior to entering a RAM area.
- Notify the RSO immediately if injured while in a RAM area.
- Secure work to a safe condition and immediately leave the area when an Air Monitor alarms and notify the RSO.
- Report any discrepancies or actions which could increase radiological hazards to the RSO or to your supervisor

3.4 Radiation Safety Committee

The Radiation Safety Committee (RSC) reports directly to the president of USRS as shown in Figure 1. The RSC works with executive management and the RSO in implementing the RPP, and will be involved in establishing policies and procedures for managing the RPP. The RSC has the approval of the executive management and the authority and flexibility necessary to effectively fulfill its role in managing the RPP.

Specific duties and responsibilities of the RSC include:

- Reviewing personnel dosimetry data,
- Reviewing the results of required radiation surveys, and any significant incidents, including spills, contamination, administration errors, etc.
- Review the program for maintaining doses ALARA and providing any necessary recommendations to ensure doses are ALARA.
- Ensure that employees working with radioactive materials have received the required training in operating procedures, rules, and special precautions prior to being occupationally exposed to radiation.
- Review of overall compliance status for authorized users.
- Ensure periodic audits of the radiation protection program and license operations are conducted.
- Review any consultant's audit findings and acts upon those findings.
- Review the results of the annual audit of the radiation safety program. Analyze any possible trends, and suggestions for timely and corrective action.
- Evaluate new users and new uses of byproduct material.
- Review and approve program and procedural changes
- Meet as often as necessary to conduct business, but not less than quarterly.

- Approve nominations of the RSOR by the RSO.
- Review Work Plans and RWPs for workers entering High Radiation and Very High Radiation fields as discussed in Section 5.5 of the RPP.

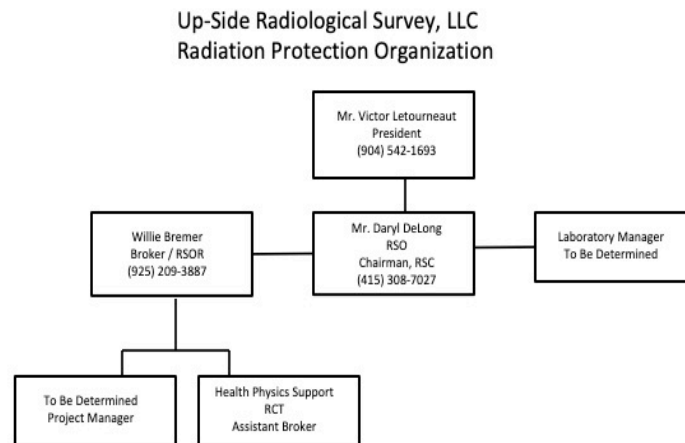
The RSC is authorized to make program changes and changes to procedures specifically identified in the license application, without prior NRC approval, so long as:

- The proposed revision is documented, reviewed, and approved by the RSC.
- The revised program is in accordance with regulatory requirement, will not change license conditions, and will not decrease the effectiveness of the RPP.
- The staff is trained in the revised procedures prior to implementation.
- The audit program evaluates the effectiveness of the change and its implementation.

The RSC may also authorize changes in the following without notifying the NRC.

- Changes indicated by NRC rule changes
- Training for individuals working in or frequenting restricted areas
- The audit program
- Radiation monitoring instruments
- Material receipt and accountability
- Occupational dose
- Safe use of Radionuclides and emergency procedures
- Surveys
- Changes in contractors for bioassay or waste disposal or for servicing, or calibrating and processing personnel dosimeters (providing the new contractor participates in the appropriate section of the National Voluntary Laboratory Accreditation Program [NVLAP])
- Changes in contractors for other outsourcing services (labs, project personnel, equipment rental, etc.). Providing the new contractor presents equivalent and,
- Change of referenced equipment providing the replacement is equivalent.

Figure 1 USRS Radiation Protection Organizational Chart



3.5 RSC Membership and Qualifications

1. The Committee is composed of members from the following activities or areas of responsibility:
 - Health Physics
 - Training
 - Executive Management
 - Projects
2. The membership of the RSC may be changed as required to meet programmatic needs. The designated representative of each of these areas is valid from the date the NRC license is issued to USRS.
3. RSC members must have a minimum of five years of experience at a senior level in the area that they represent, or five years of experience at a senior or management level in the area that they represent. Members must be familiar with the USRS RPP and procedures, applicable Federal and State regulations and RAM license requirements.

4. A quorum of the RSC is authorized to act on the behalf of the committee for approval of necessary actions between regular meetings of the Committee. A quorum shall include the Chairman and RSO.
5. The RSC is required to keep minutes of all quarterly meetings, and any ancillary actions of the committee that affect or are affected by the RPP. At a minimum, the minutes will include the date of the meeting, the members present and absent to demonstrate a quorum was present, a summary of the discussions, recommendations and the results of votes.

4. TRAINING³

4.1 General

All personnel who work with radioactive materials or other sources of radiation shall receive training commensurate with the potential radiological hazard. Training shall be provided prior to initially working with radioactive material or entering a radiologically controlled area and shall be conducted in accordance with established written procedures applicable to the project, location, or level of hazard.

4.2 Radiation Worker Training

1. Initial training shall consist of the following, as a minimum:
 - a. Applicable regulations, procedures, forms and their location.
 - b. Basic radiation fundamentals and radiation protection concepts
 - c. Potential hazards associated with exposure to radiation and RAM.
 - d. Maintaining exposure ALARA.
 - e. Radiation sources, identification of sources and location of RAM
 - f. Types and quantities of radiation.
 - g. Response to abnormal situations.
 - h. Obligation to report unsafe conditions.
 - i. Types and use of instrumentation.
 - j. Methods of performing surveys.
 - k. Packaging, shipping and receipt of RAM (as applicable to position).
 - l. Radiation worker responsibilities for compliance with license conditions and the RPP.
 - m. Radiation exposure reports which workers may request.
2. Performance based training shall be provided as necessary to ensure competency in radiological duties as assigned.

