Review and Approvals	
Prepared: Jay Maisler	
Signature:	Date:
Reviewed by Todd Brautigam	
Signature:	Date:
Reviewed by Quality Assurance Coordinator: Chuck Beatty	
Signature:	Date:
Approved by Radiation Safety Officer: Jay Maisler, CHP	
Signature:	Date:
Approved by Trustee Project Manager: Jeff Lux	
Signature:	Date:
Approved by Administrator, Cimarron Environmental Response Trust: Bill Halliburton	
Signature:	Date:

NOTE

The content of Revision 4 to the Radiation Protection Plan (RPP) includes provisions that apply to activities proposed in the Decommissioning Plan (DP) that is under review by the U.S. Nuclear Regulatory (NRC. This RPP is incorporated as Appendix O of that DP. Upon approval by the NRC, this RPP will be revised to incorporate any changes required by the NRC staff agreed to during the review process, as documented in a Safety Evaluation Report. RPP provisions that cannot be implemented without NRC approval are identified in GRAY HIGHLIGHTED TEXT. Other changes in Rev. 4 have been reviewed in accordance with license condition 27(e) of SNM-928 by the ALARA Committee and determined that they may be implemented as they do not:

- Conflict with the ALARA principle or decommissioning process.
- Conflict with requirements specifically stated in the license or impair the Cimarron Environmental Response Trust's ability to meet all applicable NRC regulations.
- Cause degradation in safety or environmental commitments addressed in the NRC-approved RPP and/or DP or have a significant adverse effect on the quality of the work, the remediation objectives, or health and safety.
- Conflict wit the conclusions analyzed in the Environmental Assessment, dated July 29,1999, and Safety Evaluation Report, dated August 20,1999.

Summary of Changes

Revisions to this document will be identified, and revisions or addenda will be issued as needed. The end user is responsible to verify that any hard copy being used is the current revision. A current version of the RPP is maintained on the Cimarron SharePoint site. A hard copy is available at the Site office. A summary description of each revision or addenda will be noted in the following table.

Revision Number	Date	Comments
Rev. 0	April 11, 2011	Original
Rev. 1	Feb. 3, 2012	Revision 1 to the Cimarron RPP contains numerous administrative changes and editorial changes. Specific changes are identified in a separate 27(e) evaluation and attached markup of changes from RPP Rev. 0.
Rev. 2	Feb. 24, 2014	Revision 2 to the RPP includes clarifications addressing groundwater processing and editorial changes. Specific changes are identified in a separate 27(e) evaluation and attached markup of changes from Rev. 1.
Rev. 3	April 15, 2016	Revision 3 provides changes to support the proposed Decommissioning Plan and includes editorial changes. Clarifications were added to address how radiological controls for routine activities are handled when an Activity Plan is not required or used. Specific changes are identified in a separate 27(e) evaluation and attached markup of changes from Rev. 2.

Revision Number	Date	Comments
Rev. 3.1	Dec. 31, 2018	Revision 3.1 is an interim revision This is an interim revision pending approval of draft Revision 4 by the NRC. Accordingly, it is labeled Revision 3.1. This revision to the RPP incorporates changes identified during the submittal of the Cimarron Facility Decommissioning Plan, Rev. 1, that the ALARA Committee determined can be implemented prior to NRC approval of the Decommissioning Plan. This revision also addresses and clarifies issues discussed with the NRC staff during the November 2018 inspection at the Site.
Rev. 3.2	Sep. 15, 2019	Includes editorial corrections. Corrected error in Section 8.2 that implied personnel access logs were required for entry into areas posted solely as Radioactive Materials Areas. Corrected typographical area regarding Radioactive Materials Area in Table 8.1 and Section 10.2.

Revision Number	Date	Comments
Rev. 4	March 1, 2021	Added signature blocks to Reviews and Approvals page to identify preparer and technical reviewer. Changed language on verification of the current version of the RPP in accordance with Site practices in Summary of Changes and footers. Includes changes made to conform with the Cimarron Site Decommissioning Plan under review by the NRC for approval Added a Note on the cover page to indicate that certain changes identified within the RPP cannot be implemented until NRC approves the Decommissioning Plan. After NRC approval, Rev. 5 to the RPP will be issued to reflect NRC approved RPP language. Other changes have been to clarify Site implementation of the RPP or to make editorial corrections and clarifications. Specific changes approved for implementation are identified in a separate 27(e) evaluation and attached markup of changes from Rev. 3.2.

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1.0 INTRODUCTION

1.1 Purpose

This Radiation Protection Plan (RPP) establishes radiation protection requirements implemented at the Cimarron Site to achieve compliance with applicable regulatory requirements and License SNM-928. As provided in the Cimarron Site Decommissioning Plan, the RPP will be implemented during decommissioning (extraction and treatment of uranium-impacted groundwater).

1.2 Scope

The RPP applies to all radiological operations, routine and emergency, at the Cimarron Site. The RPP applies to the following personnel when present at the Cimarron Site:

- Licensee employees
- Contractors and their employees
- Visitors

2.0 TRAINING REQUIREMENTS AND POLICY

2.1 Section Overview

This section describes radiation safety training requirements for individuals who enter a Restricted Area (RA), handle radioactive material, or work in the vicinity of radioactive material at the Site.

2.2 Responsibilities

The RSO is responsible for the radiation safety training program which includes:

- Approving radiation safety training materials
- Approving personnel performing radiation safety training
- Performing radiation safety training
- Verifying that those individuals who require radiation safety training receive appropriate training

2.3 Training Requirements

Radiation safety training requirements are tiered to provide an appropriate level of training based on the potential for radiation exposure of an individual at the Cimarron Site. Individuals who visit or work at the Site but do not require unescorted access to RAs or Radioactive Material Areas must complete Radiological Orientation. In addition to Radiological Orientation, General Worker Radiological Training is required for individuals requiring unescorted access to RAs or Radioactive Material Areas whose duties do not involve working with or handling radioactive material. Radiation Worker Training is required for individuals who handle or work directly with radioactive materials.

The Licensee shall not assume that radiation safety training has been adequately covered by prior employment or academic training.

Inspectors and representatives of the NRC and the Oklahoma Department of Environmental Quality, Land Protection Division, Radiation Management Section are exempt from radiation safety training. Site-specific information may be provided to agency personnel if deemed necessary by the RSO.

A prospective evaluation of radiological conditions and potential doses to workers for the groundwater treatment process will be performed. Based on the results of this evaluation, the RSO will determine the need for individual monitoring, and General Worker Radiological Training (Subsection 2.3.2) or Radiation Worker Training (Subsection 2.3.3) for workers accessing RAs, and the boundaries of any required RA(s).

2.3.1 *Radiological Orientation*

Radiological Orientation is required for visitors and individuals visiting or working at the Cimarron Site but not permitted to enter RAs or Radioactive Material Areas. Individuals who complete Radiological Orientation will be granted escorted (i.e., under direct supervision of a Qualified Escort) access to RAs and Radioactive Material Areas but working with or handling radioactive materials is not permitted. Entry into Contaminated Areas, Airborne Radioactive Material Areas, or areas requiring either bioassay or respiratory protection is not permitted. Activities these individuals undertake may include, but is not limited to general office work, housekeeping, and tours and inspections of the property.

Information required for Radiological Orientation may be presented in a classroom setting or provided as a "read-and-sign" document. A test is not required for

Radiological Orientation. Documentation will be maintained for all individuals completing Radiological Orientation. The following topics will be addressed:

- Radioactive materials that are present at the Site
- NRC Form 3, "Notice to Employees"
- Information regarding radiation safety requirements for work to be performed (e.g., groundwater sampling, well installation, groundwater processing, packaging and shipping for disposal, etc.)
- Site access and egress (typically covered in Site Safety & Health Orientation);
- Response to emergency conditions (including weather, fires, personnel injuries) (typically covered in Site Safety & Health Orientation);
- Site industrial safety requirements (typically covered in Site Safety & Health Orientation)

Refresher training for Radiological Orientation shall be conducted annually (within 12 months).

2.3.2 *General Worker Radiological Training*

General Worker Radiological Training is required for workers who are granted unescorted access to RAs Radioactive Material Areas but who are not permitted:

- Work with or handle radioactive material.
- Enter Contaminated Areas or Airborne Radioactive Material Areas.
- Enter areas where bioassay or respiratory protection is required.

Information required for General Worker Radiological Training may be presented in a classroom or virtual classroom setting or provided as a "read-and-sign" document.

Documentation will be maintained for all individuals completing General Worker Radiological Training. General Worker Radiological Training will include:

- Information covered in Radiological Orientation described above;
- Information regarding the principles and practices of radiation protection;
- Information regarding the purpose and functions of protective and monitoring devices that will be used, as applicable;
- Information regarding protection available for the embryo/fetus, as applicable.

General Worker Radiological Training will include a test to verify an adequate understanding of the training. Each test shall have a minimum passing grade of 80%. If an individual does not pass the test, the test may be administered a second time. If the candidate fails the test a second time, the candidate must repeat the entire General Worker Radiological Training course before he/she can take another test.