³**Regulations:** 10 CFR 19.11; 10 CFR 19.12; 10 CFR 19.13; 10 CFR 30.33(a)(3); and 10 CFR 30.34(e).

Response from Applicant: Submit a description of the radiation safety training program developed for each group of workers, including: topics covered; qualifications of the instructors; method of training; method for assessing the success of the training; and the frequency of training and refresher training; or identify the model training program described in the appropriate base NUREG corresponding to your particular type of licensed program and submit a statement that this training program will be implemented. In addition, if you are a Type A broad scope licensee or applicant, and you want the flexibility to revise your radiation safety training program without amendment of the license as discussed in Sections 1 and 8.7.2 of this document, describe the process that will be used to revise and implement your submitted training program.

3. Refresher training will be provided for all radiation workers at intervals **not to exceed 12 months**. As a minimum, it will cover those issues and topics necessary for personnel to maintain job competency and ensure compliance with the USRS RPP. Retaining shall be performed whenever there is a change in duties or the work environment and at a frequency sufficient to ensure that all staff is adequately trained. The RSO will document the program of instruction and certify in writing those personnel who are qualified as radiation workers. Attendance records for all classes **shall be maintained** to demonstrate compliance with the training requirements in this section.

4.3 General Awareness and Visitor Training

1. Individuals who work around RAM areas, radiation areas, or other sources of radiation, and visitors to these types of areas shall be provided appropriate General Awareness Training. Such training will be accomplished using written briefings, consisting of appropriate information as deemed necessary by the RSO. As a minimum, this information shall consist of:
 - a. Recognition of RAM and/or radiation producing devices.
 - b. Whom to contact if RAM is found in an area where it is not allowed.
 - c. Whom to contact and expected actions in the event of an emergency, breakage or spill of RAM.
 - d. Risks associated with the types of RAM and radiation producing devices commonly encountered at USRS project sites.
2. Awareness training may be conducted by group briefings, videotape or by written handouts provided to personnel and approved by the RSO.
3. Escorted visitors will not be allowed to enter any high radiation area, contaminated or airborne radioactivity areas. Permission to deviate from this must be obtained on a case-by-case basis, in writing, from the RSO.

4.4 Declared Pregnant Females

Female workers, who work with radioactive materials as part of their normal work duties, and their supervisors, shall receive annual training concerning protection of the embryo/fetus, the risks associated with exposure to ionizing radiation, and USRS's policy for protection of declared pregnant workers. Training may be conducted by written informative handouts. Individuals will certify by signature that they are aware of potential radiation hazards to the embryo/fetus and understand USRS's policy for declared pregnant workers. Training shall be

documented and maintained to demonstrate compliance with the training requirements in this section.

4.5 Radiological Training Methodology

Radiological training will be conducted by the RSO or a designated representative. Successful completion of the training course includes passing an exam with a minimum grade of 80%. Individuals with previous experience or qualifications may take a challenge exam.

4.6 Trainer Qualifications

The instructor must have a four year college degree and at least two years of health physics related experience in training, or at least five years of health physics experience in a program management position. The instructor must be familiar with the USRS RPP, procedures, applicable Federal and State regulations and the USRS license requirements.

4.7 Training Documentation and Audits

All training shall be documented and maintained to demonstrate compliance with the training requirements in this section. The RSO or independent consultant will conduct an annual assessment of the training program. The assessment will be documented and any recommended changes will be approved by the RSC.

5. RADIOLOGICAL PROTECTION STANDARDS

USRS will make every effort to maintain personnel radiation exposures below the indicated radiation protection standards as set forth in this section and consistent with the ALARA principle. The occupational exposure standards prescribed in this section are exposures received by an individual assigned duties involving exposure to radiation and to radioactive materials. Radiation exposures received from background radiation and medical exposures are not included in the radiation exposure limits specified in this section. The Federal limit for radiation will not ordinarily be exceeded. These limits may be seen in Table 1.

5.1 Occupational Dose Limits⁴

Table 1. Dose Limits

Category	Annual Limit (rems)	Dose
General Employees	5	Whole body (internal + external)
	50	Any organ or tissue (other than lens of eye) and skin
	15	Lens of the eye
	50	Extremity (hands and arms below the elbow; feet and legs below the knees)
Declared pregnant worker	0.5	Embryo / Fetus (during the entire pregnancy)
Occupationally exposed minors	0.1	Whole body (internal + external)
Member of public	0.1	Whole body (internal + external)

Notes:

- a) Doses received in excess of the annual limits, including doses received during accidents, emergencies, and planned special exposures, must be subtracted from the limits for planned

⁴ **Regulations:** 10 CFR 20.1201; 10 CFR 20.1202; 10 CFR 20.1203; 10 CFR 20.1204; 10 CFR 20.1207; 10 CFR 20.1208; 10 CFR 20.1501; 10 CFR 20.1502; 10 CFR 20.1703; 10 CFR 20.2106; and 10 CFR 20 Appendix B.

Criteria: The use of individual monitoring devices for external dose is required, pursuant to 10 CFR 20.1502(a), for any individual that will exceed 10 percent of any annual limit.

special exposures that the individual may receive during the current year and during the individual's lifetime (refer to 10CFR20.1206).

- b) The assigned deep-dose equivalent must be for the part of the body receiving the highest exposure. The assigned shallow-dose equivalent must be the dose averaged over the contiguous 10 square centimeters of skin receiving the highest exposure. The deep-dose equivalent, lens-dose equivalent, and shallow-dose equivalent may be assessed from surveys or other radiation measurements for the purpose of demonstrating compliance with the occupational dose limits, if the individual monitoring device was not in the region of highest potential exposure, or the results of individual monitoring are unavailable.
- c) Derived air concentration (DAC) and annual limit on intake (ALI) values are presented in table 1 of appendix B to 10CFR20 and may be used to determine the individual's dose and to demonstrate compliance with the occupational dose limits.
- d) In addition to the annual dose limits, USRS shall limit the soluble uranium intake by an individual to 10 milligrams in a week in consideration of chemical toxicity (refer to 10CFR20 appendix B).
- e) USRS shall reduce the dose that an individual may be allowed to receive in the current year by the amount of occupational dose received while employed by any other person or organization (refer to 10CFR20.2104). Additionally, occupationally exposed workers who have received radiation exposure prior to employment with USRS are required to provide their radiation exposure history records or names and addresses of previous employers and locations where they have received exposures.
- f) USRS shall perform radiation monitoring (external and/or internal) when it is likely that any individual will exceed 10 percent of any annual limit.

5.2 Public Dose Limits

USRS will ensure that licensed material will be used, transported, stored, and disposed in such a way that the total effective dose equivalent (TEDE) to members of the public will not exceed more than 1 milliSievert (mSv) or 100 millirem (mrem) in one year, and the dose in any unrestricted area will not exceed 0.02 mSv (2 mrem) in any one hour.

USRS will have a prospective evaluation and determination that unmonitored individuals are not likely to receive, in one year, a radiation dose in excess of 10% of the allowable limits in 10 CFR Part 20, or we will monitor individuals in accordance with the criteria in Section 8.10.6 entitled, "*Occupational Dose*" in NUREG-1556 Volume 18 Revision 1, "*Consolidated Guidance About Materials Licenses: Program-Specific Guidance About Service Provider Licenses*", dated August 2017"

5.3 Visitor Dose Limits

Visitors shall be limited to an annual radiation dose of 100 mrem from the sum of internal and external radiation sources, and will not be exposed to radiation fields greater than 2 mrem in any one hour. Visitors will always be escorted in any restricted area. Visitors may not perform work nor supervise personnel performing work. Visitors shall not enter a contamination area, high radiation area or airborne radiation area. Training commensurate with the hazard or risk involved will be provided and documented for retention in the visitor file.

5.4 Embryo / Fetus – Declared Pregnant Worker Dose Limits

After a female worker voluntarily notifies USRS in writing that she is pregnant, she is considered a declared pregnant worker. For a declared pregnant worker who chooses to continue working as a radiological worker the dose limit for the embryo/fetus from conception to birth (entire gestation period) is 500 mrem. Measures shall be taken to avoid substantial variation above the uniform exposure rate necessary to meet the 500 mrem limit for the gestation period. If the dose to the embryo/fetus is determined to have already exceeded 500 mrem when a worker notifies USRS of her pregnancy, the worker shall not be assigned to tasks where additional occupational radiation exposure is likely during the remainder of the gestation period. Following declaration, the USRS RSO will provide the declared pregnant worker with information regarding embryo/fetus exposure (i.e., NRC Regulatory Guide 8.13, *Instruction Concerning Prenatal Radiation Exposure*).

5.5 Working in High Radiation and Very High Radiation Fields

All work performed in fields exceeding 1 Rad per hour (gamma exposure) or 100 mrem per hour (neutron dose) will be planned in advance to minimize potential exposures to workers, the public, and the environment. The RSC will review and approve all Work Plans and Work Permits for activities occurring in fields greater than 1 Rad per hour (gamma exposure) or 100 mrem per hour (neutron dose).

If, in the course of work, an **unplanned** dose or exposure rates exceed 1 Rad per hour (gamma exposure) or 100 mrem per hour (neutron dose), work will be placed in a safe condition, and the RSO will be immediately notified. The access control methods of Section 6.2 and Section 6.3 or the RPP will immediately become applicable. Work should stop and a (revised) work plan will be prepared with sufficient ALARA controls which will be implemented sufficient to protect workers, the public, and the environment.

Workers should assume all previously posted areas indicating a “High Radiation Area” or “Very High Radiation” area contain exposure rates above 100 mrem per hour. Work plans and special controls for entry will be used in these areas.

5.6 Planned Special Exposures

USRS may authorize, in writing, an adult worker to receive doses in addition to and accounted for separately from routine occupational doses. Planned Special Exposures shall only be authorized in exceptional situations when alternatives that might avoid the dose estimated to result from the planned special exposure are unavailable or impractical. Before a planned special exposure, USRS will ensure that the individuals involved are:

- a. Informed of the purpose of the planned operation,
- b. Informed of the estimated doses and associated potential risks and specific radiation levels or other conditions that might be involved in performing the task; and
- c. Instructed in the measures to be taken to keep the dose ALARA considering other risks that may be present.
- d. Prior to permitting an individual to participate in a planned special exposure, USRS ascertains prior doses as required by 10CFR20.2104 during the lifetime of the individual for each individual involved.
- e. A planned special exposure shall not be authorized that would cause an individual to receive a dose from all planned special exposures and all doses in excess of the limits to exceed:
 - i. The numerical values of any of the federal dose limits in any year; and
 - ii. Five times the annual dose limits (10CFR20.1201) during the individual's lifetime.
- f. USRS shall maintain records of the conduct of all planned special exposures in accordance with the federal regulations and report the best estimate of the dose resulting from the planned special exposure to the individual, in writing, of the dose within 30 days from the date of the planned special exposure.