A candidate who does not achieve a minimum of 80% on the General Worker Radiological Training test will not be granted unescorted access to any RA or Radioactive Material Area.

Refresher training for General Worker Radiological Training shall be conducted annually (within 12 months) and does not require re-testing.

2.3.3 *Radiation Worker Training*

Radiation Worker Training is required for individuals who in the course of employment are likely to receive an occupational dose to radiation greater than 100 mrem (1 millisievert) in a year or whose duties require them to work in an RA, Radioactive Material Area, Contaminated Area, Airborne Radioactive Material Area, or routinely

work with or handle radioactive material, or use respiratory protection equipment (for radiation protection). Such workers may include groundwater processing operators and their supervision, health physics technicians, and environmental sampling personnel.

Radiation Worker training will include:

- Information covered in General Worker Radiological Training described above;
- Radioactivity measurements, monitoring techniques, and usage of monitoring instrumentation;
- Basic calculations involved in using and measuring radioactivity;
- Types of radiation, range and effects;
- Regulatory and Site-specific dose limits to the general public and occupationally exposed persons;
- Storage, transfer, or use of radiation and/or radioactive material;
- Biological effects of radiation;
- Health protection problems associated with exposure to radiation and/or radioactive material;
- Precautions or procedures to minimize exposure;
- Purposes and functions of protective devices employed;
- Applicable NRC regulations and license requirements for the protection of personnel from exposure to radiation and/or radioactive material including responsibility to observe regulatory and license requirements to the extent within the worker's control;
- Workers' responsibility to report promptly to the Licensee any condition which may lead to or cause a violation of Commission regulations and licenses or unnecessary exposure to radiation and/or radioactive material;

- Appropriate response to warnings made in the event of any unusual occurrence or malfunction that may involve exposure to radiation and/or radioactive material;
- Radiation exposure reports which workers may request pursuant to 10 CFR 19.13.

Initial Radiation Worker Training will include a test to verify an adequate understanding of the training. Each test shall have a minimum passing grade of 80%. Each test question answered incorrectly shall be reviewed with the test participant and noted on test. If an individual does not pass the test, the test may be administered a second time. If the candidate fails the test a second time, the candidate must repeat the entire Radiation Worker Training course before he/she can take another test.

A candidate who does not achieve a minimum of 80% on the Radiation Worker training test will not be permitted to perform work in an RA or to handle radioactive material until such time as the Radiation Worker training and test is successfully completed. The individual may continue unescorted access to RAs or Radioactive Material Areas if they successfully completed General Worker Radiological Training.

2.3.4 *Training Delivery*

Any of the following techniques, or combination thereof, may be used for radiation safety training:

- Classroom training
- Audiovisual media
- Reading assignments (Self Study)
- Computer-based or on-Line training (Internet)
- On-the-job training (OJT) under the presence of an individual trained in the specific activity being observed;

- Demonstrations
- Drills
- Discussions

2.3.5 *Training Frequency*

- Initial Radiation Worker Training shall be conducted before working in working with or handling radioactive material.
- A training update for Radiological Orientation, General Worker Radiological Training, or Radiation Worker Training shall be provided, as appropriate, whenever there is a significant change in duties, regulations, or terms of the license.
- Refresher for Radiation Worker Training shall be conducted annually (within 12 months) and does not require re-testing.

2.4 Refresher Training

Refresher training for Radiological Orientation, General Worker Radiological Training, and Radiation Worker may be satisfied by the RSO or designee issuing required reading that is formally acknowledged by the individual in an email or signed acknowledgement form. Other methods for conducting refresher training may be required by the RSO based upon lessons learned throughout the year.

2.5 Training Records

Training records shall include the following documentation:

- Rosters of individuals attending Radiological Orientation briefings.

- Rosters of individuals attending General Worker Radiological Training.
- Rosters of individuals completing Radiation Worker Training.
- Completed General Worker Radiological Training graded tests.
- Completed Radiation Worker Training graded tests.
- Documentation of completion of refresher for General Worker Radiological Training.
- Documentation of completion of refresher for Radiation Worker Training.

Records for all individuals shall be maintained in accordance with the Quality Assurance Program Plan (QAPP).

3.0 ADMINISTRATION AND RESPONSIBILITIES

3.1 Section Overview

This section describes the radiation protection organization and responsibilities of those individuals implementing the RPP.

Administration of the radiation protection program requires coordination among the following individuals:

- Trust Administrator
- Trustee Project Manager (Trustee PM)
- RSO
- Quality Assurance Coordinator (QAC)
- Task Specific Project Managers (PMs)
- Activity Leaders
- Individual Workers
- ALARA Committee

3.2 Radiation Protection Organization

The radiation protection organizational structure for the Cimarron Site is shown in Figure 3-1.

Trust Administrator – The Trust Administrator has expertise in management and has managerial and financial responsibility for the decommissioning of the Cimarron Site. The Trust Administrator is a permanent member of the Site ALARA Committee.

Trustee PM – The Trustee PM is responsible for overseeing the construction and operation of decommissioning systems, the implementation of radiation safety, industrial health and safety,

quality assurance, and environmental compliance programs. The Trustee PM is responsible for ensuring that all personnel performing decommissioning activities, or working in radiation protection, health and safety, quality assurance, or environmental compliance functions receive training and have the skills and experience required to perform those functions. The Trustee PM, having expertise in decommissioning and responsibility for implementing decommissioning changes, is a permanent member of the ALARA Committee.

RSO (Jay Maisler) – The RSO is responsible for maintenance and implementation of the radiation protection program. The RSO is also responsible for review and revision of the RPP and procedures, radiation exposure monitoring, dose reporting, the radiological instrument program, and all levels of radiation safety training. The RSO is responsible for ensuring that all activities comply with license requirements, chair the ALARA Committee, and manage the health physics staff. The RSO is given specific authority to implement and manage the Licensee's radiation protection program, either directly or through qualified individuals who are designated in writing as having authority to exercise specific functions. All radiation protection personnel have stop work authority.

The responsibility for the implementation and review of the Material Control and Accountability (MC&A) program is assigned to the RSO for the Cimarron Site. The RSO establishes training programs for individuals who implement activities in accordance with MC&A procedures and designates specific individuals are qualified to implement those activities.

QAC – The QAC is responsible for the maintenance and implementation of the quality assurance program. The QAC performs or schedules periodic and/or ad hoc audits and observations of all decommissioning and program management functions. All quality assurance personnel have stop work authority. The QAC is also responsible to perform periodic evaluations of the effectiveness of the quality assurance program and to ensure that all personnel performing

quality-critical tasks have received the appropriate level of training on the Site-specific quality assurance program. The QAC attends the Site ALARA Committee.

PMs – PMs are responsible for the preparation of plans, procurement of services and materials, and the execution of decommissioning projects. PMs ensure that all personnel working on projects have received all the training needed and are qualified to perform the tasks for which they are responsible to perform. PMs are responsible for monitoring the schedule, cost, and quality of the project work.

Activity Leader and Front-Line Supervisor – Activity Leaders (ALs) are the front-line supervisors over non-routine work performed at the Cimarron Site. ALs are responsible for the preparation of activity plans and procurement of services and materials for non-routine activities. Front-line supervisory personnel are responsible for procurement of services and materials and the performance of decommissioning operations for routine operations. ALs and front-line supervisors ensure that all personnel working on projects are familiar with the activity plan under which the work is being performed, and that they have received all the training needed and are qualified to perform the tasks for which they are responsible to perform. ALs and front-line supervisors are responsible for monitoring the schedule, cost, and quality of the project work.

Individual Worker – Each worker is responsible for their own protection and the protection of their co-workers. Workers should know how NRC requirements relate to their work and should follow them. If a worker observes violations of the requirements or has a safety concern, they should report them as discussed in section 3.3.2 of this Plan. Workers are provided training related to their responsibilities in Radiological Orientation, General Worker Radiological Training, and Radiation Worker Training.

ALARA Committee – The ALARA Committee is responsible for ensuring that ALARA policy and regulatory compliance are integrated into Site work activities as appropriate. The Committee reviews and approves ALARA goals for the Cimarron Site and the effectiveness of the ALARA program in meeting these goals. The Committee also reviews plans for new Site activities to ensure that ALARA principles have been considered, reviews the radiation protection program annually to ensure regulatory compliance and incorporate any necessary changes, and evaluates and approves changes to the DP or the RPP in accordance with License Condition 27(e).

3.3 Policies

3.3.1 *Stop Work Authority*

All Site personnel have the authority to stop work:

- If radiological health and safety of workers is compromised
- If radiological health and safety of the general public is compromised
- If radiological regulatory non-compliance may occur (includes NRC regulations, license conditions, and radiation protection procedures)

3.3.2 *Reporting Safety Concerns and Regulatory Violations*

All workers at the Site have the right to report safety concerns and observations of potential regulatory or license violations. Individuals are encouraged to contact the RSO first if they have a radiation safety concern or observe a potential regulatory or license violation. This is not a requirement.

Individuals who are not satisfied with the response to an expressed concern have the right to contact the NRC for resolution. See NRC Form 3, "Notice to Employees." No penalty or retribution will result to an individual who contacts the NRC.