5.7 Contamination Control Levels

Control of radioactive contamination is achieved by using engineering controls and worker performance to contain contamination at the source, reducing existing areas of contamination and promptly decontaminating areas that become contaminated.

Radioactive material will be controlled in such as manner that the surface contamination for use without restriction does not exceed the levels specified in Atomic Energy Commission Regulatory Guide 1.86, Termination of Operating Licenses for Nuclear Reactors, and DOE Order 5400.5 (Radiation Protection of the Public and the Environment, Internal order change 2). These values may be seen in Table 2.

Additionally, USRS will ensure that all surface areas (i.e., buildings, floors, walls, etc.) will be released using appropriate guidance for surveys NUREG-1575 (MARSSIM, Rev 1), and the guidance for release described in NUREG-1757 (Consolidated Decommissioning Guidance). USRS will also follow all other portions of 10 CFR Part 20, and 10 CFR 30.36.

Table 2 ACCEPTABLE SURFACE CONTAMINATION LEVELS disintegrations per 100 square centimeters (dpm/100 cm²)		
NUCLIDE	Removable	Total (fixed + removable)
U-nat, U-235, U-238, and associated decay products	1,000 α	5,000 α
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	20	100
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	200	1,000
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	1,000 β - γ	5,000 β - γ
Tritium	10,000	NA

5.8 Airborne Radioactivity Control Levels

Personnel should not be exposed unnecessarily to airborne radioactivity. Use of engineering and administrative controls to reduce the potential for internal exposure should be evaluated before allowing personnel, with or without respiratory protection, to enter areas with airborne radioactivity. The amount of radioactive materials taken into a workers body will be limited to less than 10% of the ALI as specified in Table I, Columns 1 and 2, of Appendix B of 10 CFR Part 20, providing the total effective dose to the individual is maintained ALARA.

6. ACCESS CONTROL

Access controls to areas posted with the suitable radiological posting include training and the controls listed in this section.

6.1 Radiologically Controlled Areas

Personnel entry control shall be maintained for each Radiological Controlled Area. The degree of control shall be commensurate with existing and potential radiological hazards within the area. One or more of the following control methods shall be used:

- Signs and barricades.
- Control devices on entrances.
- Conspicuous visual and/or audible alarms.
- Locked entrance ways.
- Administrative controls.

Controls that would prevent rapid evacuation of personnel under emergency conditions shall not be installed at any Radiological Area exit.

6.2 High Radiation Areas

Access to High Radiation Areas shall be monitored as necessary to determine the exposure rates to individuals in the area. Hand-held radiation detectors should be used in addition to any installed radiation area monitors because the area dose rates may vary significantly. In addition, a supplemental dosimeter is required for access to High Radiation Areas. This dosimeter must be capable of providing an immediate estimate of the individual's integrated deep dose equivalent during the entry. Where a supplemental dosimeter is impractical or ineffective (e.g., when monitoring doses from neutron radiation), other means (e.g., knowledge of the area exposure rate and tracking of individual access times) may be used to provide an immediate estimate of an individual's dose.

One or more of the following controls shall be used for each access point to a High Radiation Area where an individual's whole-body dose could exceed 100 mrem in any one hour at 30 cm from the source or from any surface that the radiation penetrates:

- A control device that prevents entry into the area when high-radiation levels exist or that, upon entry, causes the radiation level to be reduced below levels that define a High Radiation Area.
- A device that functions automatically to prevent use or operation of the radiation source or field while individuals are in the area.

- A control device that energizes a conspicuous visible or audible alarm signal so that the individual entering the High Radiation Area and the supervisor of the activity are made aware of the entry. The audible signal shall be of a frequency (or be capable of producing a sound-pressure level) that can be heard over background noise.
- Entryways that are locked. During periods when access to the area is required, positive control over each entry is maintained.
- Continuous, direct, or electronic surveillance that is capable of preventing unauthorized entry.
- A control device that will automatically generate audible and visual alarm signals to alert personnel in the area of the intended use or operation of the radiation source in sufficient time to either evacuate the area or activate a secondary control device that will prevent use or operation of the source.

6.3 Very High Radiation Areas

In addition to the requirements in Section 8.2, the programmatic organization shall implement additional measures, such as double controlled locks, to ensure individuals are not able to gain unauthorized or inadvertent access to Very High Radiation Areas.

In no instance, will USRS enter any location marked as an “Exclusion Area” that contains any features typical of radioactive materials postings.

7. POSTING AND LABELING

Radiological posting shall be used to alert personnel to the presence of radiation and radioactive materials and to aid them in minimizing exposures and preventing the spread of contamination. All radiological postings shall be in accordance with requirements contained in 10 CFR 20, 10 CFR 835, applicable State regulations, or specific license conditions.

1. Signs shall contain the standard radiation symbol. Standardized signs shall be used where practicable.
2. Signs shall be conspicuously posted, clearly worded, and, where appropriate, may include radiological control instructions.
3. Radiological postings should be displayed only to signify actual or potential radiological conditions.
4. Signs used for training should be clearly marked, such as "For Training Purposes Only."
5. Posted areas should be as small as practicable for efficiency.
6. Rope, tape, chain and similar barriers used to designate the boundaries of posted areas should be yellow and magenta in color.
7. Posting requirements may be waived for periods of less than 8 continuous hours when the area is placed under the continuous observation and control of an individual knowledgeable of and empowered to implement required access and exposure control measures..

7.1 Posting of Radiation Areas

USRS shall post each radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, RADIATION AREA."