3.4 Radiation Protection Program Document Hierarchy

The order of precedence in regulating the Cimarron Site is:

1. Federal radiation protection regulations (10 CFR)
2. License SNM-928, including the RPP which is incorporated into the license via a license condition
3. Radiation protection program procedures

3.5 Procedure Development

Radiation protection procedures have been developed to provide consistent, effective performance of radiation protection activities. Radiation protection procedures include, but are not limited to, the sampling and analysis of influents and effluents to monitor the accumulation of special nuclear material in resins, the sampling of loaded resin and biomass for waste characterization, and the sampling, analysis, handling, storage, manifesting, transportation, and disposal of low-level radioactive waste.

Radiation protection procedures shall be developed in accordance with the QAPP.

Radiation protection procedures shall comply with regulatory requirements, license conditions, and the RPP.

Radiation protection procedures may incorporate or reference applicable technical guidance documents (e.g., NRC Regulatory Guides and NUREGs, National Council on Radiation

Protection and Measurements (NCRP) guidance, International Council on Radiation Protection (ICRP) guidance, American National Standards Institute (ANSI) documents, etc.).

3.6 Procedure Review, Approval, and Control

Radiation protection procedures shall undergo technical verification and review to ensure compliance with regulatory requirements, applicable licenses and permits, and the RPP, as well as conformance, to the extent practicable, with applicable industry standard practices.

- Radiation protection procedure review shall assess compatibility with all other Licensee plans, manuals, and procedures.
- Radiation protection procedure review shall ensure that the procedure can be performed as written.
- All radiation protection procedures shall be reviewed and approved by the RSO.
- All radiation protection procedures shall by reviewed by the QAC or designee for conformance with quality assurance program requirements.

All radiation protection procedures shall be controlled in accordance with the QAPP.

3.7 Desk Instructions

Desk Instructions may be developed and implemented to provide guidance on radiation protection program implementation or to clarify program implementation expectations from the RSO. Desk Instructions serve as a reference guide on specific topics that help the user implement various aspects of the RPP. Desk Instructions may be written to provide instructions for performing routine or special radiological surveys, qualify or requalify individuals to perform radiological surveys, or identify RSO designees.. Desk Instructions are issued by the RSO or

designee and expire 12 months after approval. Desk Instructions may be renewed at additional 12-month increments. All Desk Instructions shall be controlled in accordance with the QAPP.

3.8 Notifications and Reports

Notifications and reports shall be made in accordance with the requirements of 10 CFR 19, 10 CFR 20 and 10 CFR 70. Detailed instructions for regulatory requirements related to notifications and reports are provided in radiation protection procedure, RP-05, "Radiation Protection Reports and Assessments."

3.8.1 *Required Notices and Postings*

The RSO responsible for ensuring the following postings and reports available to employees and contractors working at the Site. In some cases, where the volume of pages associated with a required posting or report is impractical to physically post, notice informing workers where the information is available or how it can be obtained may be posted:

- Current NRC Form 3, "Notice to Employees"
- 10 CFR 19 and 10 CFR 20 regulations
- A copy of SNM-928 and documents incorporated by license, reference, and amendments to the license.
- Operating procedures applicable to licensed activities.
- Any notice of violation involving radiological working conditions, proposed imposition of civil penalty, or order issued by the NRC, and any response from the Trust.

3.9 RSO Designees and Task Qualification

Prior to designating an individual, the RSO should consider the following:

3.9.1 *Education*

The designated individual should have a Bachelors' degree in the physical sciences, industrial hygiene or engineering from an accredited college or university or an equivalent combination of training and relevant experience in radiological protection. Two years of relevant experience are considered equivalent to 1 year of academic study.

3.9.2 *Health Physics Experience*

The designated individual should have at least 1 year of work experience in applied health physics, industrial hygiene or similar work relevant to radiological hazards associated with site remediation. This experience should involve actually working with radiation detection and measurement equipment, not simply administrative or "desk" work.

3.9.3 *Specialized Knowledge*

The designated individual should have a thorough knowledge of the proper application and use of all health physics equipment used for the radionuclides present at the Site, the chemical and analytical procedures used for radiological sampling and monitoring, and methodologies used to calculate personnel exposure to the radionuclides present at the Site. The individual must have the appropriate specialized knowledge to perform the designated responsibility.

Designated individuals may be qualified to perform specific tasks approved by the RSO. A modified "systematic approach to training" is employed to qualify individuals on specific tasks. Task qualifications must be documented and include the following:

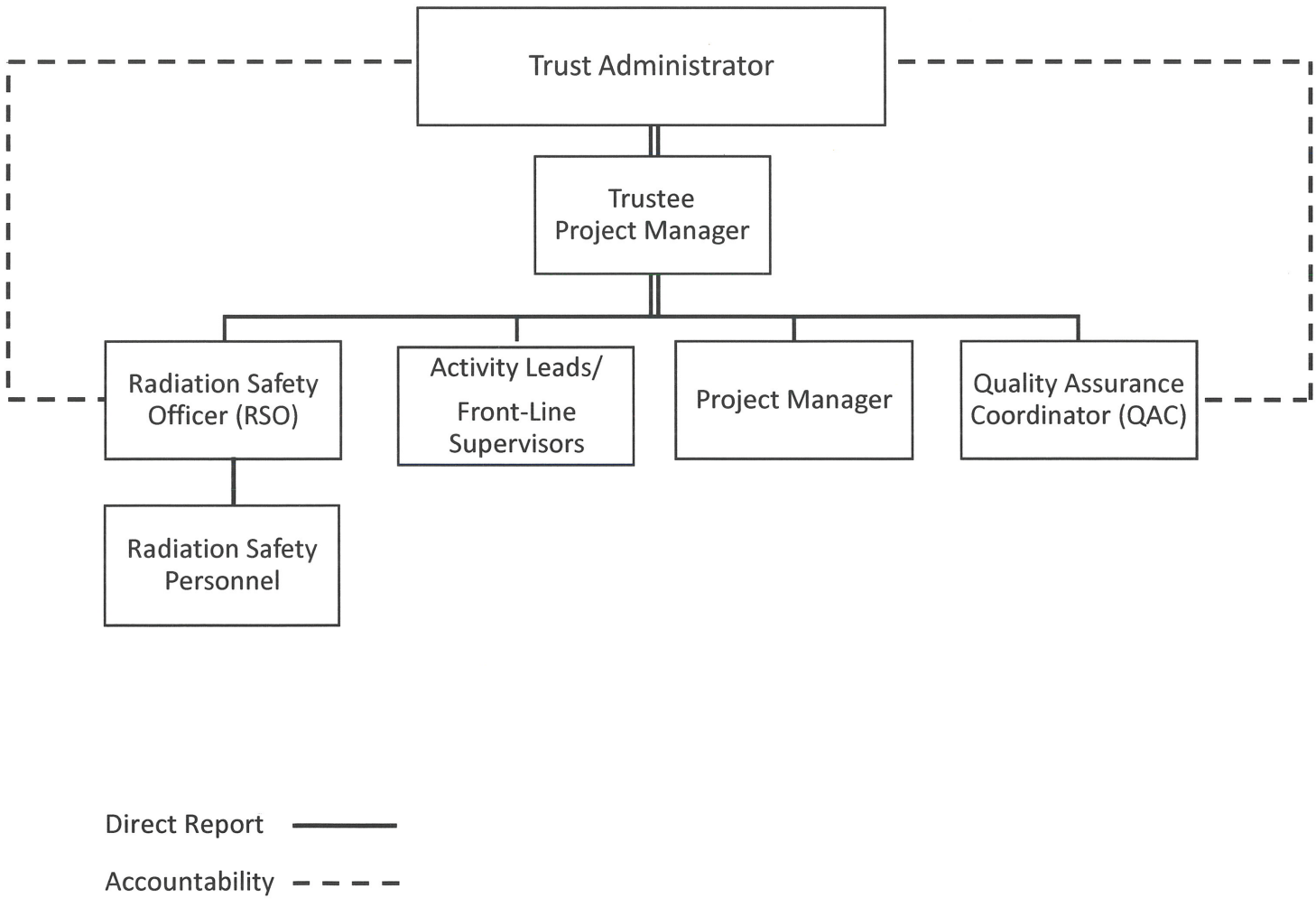
- Verification that the selected individual has sufficient experience (e.g., related technical experience, such as environmental remediation, industrial hygiene, use of scientific instruments, etc.), education (including physical science and math), and prior training (related to the specific task, which may include electronic equipment use and handling, computer applications, etc.).
- Learning objectives based on the procedural requirements to perform the task.
- On-the-job training including performance terminal objectives that the individual must satisfy through performance, simulation, or discussion. Each performance terminal objective should include the behavior being evaluated (e.g., task being performed), conditions associated with the task, standards that must be met (e.g., applicable procedures), and the steps necessary to perform the specific task.

3.9.4 *Expiration of Task Qualifications.*

Task qualifications are typically valid for 12 months and may be extended with refresher training and RSO or designee approval.