7.2 Posting of High Radiation Areas

USRS shall post each high radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, HIGH RADIATION AREA" or "DANGER, HIGH RADIATION AREA."

7.3 Posting of Very High Radiation Areas

USRS shall post each very high radiation area with a conspicuous sign or signs bearing the radiation symbol and words "GRAVE DANGER, VERY HIGH RADIATION AREA."

7.4 Posting of Airborne Radioactivity Areas

USRS shall post each airborne radioactivity area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, AIRBORNE RADIOACTIVITY AREA" or "DANGER, AIRBORNE RADIOACTIVITY AREA."

7.5 Posting of Areas or Rooms in Which Licensed Material is Used or Stored

USRS shall post each area or room in which there is used or stored an amount of licensed material exceeding 10 times the quantity of such material specified in Appendix C to part 20 with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, RADIOACTIVE MATERIAL(S)" or "DANGER, RADIOACTIVE MATERIAL(S)."

7.6 Posting of Waste Containers

USRS shall ensure that each container of licensed material bears a durable, clearly visible label bearing the radiation symbol and the words "CAUTION, RADIOACTIVE MATERIAL" or "DANGER, RADIOACTIVE MATERIAL." The label must also provide sufficient information (such as the radionuclide(s) present, an estimate of the quantity of radioactivity, the date for which the activity is estimated, radiation levels, kinds of materials, and mass enrichment) to permit individuals handling or using the containers, or working in the vicinity of the containers, to take precautions to avoid or minimize exposures.

Prior to removal or disposal of empty uncontaminated containers to unrestricted areas USRS shall remove or deface the radioactive material label or otherwise clearly indicate that the container no longer contains radioactive materials.

7.7 Notices to Employees at Temporary Job Sites

A register shall be posted at each temporary job location noting where the current copies of the documents listed below may be found. Items *c*, *d*, and *e* will be posted at each temporary job location.

- a. 10 CFR 19, 20, 21, 30, and 49 CFR
- b. NRC license and amendments
- c. Notice of Violation or any other applicable infraction involving radiological working conditions
- d. NRC Form 3, Notice to Employees
- e. Section 206 of the Energy Reorganization Act
- f. Any applicable Memorandum of Understanding with other RAM license holders

8. RESPIRATORY PROTECTION PROGRAM

USRS shall use, to the extent practical, process or other engineering controls (*e.g.*, containment, decontamination, or ventilation) to control the concentration of radioactive material in air.

When it is not practical to apply process or other engineering controls to control the concentrations of radioactive material in the air to less than ARA requirements, USRS shall, consistent with maintaining the total effective dose equivalent ALARA, increase monitoring and limit intakes by:

1. Control of access,
2. Limitation of exposure times,
3. Use of respiratory protection equipment, or
4. Other controls.

USRS will only use respiratory protection equipment that is tested and certified by the National Institute for Occupational Safety and Health (NIOSH).

USRS shall implement and maintain a respiratory protection program that includes:

1. Air sampling sufficient to identify the potential hazard, permit proper equipment selection, and estimate doses,
2. Surveys and bioassays, as necessary, to evaluate actual intakes,
3. Testing of respirators for operability (user seal check for face sealing devices and functional check for others) immediately prior to each use,
4. Written procedures,
5. Determination by a physician that the individual user is medically fit to use respiratory protection equipment and
6. Fit testing

9. AUDIT PROGRAM⁵

USRS shall conduct audits on a routine basis to evaluate the RPP. The audits shall be conducted on every major program element of the RPP at least annually. The audits shall include examination of the radiation protection program's content and implementation with applicable regulations, standard operating procedures, and license conditions. The audit of the RPP will be based on an approved written schedule.

A written plan shall be established to identify the scope and areas to be audited prior to the performance of an audit. A qualified individual having no direct responsibility for the operation being audited shall be used to perform the audit in order to ensure unbiased results. The annual audit for radiological safety shall be performed by an individual with at least five years experience in applied health physics. Upon completion of the audit, a written report including any suggestions for corrective actions should be provided to the RSO or designee by the audit/assessment team. Response to any corrective will be documented. Audits that are conducted by regulatory agencies can fulfill the annual requirement providing there were no significant findings and that a documented report is issued to the RSO.

Individual project inspections should be scheduled annually or as appropriate. The RSO or designee shall designate an individual or group of individuals to perform the inspections. Upon completion of the inspection, a briefing including any suggestions for corrective actions should be provided to the RSO or designee by the inspector. Response to any corrective will be documented.

⁵**Criteria:** Applicants for Type A, Type B, and Type C broad scope licenses are required by 10 CFR 33.13(c), 33.14(b), and 33.15(c) respectively, to establish administrative controls and provisions relating to management review necessary to ensure safe operations. 10 CFR 20.1101(c) requires the licensee to review the radiation program content and implementation, periodically (at least annually). Licensees are required by 10 CFR 20.2102 to maintain records of the radiation protection program, including: (1) the provisions of the program; and (2) audits and other reviews of the program contents and implementation.

Response from Applicant: Describe the mechanisms used by executive management to ensure that adequate oversight of the program is exercised. In addition, if you are upgrading your limited scope license to a Type A broad scope license or you are renewing your Type A broad scope license, describe the RSC's involvement in these oversight mechanisms. The applicant is not required to, and should not, submit its program for conducting the annual audit required by 10 CFR 20.1101 to the NRC for review during the licensing phase. The adequacy of this audit program will be reviewed during NRC inspection. Describe the audit mechanism implemented by the RSO or other responsible individual to determine user compliance with NRC regulations, the terms and conditions of the NRC license, the requirements of the RSC or RSO-approved permits (as appropriate), and good health physics practices.

10. RADIATION MONITORING INSTRUMENTS⁶

Instruments and equipment used for radiological monitoring shall be:

- Periodically maintained and calibrated on an established frequency (typically annually for hand-held instrumentation),
- Appropriate for the type(s), levels, and energies of the radiation(s) encountered,
- Routinely tested for operability and
- Used in accordance with standard operating procedures.

Radiological instrument calibration shall be performed at least annually by a qualified vendor possessing a valid NRC or Agreement State License to provide calibration services.

Calibrations shall be performed in accordance with the instrument manufacturer recommendations, ANSI N 323A using standard sources traceable to the National Institute of Standards and Technology (NIST).

The RSO shall ensure that radiation detection equipment is properly maintained and calibrated and that the individuals using the instruments are qualified on the proper application and operational parameters of each instrument. A sufficient number of instruments shall be maintained such that radiological operations will not be compromised while instruments are being repaired, replaced, or calibrated.

An inventory of radiological instruments will be documented for each project and a calibration sticker shall be attached to each instrument to allow the operator to verify the instrument is within current calibration prior to use. If an instrument is found to have a past due calibration, the instrument SHALL NOT be used and SHALL BE tagged with an “OUT OF CALIBRATION” sticker or equivalent tag.

⁶ **Regulations:** 10 CFR 20.1501; 10 CFR 20.2103(a); 10 CFR 30.33(a)(2); 10 CFR 33.13; 10 CFR 33.14; 10 CFR 33.15; 10 CFR 34.25; and 10 CFR 35.51.

Criteria: Licensees must, pursuant to 10 CFR 20.1501, possess and periodically calibrate radiation monitoring instruments that are necessary to protect health and minimize danger to life or property.

Response from Applicant: Provide the criteria used by your RSC and/or RSO, as appropriate, to review and approve radiation monitoring instrumentation to assure that appropriate radiation monitoring equipment will be used during licensed activities.

Discuss how the RSC and/or RSO, as appropriate, will assure that instruments are properly calibrated at prescribed frequencies. Submit procedures for instrument calibration or state that instruments will be calibrated by a vendor who is licensed by NRC or an Agreement State to perform instrument calibrations. Licensees who want authorization to calibrate their own survey instruments may commit to implementing the model procedures published in Appendix F of this document.

11.MATERIAL RECEIPT AND ACCOUNTABILITY⁷

USRS operating procedures assure that only authorized individuals (RSO) receive radioactive materials and that individuals receive only the types and quantities of radioactive material that they are authorized by the license to receive. Only the RSO is authorized to procure radioactive materials that the license is authorized to receive, as required for each project.

Inventory control and accountability is accomplished by documenting receipts and transfers of licensed material in accordance with approved procedures and through a centralized purchasing and receipt process. To ensure compliance and general safety in the workplace, it is essential that radioactive items be properly surveyed, identified and managed from the time of receipt.

1. Radioactive packages will be delivered directly to the RSO or designee. The procedure for opening packages containing radioactive materials can be found in Appendix E of NUREG-1556, Volume 18.
2. Inventory balances will be maintained to ensure that possession limits are not exceeded.
3. Purchases of licensed calibration standards shall be from licensed vendors only
4. USRS shall secure from unauthorized removal or access licensed materials that are stored in controlled or unrestricted areas.
5. USRS shall control and maintain constant surveillance of licensed material that is in a controlled or unrestricted area and that is not in storage.
6. At each project site a list of all known commodities containing radioactive materials is to be maintained and routinely inventoried by the RSO or RSOR. Any new radioactive

⁷ **Regulations:** 10 CFR 20.1501(a); 10 CFR 20.1801; 10 CFR 20.1802; 10 CFR 20.1906; 10 CFR 20.2001; 10 CFR 20.2108(b); 10 CFR 20.2201; 10 CFR 30.34(e); 10 CFR 30.35(g); 10 CFR 30.41; 10 CFR 30.51; 10 CFR 33.13; 10 CFR 33.14; and 10 CFR 33.15.

Criteria: Licensees must, pursuant to 10 CFR Parts 20, 30, and 33, develop, implement, and maintain written procedures for all of the following: Purchasing and receipt of radioactive material Safely receiving and opening packages Ensuring control and accountability of licensed material. The licensee must also maintain records of receipt, utilization, transfer, and disposal of licensed material.

Response from Applicant: Describe your administrative procedures to assure control of procurement and use of byproduct material. While the applicant is required to develop and implement safe opening procedures for packages containing radioactive material, the applicant need not submit the procedures during the licensing process. These procedures will be reviewed during inspection. Describe your administrative controls and provisions relating to materials control, accounting and security.

items and/or devices received by USRS must be properly identified and as a minimum, the following information (where applicable) should be provided to the RSO:

- Any Serial, Stock, Model or other notable identifying number
 - Item Name
 - Name of the radionuclide(s).
 - Activity per radionuclide(s)
7. USRS shall maintain records of receipt, use, transfer, and disposal of all licensed material.

12. SAFE USE OF RADIONUCLIDES AND EMERGENCY PROCEDURES⁸

USRS shall use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are ALARA.

12.1 Licensed Material

USRS's work with licensed materials will be performed within the requirements specified in a RAM License issued by the NRC or an Agreement State.

USRS shall implement procedures to ensure the security and safe use of all licensed material from the time it arrives at the facility until it is used, transferred, and/or disposed.

Operations involving sealed sources will follow the manufacturer's procedures for inspection maintenance, source exchange, and operations that involve access to the sealed source(s) and safety systems (if applicable).