Figure 3-1

The Cimarron Environmental Response Trust Organization



4.0 ALARA PROGRAM

4.1 Section Overview

This section describes the philosophy, requirements, and responsibilities of the Cimarron Site As Low As Reasonably Achievable (ALARA) program.

4.2 ALARA Policy

The Cimarron Site radiation protection program uses, to the extent practicable, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and dose to members of the public that are ALARA. The Licensee is committed to providing resources such as personnel, training programs, engineering controls, monitoring devices, activity planning, etc. to achieve the goals of the ALARA principle.

Radiation Protection Procedure, RP-10, "ALARA Program," is the implementing procedure for the ALARA program. In addition, the Licensee encourages individuals working at the Site to provide input regarding improvements that would minimize dose and improve the safety and efficiency of activities.

4.3 ALARA Committee

At a minimum, the ALARA Committee meets once each calendar quarter.

4.3.1 *ALARA Committee Responsibilities*

The responsibilities of the ALARA Committee include:

- Ensuring that ALARA policy and regulatory compliance are integrated into all Site work activities as appropriate

- Reviewing and approving ALARA goals for the Cimarron Site (if individual monitoring is required)
- Reviewing the effectiveness of the ALARA Program (if individual monitoring is required)
- Reviewing plans for new activities to ensure that ALARA principles have been considered
- Reviewing liquid effluent discharges to address the need to incorporate ALARA principles
- Annual review of the RPP to ensure regulatory compliance and to incorporate any necessary changes
- Evaluate and approve changes to the DP or the RPP in accordance with License Condition 27(e)

4.3.2 *Annual ALARA Committee Report*

The ALARA Committee ensures that a formal annual report is submitted to the NRC that includes:

- A description of all changes, tests, and experiments made or conducted pursuant to License Condition 27(e), including a summary of the safety and environmental evaluation of each action.
- Any DP or RPP pages revised pursuant to License Condition 27(e).

A formal report shall also be submitted to the NRC annually if no changes, tests or experiments were approved by the ALARA Committee.

4.3.3 *ALARA Committee Membership*

License Condition 27(e) states:

"The ALARA Committee shall consist of a minimum of three individuals, one of whom shall be designated as the ALARA Committee chairman. Of these three designees, one shall have expertise in management and shall have managerial and financial responsibility for the decommissioning of the site; one shall have expertise in decommissioning and shall be responsible for site decommissioning, and one shall be the site Radiation Safety Officer or equivalent and shall ensure conformance to radiation safety and environmental requirements. The designee with managerial and financial responsibility shall be employed by the Licensee's Trustee. The designee for decommissioning of the site and the Radiation Safety Officer or equivalent, shall be retained by the Trustee. Except for the representative of management, ALARA Committee members may be consultants."

In accordance with this License Condition, the ALARA Committee shall consist of a minimum of three individuals:

- The Trust Administrator is a permanent (voting) member who has managerial and financial responsibility for the decommissioning of the Site.
- The Trustee PM is a permanent (voting) member who is responsible for Site decommissioning and groundwater remediation.
- The RSO is a permanent (voting) member of the ALARA Committee who ensures conformance to radiation safety and environmental requirements.

The Licensee is authorized to make certain changes to the NRC-approved DP and RPP without NRC's approval, if these changes are consistent with the ALARA principle and the decommissioning process. The criteria for approval of these changes are stipulated in License Condition 27(e) and require ALARA Committee approval. Formal approval of such changes shall require a majority of the voting members and documented in minutes from the ALARA Committee meeting where these changes were approved.

Additional may be nominated and approved by the three voting members identified in License Condition 27(e)3. These members shall be identified in radiation protection procedure RP-11, "ALARA Committee Reviews and Evaluations." Non-voting members may be included, as appropriate, to address technical issues such as quality assurance, decommissioning activities, health physics, hydrogeology, etc. The QAC routinely attends ALARA Committee meetings to monitor Committee activities and report on QAPP issues. Others may periodically be appointed to the Committee including, PMs and Activity Leaders involved with radiological work activities.

4.3.4 *ALARA Committee Meetings*

ALARA Committee meetings will include reports on the following aspects of decommissioning work:

- Radiological exposures
- Compliance with license possession limits
- Compliance with Material Control & Accountability requirements
- Compliance with OPDES Discharge Permit limits
- Active Activity Plans
- Quality control/quality assurance performance issues

- Chemical concerns
- Health and safety performance and issues
- Radiological waste characterization and disposal

5.0 ASSESSMENTS

5.1 Section Overview

Audits and/or surveillances provide a review of decommissioning and radiation protection activities to evaluate compliance with regulatory requirements, license conditions, the RPP and, radiation protection procedures. Audits and/or surveillances identify unsatisfactory performance and/or weaknesses in procedures, training, or work practices. The results of all audits and surveillances are reviewed by the ALARA Committee.

5.2 Audits

10 CFR 20.1101(c) requires that a licensee shall, at least annually, review the radiation protection program content and implementation. To satisfy this requirement, an annual audit is performed by the QAC and/or other individuals appointed by the Trustee PM. The audit is based upon various NRC guidance documents including Appendix H, NUREG-1556, Vol. 7, which provides sample audit forms to assist licensees in meeting this requirement.

Periodic audits (review of documentation and records), the ALARA Committee review of the RPP and an annual audit modeled on NRC's sample audit form are used to meet this requirement. Periodic audits are conducted, as required, under the QAPP. Audits shall be documented, as well as program changes resulting from audit findings or observations.

Corrective action for non-conformances and incidents is implemented through the "Notice of Deficiency" reporting process. The Notice of Deficiency is used to report conditions adverse to safety, and to report accidents that occur. Notices of Deficiency document stop-work actions initiated by anyone working at the Site, deficiencies in procured items or services, documents, procedure content, or adherence to procedures in the performance of work. Notices of

Deficiency document failure to comply with specified requirements. The adoption of this single reporting mechanism simplifies deficiency reporting and integrates the resolution of issues that impact quality at the Site.

This process provides for the prompt identification of conditions adverse to quality, determination of their cause, and resolution of the specific conditions adverse to quality. A log of deficiencies and corrective actions is maintained to permit trending analysis if appropriate. The trend analysis can be used to identify timely corrective actions to prevent recurring problems and improve performance. Deficiency reporting and the corrective action process are controlled by a single procedure under the QAPP.

5.3 Surveillances

Surveillances are observations of activities being performed. Surveillances of Site activities are done by, or under the direction of, the QAC and/or the RSO. The goal of surveillances is to determine whether or not an activity is being performed in accordance with applicable procedures, plans, accepted industry standards, etc. Surveillances shall be documented, as well as program changes resulting from findings or observations made during surveillances. Surveillances are conducted once each calendar quarter at a minimum.

5.4 Records

Records of audits and surveillances are maintained in accordance with the QAPP.

Audit and surveillance records shall include the following information:

- The date(s) the audit/surveillance was conducted.
- Name of person(s) conducting the audit/surveillance.
- Audit/surveillance findings, corrective actions, and follow-up.

6.0 PERSONNEL MONITORING

6.1 Individual Monitoring of Occupational Dose

NRC regulation 10 CFR 20.1502 requires the Licensee to monitor occupational exposures from both licensed and unlicensed radiation sources. Monitoring is required of any adult likely to receive, in 1 year from sources external to the body, a dose in excess of 10 percent of the Occupational Dose Limits for Adults and/or who are likely to receive, in 1 year, an intake in excess of 10 percent of the applicable annual limit on intake (ALI) in Table 1, Columns 1 and 2, of Appendix B to 10 CFR 20.1001-20.2402. Monitoring for minors is required when they are likely to receive, in 1 year, from radiation sources external to the body, a deep dose equivalent (DDE) in excess of 0.1 rem, a lens dose equivalent in excess of 0.15 rem, or a shallow dose equivalent to the skin or the extremities in excess of 0.5 rem and/or likely to receive, in 1 year, a committed effective dose equivalent (CEDE) in excess of 0.1 rem. Monitoring of declared pregnant women is required when they are likely to receive during the entire pregnancy, from radiation sources external to the body, a DDE in excess of 0.1 rem and/or likely to receive during the entire pregnancy, a CEDE in excess of 0.1 rem.

Personnel monitoring has not been performed at the Site since 2006 because there was no potential to receive a dose that would require monitoring under 10 CFR 20.1502. During the design of groundwater extraction and treatment systems, new work activities, such as groundwater processing, were evaluated to determine if they may result in exposure requiring personnel monitoring. The threshold dose for personnel monitoring will not be approached; accordingly, monitoring of workers is not required for external or internal occupational dose. Area radiation monitoring was established (Section 10.5) to confirm the results of this

evaluation. Air sampling during spent ion exchange resin handling activities will be performed as discussed in Section 6.6, below, and Section 11.1 of the Decommissioning Plan.

Two calculations were performed to determine the potential radiological conditions that may be encountered when the groundwater treatment system is operational. One calculation was performed to determine the potential intake from the groundwater processing operations. The other calculation was performed to determine potential external dose rates from spent resin vessels.