12.2 Exempt Materials

USRS may possess exempt quantities of radioactive materials in the form of check sources that are used to response check instruments. Exempt radioactive sources will be kept in a locked source storage locker when not in use. These sources will be accounted for on the USRS source inventory log.

12.3 Required Notifications

USRS shall perform any required notifications including: (1) Reports of theft or loss of licensed material, (2) Notification of incidents and (3) Reports of exposures, radiation levels, and

⁸ **Regulations:** 10 CFR 19.11(a)(3); 10 CFR 20.1101; 10 CFR 20.1801; 10 CFR 20.1802; 10 CFR 20.2201-2203; 10 CFR 21.21; 10 CFR 30.32(i); 10 CFR 30.34(e); 10 CFR 30.50; 10 CFR 30.72; 10 CFR 33.13; 10 CFR 33.14; and 10 CFR 33.15.

Criteria: Licensees are required, pursuant to the regulations stated above, to: Keep radiation doses to workers and members of the public ALARA Ensure security of licensed material Make required notifications to NRC of events.

Response from Applicant: Submit your procedures for safe use of radionuclides and emergencies. Your submission should include procedures for maintaining security of licensed radioactive materials. As an alternative, you may state "We will adopt the procedures for the safe use of radionuclides and emergencies as published in Appendix R of NUREG-1556, Volume 11, "Program-Specific Guidance About Licenses of Broad Scope."

concentrations of radioactive material exceeding the constraints or limits, in accordance with the applicable federal or state regulations including 10CFR20.2201-2203.

1. The Project Manager is responsible for notifying the RSO whenever a suspected event occurs and ensuring that the affected area is isolated and control of access is established until the RSO responds. All radiological events shall be reviewed by the RSO against the reporting requirements specified in State and Federal regulations.
2. The Project Manager and the Corporate President shall be notified of any event requiring notification of the regulatory agencies. The RSO shall perform all required regulatory notifications.
3. The RSO is responsible for notification of the RSC and USRS Corporate President of all events requiring notification of any outside agencies. Such events shall have a written report detailing the event, immediate corrective actions and actions necessary to preclude recurrence completed and submitted to the Corporate President within 10 days of the occurrence.

12.4 Emergency Procedures

The Project Manager and/or RSO will maintain a current list of appropriate local Points of Contact (POC) for use in the event of an emergency. USRS will provide whatever response is necessary in order to protect the health of our workers and all others at or in the immediate area of the USRS work site.

USRS we will adopt the procedures for the safe use of radionuclides and emergencies as published in Appendix R of NUREG-1556, Volume 11, "Program-Specific Guidance About Licenses of Broad Scope." USRS will immediately notify the NRC and the licensee for which the work is being performed if any of the following conditions listed in 10 CFR 20, Subpart M exist.

13.SURVEYS⁹

13.1 Radiological Monitoring of Work Areas

Radiological Monitoring of work areas is performed to:

- Demonstrate compliance with federal and/or state regulations.
- Document radiological conditions.
- Detect changes in radiological conditions.
- Detect the gradual buildup of radioactive material.
- Verify the effectiveness of engineered and process controls for containing radioactive materials and reducing radiation exposure.
- Identify and control potential sources of individual exposure to radiation and radioactive materials.

The methods and type of survey performed are commensurate with the type of hazard expected or as specified by the RSO (e.g., dose rate, air sample or contamination). All surveys will be performed only by qualified personnel and in accordance with written procedures.

USRS will perform many different types of surveys due to the particular use of licensed materials. Some of the most relevant are as follows:

- Surveys for radioactive contamination that could be present on surfaces of floors, walls, systems, open lands, waste containers, laboratory furniture, and equipment.

⁹ **Regulations:** 10 CFR 20.1501; 10 CFR 20.2103; 10 CFR 30.53; 10 CFR 33.13; 10 CFR 33.14; 10 CFR 33.15; 10 CFR 34.27(c)(2); 10 CFR 34.67; 10 CFR 35.59(d); 10 CFR 36.81(h); and 10 CFR 39.35(a).

Criteria: Licensees are required, pursuant to the regulations listed above, to make surveys of potential radiological hazards in their workplace. NRC requires testing to determine whether there is any radioactive leakage from sealed sources. Records of surveys and leak test results must be maintained.

Response from Applicant:

Surveys

Submit procedures to evaluate radiological hazards, both external and internal. If you wish, you may state “we will survey our facility and maintain contamination levels and perform bioassays of occupationally exposed workers in accordance with the survey frequencies and contamination levels published in Appendix S of NUREG-1556, Volume 11, ‘Program-Specific Guidance About Licenses of Broad Scope.’”

Leak Testing

Submit your leak test procedures. As an alternative, you may state, “we will implement the model leak test program published in Appendix T of NUREG-1556, Volume 11, Program-Specific Guidance About Licenses of Broad Scope.”

- Measurements of radioactive material concentrations in air for areas where radioactive materials are handled or processed in unsealed form and where operations could expose workers to the inhalation of radioactive material or where licensed material is or could be released to unrestricted areas.
- Measurements of radioactive material concentrations in water that is released to the environment or to the sanitary sewer.
- Bioassays to determine the kinds, quantities or concentration, and in some cases, the location of radioactive material in the human body. A bioassay can be made by direct measurement, *in vivo* counting, or by analysis and evaluation of material excreted or removed from the human body.
- Surveys of external radiation exposure levels on waste containers and in both restricted and unrestricted areas.

USRS will survey any facility that falls under the control of the USRS RAM license and maintain contamination levels and perform bioassays of occupationally exposed workers at a minimum in accordance with the survey frequencies and contamination levels as stated in this manual, or in accordance with the survey frequencies and contamination levels established in Appendix S of NUREG-1556, Volume 11, whichever is the most restrictive. Additionally, USRS will follow the guidance of NRC Regulatory Guide 8.20 “*Applications for Bioassay for I-125 and I-131*” when appropriate.