- Potential intakes from airborne exposure to uranium while handling spent resins are documented in Appendix A (EPM028-CALC-001, Potential Intake Calculation). Appendix A also provides the potential intake calculation for oral ingestion of uranium, airborne exposure to Tc-99, and oral ingestion of Tc-99. A sensitivity analysis to estimate potential intakes through inhalation of U-235 progeny (Th-231 and Pa-231) and U-238 progeny (Th-234 and Pa-234). These calculations demonstrate that the potential intakes of radioactive materials are very low. The contamination control program described in this RPP is designed to ensure workers are not exposed to airborne radioactive material. The air sampling program described in the RPP is based on the results of these analyses and will be used to confirm conclusion of the calculations.
- Appendix B (EPM017-CALC-001, Dose Rate Near Uranium Treatment Train) provides the results of external dose rate calculations from spent resin vessels. Dose rates less than 0.3 mrem/hour were considered in the development of the radiation dose monitoring program described throughout this RPP.

These calculations were based on the 60% design of the groundwater treatment system. The potential intake calculation supported the decision that internal monitoring (e.g., bioassay) and respiratory programs were not needed at the Site. This calculation also informed the development

of the air sampling program described in Section 10.7. The dose rate calculation supported the decision that personnel dosimetry was not required at the Site.

Both calculations will be reviewed at 90% design, updated, if necessary, and reevaluated to determine if the RPP should be updated. In addition, periodically through groundwater processing, these supporting calculations will be reviewed to ensure they reflect operational experience and determine if changes to the RPP are necessary. If additional activities are identified or planned, the radiological consequences of those activities will be evaluated to determine if personnel monitoring for occupational dose is required.

6.2 Occupational Dose Limits

NRC Regulation 10 CFR 20.1201 establishes a total effective dose equivalent (TEDE) limit and a total organ dose equivalent (TODE) limit for occupationally exposed adults. The TEDE is the sum of the DDE from external exposures and the CEDE from internal exposures. The TODE is the sum of the DDE and the committed dose equivalent (CDE) to the organ receiving the highest dose. The following annual dose limits apply to all Licensee employees, contractors, and visitors who receive occupational dose at the Cimarron Site.

Occupational dose is defined Section 16 of the RPP.

6.2.1 *Occupational Dose Limits for Adults (10 CFR 20.1201)*

- Whole Body - The more limiting of a TEDE equal to 5 rem or the sum of the DDE and CDE to any individual organ or tissue, other than the lens of the eye, equal to 50 rem.

- Skin of the whole body or skin of any extremity - A shallow dose equivalent equal to 50 rem.
- Lens of the Eye - A lens dose equivalent equal to 15 rem.

6.2.2 *Occupational Dose Limits to Minors (10 CFR 20.1207)*

- 10 percent of the corresponding limit for adults.

6.2.3 *Occupational Dose Limits to Embryo/Fetus (10 CFR 20.1208)*

- Dose to the embryo/fetus shall be limited to 500 mrem during the entire time of pregnancy of a declared pregnant woman. Substantial variations in dose rate over the gestation period shall be avoided.

6.3 Dose Limits for Individual Members of the Public (10 CFR 20.1301)

The TEDE received by individual members of the public from licensed operations shall not exceed 100 mrem in a year, exclusive of the dose contributions from background radiation, from any administration the individual has received, from exposure to individuals administered radioactive material and released under 10 CFR 35.75, or from voluntary participation in medical research programs. In addition, the dose in any Unrestricted Area from external sources shall not exceed 2 mrem above background in any one hour. Members of the public are not subject to the individual monitoring, record keeping, and reporting requirements of 10 CFR 20.

6.4 Determination of Prior Occupational Exposure

The occupational dose during the current year shall be determined and an attempt shall be made to obtain records of lifetime dose for all personnel who are likely to receive a dose in excess of 10% of the annual dose limit. The prior dose history shall be documented on Form NRC-4, or

equivalent. Forms NRC-4 and NRC-5 and records used in their preparation shall be retained by the Licensee until the regulating agency terminates each pertinent license requiring this record and in accordance with the QAPP.

6.5 Personnel Monitoring for External Radiation

As discussed in Section 6.1, individual monitoring for external exposure is not expected to be required during groundwater extraction and processing and related activities. Passive area radiation monitoring using thermoluminescent dosimeters (TLDs) or optically stimulated luminescent dosimeters (OSLDs) will be performed to demonstrate that individuals will not exceed the requirements for individual monitoring provided in the RPP. However, individual monitoring devices will be assigned if any of the following conditions are encountered or expected to be encountered:

- Any individual likely to receive, from radiation sources external to the body, a dose in excess of 10 percent of the 10 CFR 20 occupational dose limits in a year.
- Any minor likely to receive, in 1 year, from radiation sources external to the body, a DDE in excess of 0.1 rem, a lens dose equivalent in excess of 0.15 rem, or a shallow dose equivalent to the skin or the extremities that exceeds 0.5 rem.
- Any declared pregnant woman likely to receive during the entire pregnancy, from radiation sources external to the body, a DDE that exceeds 0.1 rem.

When external exposure is determined by measurement with an external personal monitoring device, the DDE will be used in place of the effective dose equivalent, unless the effective dose equivalent is determined by a dosimetry method approved by the NRC. Dosimetry devices shall be processed by a laboratory or vendor maintaining accreditation by the National Voluntary Laboratory Accreditation Program (NVLAP).

If the need to perform external monitoring for workers is identified, RP procedures will be implemented that consider guidance provided in Regulatory Guides 8.4, Rev. 1, 8.28, Rev. 0, and 8.34, Rev.0, as applicable. The following information will be addressed in these procedures:

- A description of the individual-monitoring devices that will be provided to workers who meet the criteria in 10 CFR 20.1502(a) and 20.1601 for external exposures.
- The type, range, sensitivity, and accuracy of each individual-monitoring device.
- Use of extremity and whole body monitors when the external radiation field is non-uniform.
- When audible-alarm dosimeters and pocket dosimeters will be provided, and a description of their performance specifications.
- How external dose from airborne radioactive material is determined.
- The procedure to ensure that surveys necessary to supplement personnel monitoring are performed.

Action levels for workers' external exposure, including the technical bases and actions to be taken when they are exceeded.

6.6 Internal Exposure Monitoring

Based on anticipated radiological work involving extraction and treatment of groundwater at the Site, a bioassay program is not warranted. If radiological conditions change or evaluation of the final groundwater processing equipment design indicates that an individual worker could be exposed to 2% of the ALI in a year, then bioassay shall be performed. Bioassay shall be performed whenever a calculated intake of 40 Derived Air Concentration (DAC)-hours could have occurred in any one incident based on air sampling data, accident conditions, equipment failure, external contamination, or other conditions. Bioassay sampling shall also be performed

whenever it is likely that an individual may have received an intake of 10 milligrams of uranium in any one week. Bioassay shall be considered upon termination of all Radiation Workers who may have had intakes of radioactive materials. The need for bioassay sampling shall be determined by the RSO/designee. Requirements for the determination of internal exposure are provided in 10 CFR 20.1204.

If the need for internal monitoring is identified, RP procedures will be implemented that consider guidance provided in Regulatory Guides 8.9, Rev. 1, 8.15, Rev. 1, 8.34 Rev. 0, and 8.36, Rev. 0, as applicable. The following information will be addressed in these procedures:

- How worker intakes are determined using measurements of quantities of radionuclides excreted from or retained in the human body. Specifically, the procedures will address how frequencies for bioassay measurements for baseline, periodic, special, and termination assays are assigned.
- How radioactivity measured in the human body by bioassay techniques are converted into worker intake; and action levels for bioassay samples, actions to be taken when they are exceeded, and their technical bases.
- How worker intakes are determined by measurements of the concentrations of airborne radioactive materials in the workplace. Specifically, the procedures will address how airborne concentrations of radioactivity are measured; how airborne concentrations are converted to determine intakes; action levels for a worker's intake based on dose, and actions to be taken when they are exceeded; and action levels for a worker's intake based on chemical toxicity if soluble uranium is present in the work area.
- How worker intakes, for an adult, a minor, and a declared-pregnant woman are determined using any combination of the measurements above.

- How worker intakes are converted into committed effective dose equivalent (and organ-specific committed dose equivalent), Including how intake of radioactivity by a DPW will be converted into dose to the embryo/fetus.

6.7 Declared Pregnant Woman Exposure Policy

Based on recommendations of the NCRP and on regulatory requirements, controls are established for the protection of the embryo/fetus during a declared female workers pregnancy. These controls shall ensure compliance with regulatory requirements and protect the rights of the female worker.

Declaration of pregnancy is at the discretion of the woman (medical proof is not required). Any woman who does not declare her pregnancy shall be subject to the normal occupational dose limits and shall not be subject to special controls or treatment with respect to work assignments involving exposure to radiation even if she is pregnant. The Licensee shall ensure the dose to the embryo/fetus of a declared pregnant woman does not exceed regulatory limits due to occupational dose during the entire pregnancy.

If internal monitoring for declared pregnant workers is determined to be necessary, procedures for determining dose to the embryo/fetus will be developed and implemented. Dose to the embryo/fetus will be determined based on guidance provided in Regulatory Guide 8.36 and ICRP Publication 88.