Bioassays will be performed when airborne activity is detected above 0.1 of DAC, when suspected internal contamination may have occurred, or for workers who handle potentially volatile unsealed radioactive materials. If the calculated body burden exceeds 10% of the Annual Limit of Intake (ALI) value from 10 CFR 20 Appendix B, then the RSO will be notified to determine the causes of the uptake and to make recommendations for remedial actions. During these investigations, the worker will be restricted from further exposure until the cause is discovered and corrected. Corrective actions to eliminate or lower the potential for additional exposures will be implemented. In the event that the thyroid burden exceed 50% ALI for radioactive iodine, then the employee will be referred to appropriate medical care as soon as possible for therapeutic procedures to accelerate the removal of the iodine. All exposures exceeding the ALI will be reported to the NRC within 24 hours.

The survey frequencies in Table 3 are minimum requirements. The RSO / RSOR will review each project to determine necessary frequencies to ensure appropriate monitoring of site conditions.

Table 3 – Survey Frequencies

Location	Type	Frequency
Radiation Areas	Dose Rate	Weekly or daily (when work is performed)
High Radiation Areas	Dose Rate at boundary	Weekly
Unrestricted Areas	Dose Rate	Annually
Contamination Areas	Contamination Survey	Weekly or daily (when work is performed)

13.2 Leak Test

Sealed sources used for instrument calibration and response checks shall be inventoried and stored in a secure location. A leak check of inventoried sources will be performed and documented at least every six months. Leak testing is not required if:

- Sources contain only hydrogen-3 (tritium),
- Sources only contain byproduct material with a half-life of less than 30 days,
- Sources contain only a radioactive gas,
- Sources contain 100 microcuries or less of beta or gamma emitting material or 10 microcuries or less of alpha emitting material and
- The sources are stored and not being used (they must be leak tested before use or transfer).

Leak testing will follow the model procedures described in Appendix O of NUREG-1556 Volume 18.

14. TRANSPORTATION¹⁰

USRS shall develop, implement and maintain procedures that ensure compliance with NRC and DOT regulations. USRS shall use only qualified Waste Brokers that meet the shipping requirements of the waste disposal facilities. The Waste Broker will report to the RSO on issues related to shipment of radioactive waste and/or materials.

¹⁰ **Regulations:** 10 CFR 20.1101; 10 CFR 30.41; 10 CFR 30.51; 10 CFR 33.13; 10 CFR 33.14; 10 CFR 33.15; 10 CFR 34.35; 10 CFR 71.5; 10 CFR 71.12; 10 CFR 71.13; 10 CFR 71.14; 10 CFR 71.47; 10 CFR 71.87; and 49 CFR Parts 171-178.

Criteria: Broad Scope licensees who will transport or ship licensed material, including radioactive waste, must develop, implement, and maintain safety programs for transport of radioactive material to ensure compliance with NRC and U.S. Department of Transportation (DOT) regulations.

Response from Applicant: No response is needed from applicants during the licensing phase. Compliance with transportation requirements will be reviewed during NRC inspections.

15. WASTE MANAGEMENT¹¹

- Collection, storage and disposal of radioactive material classified as radioactive waste shall be accomplished using written procedures.
- Radiological operations generating radioactive waste should be designed and developed to promote minimization and permit segregating, monitoring, storage and disposal.
- Radioactive waste produced as a result of site operations shall be collected, packaged, and stored in a location prescribed by the RSO/RSOR.
- Radioactive waste shall be transferred to a recipient who is properly licensed to receive such waste in accordance with applicable regulations.
- Radioactive waste may be shipped directly to an authorized radioactive waste disposal facility or other authorized waste processor.

¹¹ **Regulations:** 10 CFR 20.1501; 10 CFR 20.2001; 10 CFR 20.2002; 10 CFR 20.2003; 10 CFR 20.2004; 10 CFR 20.2005; 10 CFR 20.2006; 10 CFR 20.2007; 10 CFR 20.2108; and 10 CFR 30.51.

Criteria: Radioactive waste must be disposed of in accordance with regulatory requirements, and appropriate records of waste disposal must be maintained.

Response from Applicant:

Provide procedures for waste collection, storage, and the disposal by any of the authorized methods described in this section. Applicants should contact appropriate Regional Office of the NRC for guidance to obtain approval of any method(s) of waste disposal other than those discussed in this section.

Note: Applicants do not need to provide information to NRC if they plan to dispose of LLW via transfer to an authorized recipient or to dispose of liquid scintillation media or animals containing low levels of H-3 or C-14, as authorized by 10 CFR 20.2005.

16.RECORDS

Records pertaining to the Radiation Protection Program, unusual occurrences, inspections, audits, ALARA, personnel exposures, radiation and contamination surveys, effluent monitoring, environmental monitoring program, calibrations, waste disposal and decommissioning are retained and maintained to demonstrate compliance with the conditions of the site's license(s) and with applicable Federal, State and local regulations.

Survey records will include:

- A diagram of the area surveyed
- A list of items and equipment surveyed
- Specific locations on the survey diagram where wipe test was taken
- Ambient radiation levels with appropriate units
- Contamination levels with appropriate units
- Make, model, serial number, and calibration due dates for instruments used
- Background levels
- Name of person making the evaluation and recoding the results and date

A hard copy original-signature of the primary surveyor will be retained in USRS records.

Records that are generated as a result of the requirements of federal regulations must be retained until the NRC authorizes their disposition.