6.8 Summation of Internal and External Dose

Internal and external doses are summed whenever positive doses are measured. Procedures will be used to document the methodology for the summation of internal and external doses to workers and internal dose contribution from maternal intakes to the embryo/fetus of a declared

pregnant worker. If internal and external monitoring is performed, RP procedures will be implemented that consider guidance provided in Regulatory Guides 8.7, Rev. 4, 8.34, Rev. 0, and 8.36, Rev. 0, as applicable. The following information will be addressed in these procedures:

- How the internal and external monitoring results are used to calculate TODE and TEDE doses to occupational workers.
- How internal doses to the embryo/fetus, which is based on the intake of an occupationally exposed, declared-pregnant woman, will be determined.
- A description of the monitoring of the intake of a declared-pregnant woman if determined to be necessary.
- A description of the program for the preparation, retention and reporting of records for occupational radiation exposures.

6.9 ALARA Dose Goals

As discussed in Section 4.3, ALARA dose goals will be set if individual monitoring is required. Until such time, the annual Administrative Dose Goals for the Site is effectively 100 mrem TEDE. If the Administrative Dose Goals are exceeded without prior authorization, the RSO or designee shall investigate to determine the cause and prepare a written report to document the results of the investigation and any corrective actions taken or planned.

6.10 Personnel Exposure Reports

An annual report of the individual radiation dose received shall be sent to each worker who was issued individual dosimetry and/or was subject to the requirements for monitoring as specified in Section 6.1. When requested by an individual, a written exposure report shall be provided to

each such individual within 30 days of the request or within 30 days of exposure determination, whichever is later.

Internal and external doses shall be summed whenever positive doses are measured. The dose to the lens of the eye, skin, and extremities are not included in the summation. Intakes through wounds or skin absorption shall be evaluated and, to the extent practical, accounted for in summation of internal and external doses independent of intakes by ingestion or inhalation.

6.11 Dosimetry Records

Records of individual monitoring shall be kept in accordance with 10 CFR 20.2106 and the QAPP. These records shall be updated at least annually for any radiation monitoring data collected. All radiation exposure records shall use the units curie, rem, rad, or multiples thereof.

Records of doses received by individuals for whom monitoring was required pursuant to 10 CFR 20.1502, and records received during planned special exposures, accidents, and emergency conditions shall be maintained. These records must include the following, when applicable"

- The DDE to the whole body, lens dose equivalent, shallow-dose equivalent to the skin, and shallow dose-equivalent to the extremities;
- The estimated intake of radionuclides (10 CFR 20.1202);
- The CEDE assigned to the intake of radionuclides;
- The specific information used to assess the CEDE pursuant to 10 CFR 20.1204(a) and (c), when required by 10 CFR 1502;
- The TEDE when required by 10 CFR 20.1202; and
- The total of the DDE and the committed dose to the organ receiving that highest total dose.

Procedure RP-19, "Dosimetry Records," provides for the preparation, retention, and reporting of records of occupational dose. This procedure addresses: recordkeeping frequency (10 CFR 20.2106(b), recordkeeping format (10 CFR 20.2106(c), privacy protection (10 CFR 20.2106(d). RP-19 provides instructions for maintaining records of embryo/fetus with those of the mother, including the declaration of pregnancy (10 CFR 20.2106(f).

7.0 RADIATION PROTECTION INSTRUMENTATION

7.1 Calibration

Calibration of radiation monitoring, counting, and air sampling instruments shall be performed in accordance with the manufacturers' recommendation unless otherwise approved by the RSO. These calibrations shall be consistent with regulatory requirements.

The calibration frequency for portable radiation monitoring instruments and portable air sampling equipment shall be at least every 12 months. Benchtop smear/sample instrumentation shall be calibrated at least annually.

Calibration of radiation protection instruments is performed by an approved vendor except for air samplers. Air sampler flow rate indicators are calibrated in accordance with manufacturer's recommendation using a reference air flow calibrator (calibrated annually by an approved vendor). The air sampler flow rate indicator is adjusted as necessary to ensure reported values are correctly stated and valid under the actual operating conditions of the air sampler. Detailed instructions for air sampler calibrations are provided in procedures.

Instruments used to perform release surveys must be calibrated using National Institute of Science and Technology (NIST) traceable, or equivalent, standards for energies and geometries similar to material being released. The energy dependence of the instruments to alpha, beta, and gamma radiation, as applicable, shall be known and documented.

7.2 Operation and Response Tests

Operation and response tests of radiation monitoring, counting, and air sampling instruments, shall only be performed by personnel trained in the use of the instrument and following approved procedures. At a minimum, on a daily basis, prior to use, each radiation protection instrument shall be subject to the following:

- The instrument and detector are in good physical condition.
- Verification of current calibration.
- Checking the battery, if applicable, and replacing the battery, if necessary.
- Source check.
- Background determination.

Detailed instructions for each radiation protection instrument on operation and response tests are provided in radiation protection procedures.

7.3 Maintenance and Repair

Individuals authorized by the RSO may perform routine maintenance and limited field repairs, such as replace batteries, cables, or mylar windows. Other maintenance and repair of radiation protection instrumentation shall be performed by an approved vendor. All maintenance and repair affecting calibration shall be documented.

7.4 Quality Control/Quality Assurance

Quality Control (QC) measures for instruments shall be established and maintained to ensure reliability of counting results and sensitivities.

7.5 Radiation Protection Instrumentation Inventory

Table 7-1 provides a list of equipment available to perform radiological surveys at the Site. Minimum quantities that need to be available when groundwater processing commences are provided for each instrument. The specified quantity may be reduced when an instrument is sent for calibration or repair. The RSO or designee will determine if there is a need to rent or purchase additional instruments when an instrument is being calibrated or repaired.

Radiation protection instrumentation and exempt quantity check sources will be stored in a secure storage area at the Western Area Treatment Facility.

Procedures provide implementing requirements for the program and instructions for using specific instruments, including the following information:

- Instrumentation storage, calibration, and maintenance for instruments used in field surveys, including analyses of smears and air samples collected during surveys
- MDC or MDA (at the 95 percent confidence level) for each type of radiation to be detected, as appropriate
- Instrumentation storage, calibration, and maintenance for instruments

NOTE:

1. The minimum detectable activity (MDA) for portable survey instruments is calculated by the following equation:

$$MDA = 3 + 3.29\frac{\sqrt{R_b T_s(1 + {}^{T_s}/_{T_b})}}{E \times T_s}$$

Where:

R_b is background count rate (counts/minute)
T_s is sample count time (minutes)
T_b is background count time (minutes)
E is instrument efficiency (counts/disintegration)

This equation is equivalent to Eq 3-11 of NUREG-1507. The surface efficiency is taken into account in the determination of the instrument efficiency. The following surface efficiencies factors are used in the development of the instrument efficiency:

- Alpha emitters – 0.25
- Beta emitters – 0.5
- Gamma emitters – 1.0

A surface efficiency factor is not applied to measurements of wipe sample or air samples.

2. For air sampling, the equation above is adjusted to account for the volume of air sampled. The minimum detectable concentration (MDC) for air sampling is calculated by the following equation:

$$MDC(\frac{\mu Ci}{mL}) = \frac{\frac{3}{T_s} + 3.29\sqrt{\frac{R_b}{T_s} + \frac{R_b}{T_b}}}{EVC}$$

Where:

R_b is background count rate (counts/minute)
T_s is sample count time (minutes)
T_b is background count time (minutes)
E is instrument efficiency (counts/disintegration)
V is Volume of air of air sampled (mL)
C is conversion of µCi to dpm (i.e. 2.22E+06)

For the Ludlum 3030E, the typical minimum detectable activity, for a one-minute count, is 16 dpm for alpha (Th-230) and 60 dpm for beta (Tc-99) or 7.2E-06 µCi and 2.7E-05, respectively. In the case of a four-hour air sample taken at 56 Lpm, the alpha MDC is 5.4E-13 µCi/mL and beta MDC is 2.0E-13 µCi/mL.

Table 7-1

Radiation Protection Instrument List

Manufacturer	Model	Probe	Min. Quantity	Description
Ludlum	12	44-9	2	Instrument Type: Handheld analog ratemeter with a GM pancake-type detector. Use: Contamination surveys, equipment and materials restricted release, personnel frisking. Ranges: 0-500 cpm; 0-5,000 cpm; 0-50,000 cpm; 0-500,000 cpm Counting Modes: Ratemeter. Alarm Set Point: N/A
Ludlum	19	N/A	2	Instrument Type: Gamma micro-R meter (0 to 5000 µR/hr). Use: Low-level gamma dose rate measurements. Ranges: 0-25 µR/hr; 0-50 µR/hr; 0-250 µR/hr; 0-500 µR/hr; 0-5,000 µR/hr; Counting Modes: Ratemeter. Alarm Set Point: N/A
Ludlum	2360	43-93	3	Instrument Type: Alpha-Beta Ratemeter, Scaler, and Data Logger with a dual phosphor scintillation probe. Use: Contamination surveys, material and equipment unrestricted and restricted release, personnel frisking. Ranges: 0-500 cpm; 0-5,000 cpm; 0-50,000 cpm; 0-500,000 cpm Counting Modes: Ratemeter, scaler, data logger. Alarm Set Point: N/A
Ludlum	3030E	43-10-1	1	Instrument Type: Dual channel, scaler-type sample counter with a dual phosphor detector. Use: Alpha and beta smear counting, air sample analysis. Ranges: Counting Modes: Count times are specified by procedure. Alarm Set Point: N/A

Manufacturer	Model	Probe	Min. Quantity	Description
Ludlum	2221	44-10	2	Instrument Type: Handheld ratemeter and scaler with an analog display for viewing the count rate with a 2" X 2" NaI(Tl) scintillator. Use: Walk-over (qualitative) surveys. Ranges: 0-999,999 counts Counting Modes: cpm and dpm, data logging Alarm Set Point: Not used.
Air Sampling Equipment				
Manufacturer	**Model**	**Filter Head**	**Min. Quantity**	**Description**
RADEco	AVS-28A	2500-42	2	Portable, low volume, continuous flow air sampler with a 47 mm diameter open face filter head Air Flow Rate: 15-100 Lpm Elapsed Time Meter: 99,999 hours and 59 minutes

QC for instruments shall be consistent with the manufacturer's instructions and be consistent with regulatory requirements.

Review and evaluation of instrumentation operability shall be performed on an on-going basis by the RSO or designee.

8.0 ACCESS CONTROL

8.1 Section Overview

This section provides the access control requirements for entry into and exit from RAs. Access control is designed to ensure that individuals have appropriate qualifications, training, and authorization for entry. Access control requirements are applicable to personnel, contractors and visitors who enter RAs. RAs are areas within the Site boundary for which access is controlled for the purpose of protecting individuals against undue risk from exposure to radiation and/or radioactive materials.

The tentative designation of Restricted Areas during initial groundwater treatment are provided in the following figures:

- Figure 8-1: Western Area Treatment Facility
- Figure 8-2: BA#1 Treatment Facility (If Phase II is implemented)

NOTE: These figures are annotated versions of drawings taken from the Decommissioning Plan. Restricted Areas will be periodically reviewed and may be expanded, reduced, or reconfigured based on RSO evaluation of potential exposure to radioactive material. Additional areas may be designated as Restricted Areas if appropriate. The RPP will be updated accordingly.

RAs will be established based on the potential for accumulating radioactive material greater than ten times the 10 CFR 20 Appendix C quantities or requiring posting as Radiation Areas, High Radiation Area, Contaminated Area, or Airborne Radioactivity Areas. No High Radiation Areas are anticipated based on the groundwater treatment facility design. Documentation of RAs and any changes to designated RAs shall be maintained as a decommissioning record.

8.2 Restricted Area Access Controls

Only properly trained or escorted personnel shall be permitted inside any RA. Personnel who enter RAs may be required to wear dosimetry. RAs include Radioactive Materials Areas, Radiation Areas, High Radiation Areas, Contaminated Areas, and Airborne Radioactivity Areas. RAs can be controlled through the use of guards, barriers, fences, signs, gates, or doors.

RA boundaries shall be defined by the use of postings, barriers, walls, tape, ropes, markings, or locked doors. A log of personnel entry and exit to any RA, other than Radioactive Material Areas, at the Site will be maintained by the RSO or designee. A log of personnel entry into areas posted solely as Radioactive Materials Areas is not required.

8.3 Posting and Labeling Requirements

Posting of areas within each RA shall be performed in accordance with 10 CFR 20 Subpart J. Containers of radioactive materials shall be labeled in accordance with 10 CFR 20.1904. Exceptions to posting requirements found in 10 CFR 20.1903 and exceptions to labeling requirements found in 10 CFR 20.1905 shall be approved by the RSO or designee.

Signs used for posting radiological areas within an RA shall include the wording provided in Table 8-1 when the associated requirements are expected to be encountered or expected to be encountered:

Table 8-1

Radiological Posting Requirements

POSTING WORDING	REQUIREMENT
"CAUTION, RADIATION AREA"	Accessible area in which radiation levels could result in an individual receiving 5 mrem in one hour 30 cm from the radiation source or surface that the radiation penetrates.
"CAUTION, HIGH RADIATION AREA" or "DANGER, HIGH RADIATION AREA"	Accessible area in which radiation levels could result in an individual receiving 100 mrem in one hour 30 cm from the radiation source or surface that the radiation penetrates.
"CAUTION, AIRBORNE RADIOACTIVITY AREA" or "DANGER, AIRBORNE RADIOACTIVE MATERIALS AREA"	Licensed airborne radioactive materials in a room, enclosure, or area exists in concentrations exceeding the DACs specified in 10 CFR 20 Appendix B, Table I, or when an individual present in the area without respiratory protective equipment could exceed, during the hours an individual is present in a week, an intake of 0.6% of the ALI or 12 DAC–hours.
"CAUTION, CONTAMINATED AREA"	Accessible area in which removable contamination levels exceed 1,000 dpm/100 cm^2 beta/gamma contamination or 1000 dpm/ 100 cm^2 alpha contamination.
"CAUTION, RADIOACTIVE MATERIAL(S)" or "DANGER, RADIOACTIVE MATERIAL(S)"	Areas or rooms in which there is used or stored an amount of licensed radioactive material exceeding 10 times the quantity of such material in 10 CFR 20 Appendix C.

Figure 8-1

Western Area Treatment Facility

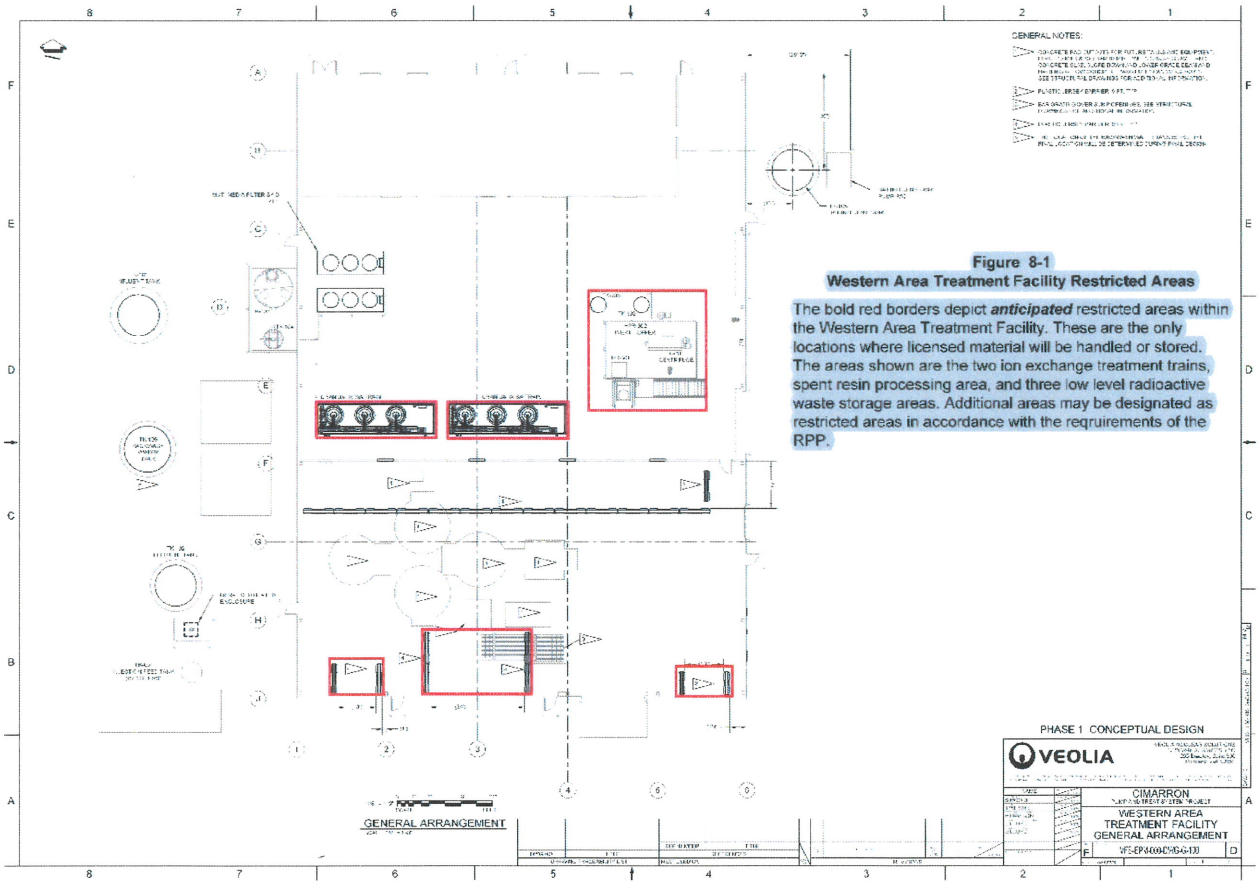
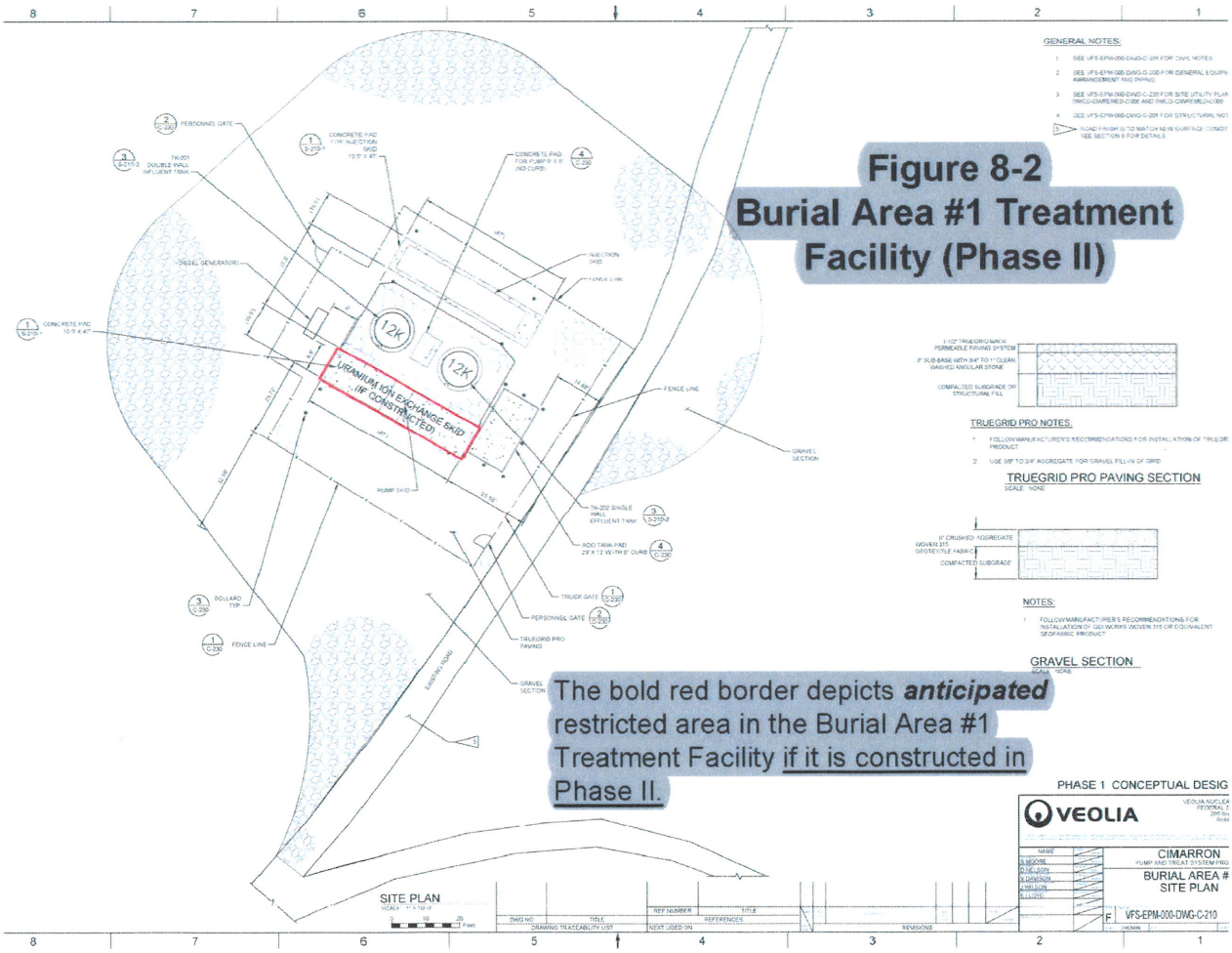


Figure 8-2

BA#1 Treatment Facility

(This figure is applicable if Phase II of Site decommissioning is undertaken. The BA#1 Treatment Facility will not be constructed during Phase I of the DP.)



9.0 RADIOLOGICAL WORK CONTROLS

9.1 Section Overview

Radiological work within RAs is controlled through two mechanisms: Site procedures and Activity Plans.

- Site procedures include quality assurance procedures, radiation protection procedures, sampling and analysis procedures, operations and maintenance procedures, waste management procedures, etc. Site procedures cover routine work or repetitive tasks that may include radiological work. Any necessary radiological controls are included in Site procedures.
- Activity Plans cover non-routine work activities and include information on the conditions that exist in the work area and radiological and non-radiological safety requirements. To ensure compliance with the RPP and regulatory requirements, Activity Plans involving radiological work must include the information identified in Section 9.2.

Work within posted High Radiation Areas, Airborne Radioactivity Areas, and Contaminated Areas, or requiring the use of respiratory protection or protective (i.e., anti-contamination) clothing shall be controlled through the use of an Activity Plan unless specifically authorized by the RSO or designee. Workers entering any RA, other than Radioactive Materials Areas, shall sign in daily on the sign-in sheet maintained in the Site Office or at the location of the routine activity.

9.2 Activity Plan Requirements

The Activity Plan job description and job location shall be consistent with the activities or task to be performed. The Activity Plan shall identify potential radiological hazards, methods to address

radiological hazards, and protective equipment needed for the work. Activity Plans shall, as a minimum, include:

- A description of the work,
- Anticipated radiological conditions,
- Reference to applicable radiation protection procedures,
- Radiation safety requirements,
- Required personal protective clothing and equipment,
- Radiological survey and/or monitoring requirements,
- Radiation safety training requirements,
- Special radiation protection sampling requirements.

9.2.1 *Activity Plan Approval/Closeout*

Activity Plan approval and closeout is addressed in the QAPP and implementing procedures.

9.2.2 *Activity Plan Training*

Training and qualifications for individuals working under an Activity Plan are addressed in the QAPP. All Radiation Workers operating under an Activity Plan are required to review and comply with the Activity Plan.

9.2.3 *Record Keeping*

Activity Plan records are maintained in accordance with the QAPP.

9.3 Receipt of Potentially Contaminated Tools, Equipment, Parts, and Material

Tools, equipment, parts, and material that have been used at oil and pipeline facilities and sites may be contaminated with naturally occurring radioactive material (NORM) or other radioactive material used as tracers. Qualified individuals shall perform receipt surveys to document the radiological conditions of all tools, equipment, parts and equipment potentially used at oil and pipeline facilities or sites prior to use at the Cimarron Site.

Procurement specifications for tools, equipment, parts, and material previously used at oil and pipeline facilities and sites shall require thorough cleaning of these procured items prior to shipment to the Site.

The Site cannot receive tools, equipment, parts, and material that are potentially contaminated with radioisotopes other than NORM or uranium.

If the receipt survey detects fixed or removable contamination or if dose rates two times background are detected, these items shall be segregated and the RSO and Trustee PM notified. The RSO and Trustee PM will determine disposition of these items.

10.0 RADIATION PROTECTION SURVEYS

10.1 General Requirements

Radiological survey information is used to:

- assist in the development of Activity Plans,
- inform individuals of the radiological conditions/hazards in the area,
- evaluate the need for area postings,
- identify needed personnel protective equipment,
- verify the effectiveness of engineering and administrative controls,
- ensure personnel exposures to radiation and radioactive materials are maintained ALARA,
- determine the decommissioning status of material, equipment, and/or environmental media, and
- determine compliance with regulatory and/or license criteria.

Radiation and contamination surveys, air sampling, and sample collection will be performed as appropriate to assess radiological conditions and to establish specific radiological controls for work to be performed. Radiation protection surveys that are required by the license shall be conducted in accordance with specified requirements.

Two types of dose rates measurements may be used. Contact dose rates are used to locate and identify radiation levels detected within 1 cm (0.5 in) from the surface being surveyed. General area dose rates are used to identify radiation levels detected at approximately 30 cm (1 ft) from the surface being surveyed.

Surveys for removable and direct contamination are performed to detect and/or quantify radioactive contaminants. Removable contamination surveys are performed when appropriate to ensure that radioactive contamination has not inadvertently spread.

NRC Regulatory Guide 8.25, "Air Sampling in the Workplace" provides an acceptable method for meeting certain survey and dose assessment requirements of 10 CFR 20. Air samples shall be collected whenever the airborne radioactivity levels are expected to exceed 1 percent of the DAC as listed in Appendix B, Table 1 "Occupational" of 10 CFR 20.

Breathing zone air sampling shall be performed whenever respiratory protection devices are worn by personnel. If air sample data indicates a measured level greater than 40 DAC-hours in any shift or operation, whichever is shorter in time duration, the RSO or designee shall conduct an investigation and identify corrective actions to that are needed to reduce airborne radioactivity levels. The RSO or designee shall work with the Activity Leader to implement the necessary corrective actions for reducing airborne radioactivity levels.

Air sample collection media shall be appropriate to address the radionuclide mixture(s) present. The analysis of air samples (including preliminary field screening) shall be performed in a timely and expeditious manner.

10.2 Routine Surveys

Routine radiological monitoring shall be performed to ensure that surveys are performed at a frequency that is consistent with the existing and potential hazards and activities planned in the RAs. The following radiation dose rate and contamination survey frequencies ensure area hazards are adequately characterized: