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Reviews and Approvals	
Reviewed by Quality Assurance Coordinator: Kurt Colborn	
Signature:	Date:
Approved by Radiation Safety Officer: Jay Maisler, CHP	
Signature:	Date:
Approved by Project Manager: Jeff Lux	
Signature:	Date:
Approved by Administrator, Cimarron Environmental Response Trust: Bill Halliburton	
Signature:	Date:

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Comment [JJM1]: Editorial change. References appeared at the end of definitions.

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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.


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, when work involves radioactive material, under the supervision of trained personnel as authorized by the Radiation Safety Officer (RSO)

1.3 License Transfer

The U.S. Nuclear Regulatory Commission (NRC) transferred the license (SNM-928) for the Cimarron Site to the Cimarron Environmental Response Trust and the Trustee, Environmental Properties Management, LLC (EPM) on February 14, 2011. EPM's maintenance of the Cimarron Site and administration of the site in accordance with License SNM-928 will provide adequate protection of the public health and safety and reasonable assurance of compliance with the NRC's regulations.

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2.0 TRAINING REQUIREMENTS AND POLICY

2.1 Section Overview

This section describes radiation safety training requirements for individuals who enter a ~~restricted~~-Restricted areaArea, handle radioactive material, or work in the vicinity of radioactive material at the Cimarron FacilitySite.

2.2 Responsibilities

The Radiation Safety Officer (RSO) is responsible for the radiation safety training program which includes:


- Approval of radiation safety training materials
- Approval of personnel conducting radiation safety training
- Performing radiation safety training
- Verifying that those individuals who require radiation safety training receive the training
- Assessing each individual's exposure to radiation or radioactive material and providing appropriate radiation safety training.

2.3 Training Requirements

~~Cimarron~~-The Cimarron Environmental Response Trust (Trust) shall not assume that radiation safety training has been adequately covered by prior employment or academic training.

Inspectors and other representatives of the Nuclear Regulatory Commission (NRC) and the Oklahoma Radiation Management Division are exempt from radiation safety training. Site specific information may be provided to agency personnel if deemed necessary by the RSO.

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Ancillary personnel (e.g., clerical, housekeeping, security, etc.) whose duties may require them to work in the vicinity of radioactive material (escorted or not) shall receive information about radiation hazards and the appropriate precautions.

This General or Site Specific Training information will include:


- Radioactive materials that are present in ~~restricted~~ Restricted areas ~~Areas~~;
- NRC Form 3, "Notice to Employees"
- 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.

Radiation Workers are individuals who in the course of employment are likely to receive in a year an occupational dose of radiation greater than 100 mrem (1milliSievert) or whose duties require them to routinely work in a ~~restricted~~ Restricted area ~~Area~~ or routinely handle radioactive material.

Radiation Worker training will include:

- General 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;

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- 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 Commission regulations and license requirements for the protection of personnel from exposure to radiation and/or radioactive material including radiation workers requirement to observe regulatory and license requirements to the extent within the workers 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; and
- Radiation exposure reports which workers may request pursuant to 10 CFR 19.13.

Initial Radiation Worker training will include a test to verify training adequacy. 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.

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

- Classroom training
- Videotapes
- Reading assignments (Self Study)

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- On-Line training (Internet)
- On-the-job training (OJT) under the presence of an individual trained in the specific activity being observed;
 - Using survey instrumentation
 - Sample collection
 - Sample analysis, etc
- Demonstrations
- Drills and
- Discussions


2.4 Training Frequency

- Initial training shall be conducted before assuming duties with, or in the vicinity of, radioactive materials;
- Whenever there is a significant change in duties, regulations, or terms of the license; and
- Refresher training shall be annually (within 12 months).

2.5 Training Records

Training records, including a copy of the initial graded test, for all individuals shall be maintained in accordance with the Quality Assurance Manual (QAM).

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3.0 ADMINISTRATION AND RESPONSIBILITIES

3.1 Section Overview

This section describes the radiation protection organization and responsibilities of those individuals implementing the Radiation Protection Plan (RPP).

Administration of the RPP requires coordination among the following individuals:

- ~~Vice President (VP) Administrator, Cimarron Environmental Response Trust~~
- Radiation Safety Officer (RSO)
- Project Manager (PM)
- ALARA Committee
- Quality Assurance Coordinator (QAC)
- Activity Supervisors
- Individual Worker

3.2 Radiation Protection Organization


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

~~Vice President (VP) Administrator, Cimarron the Trust Corporation The VP is responsible for the oversight of Cimarron's radiation protection program and has responsibility for license compliance and license activities. The VP is knowledgeable of the radiation protection program and delegates responsibility for day-to-day oversight of the program to the RSO. The VP Administrator is a permanent member of the ALARA Committee, having expertise in management and responsibility for approval of managerial and financial changes.~~

Project Manager (PM) The PM is responsible for the oversight of the Cimarron Site radiation protection program and has responsibility for license compliance and license

Comment [JJM2]: Change made to capture Cimarron Environmental Response Trust organization. Other conforming changes made throughout the RPP.

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activities. The PM is knowledgeable of the radiation protection program and delegates responsibility for day-to-day oversight of the program to the RSO. The PM provides sufficient resources to implement the radiation protection program and site activities. The PM oversees site staffing and monitors regulatory requirements, site activities, scheduling, and budget. The PM is a permanent member of the ALARA Committee, having expertise in decommissioning and responsibility for implementing decommissioning changes.

Radiation Safety Officer (RSO) – (Rick Callahan Jay Maisler) The RSO is responsible for development, implementation, and ~~day-to-day routine~~ oversight of the radiation protection program as described in the RPP and its associated procedures. The RSO chairs the ALARA Committee and is responsible for bringing radiation protection and safety issues to the attention of the ALARA Committee.


Comment [JJM3]: Change made pursuant to EPM contract.

Comment [JJM4]: Day-to-day "oversight" will typically be performed by HPT or HPS. Procedure level of detail.

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 and the effectiveness of the ALARA program for the Cimarron Site. 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 compliance and incorporate any necessary changes, and evaluates and approves changes to the Decommissioning Plan or the RPP in accordance with License Condition 27(e).

Quality Assurance Coordinator (QAC) The QAC is responsible for the development, implementation, and oversight of the quality assurance system. The QAC is responsible for the implementation, review, and revision of the Quality Assurance Manual (QAM). The QAC reviews the RPP to ensure there are no conflicts with the quality assurance system and the QAM.

Activity Supervisor Each Activity Supervisor is responsible for the effective implementation of the RPP and radiation protection procedures as applicable to their scope of activity. Before any individual under their supervision begins work, each Activity Supervisor is responsible to ensure that each individual has been properly trained in the radiation protection requirements applicable to the task(s).

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Individual Worker Each Worker is responsible for complying with regulatory requirements and applicable radiation protection procedures to the best of his/her ability and knowledge.

3.3 ~~Policies~~ Policies

Each individual listed in Section 3.2 has 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).

Individuals are encouraged to contact the RSO first if they feel there is a potential regulatory or license violation. This is not a requirement.


Individuals who are not satisfied with the response to a concern have the right to contact the Nuclear Regulatory Commission (NRC) for resolution. See NRC Form 3, "Notice to Employees."

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 Conditions, including the RPP which is a license condition
3. Radiation protection program procedures

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3.5 Procedure Development

Radiation protection procedures shall be developed in accordance with the Quality Assurance Manual.

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., U.S. NRC Regulatory Guides and NUREGs, NCRP (National Council on Radiation Protection and Measurements) guidance, ICRP (International Council on Radiation Protection) guidance, ANSI (American National Standards Institute) 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, the RPP and conformance, to the extent practicable, with applicable standard practice.

Radiation protection procedure review shall assess compatibility with all other ~~Cimarron Corporation Trust~~ 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 be reviewed by the QAC.

All radiation protection procedures shall be controlled in accordance with regulatory requirements and the Quality Assurance Manual.

3.7 Notifications and Reports

Notifications and reports shall be made in accordance with the requirements of 10 CFR 19, 10 CFR 20, ~~10 CFR 21~~, and 10 CFR 70.

Comment [JJM5]: Deleted because Part 21 does not apply. Reflected in the QAPP.

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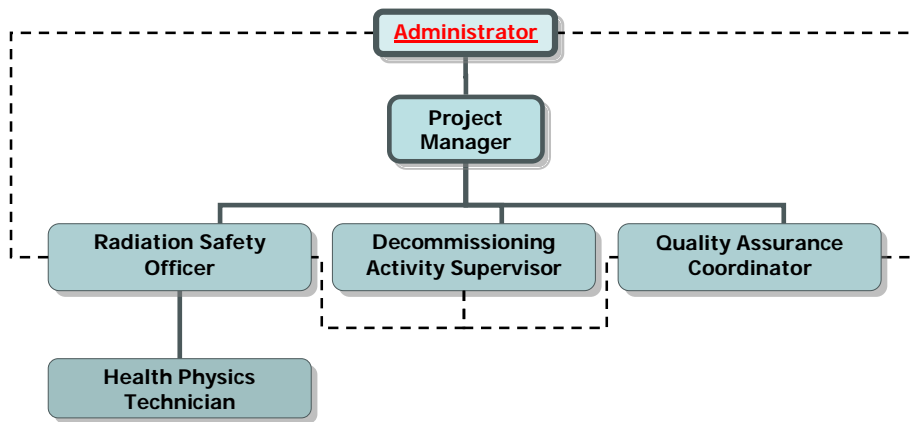
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Figure 3-1


~~Cimarron Corporation~~ The Cimarron Environmental Response Trust Organization



Line of Accountability —————

Line of Communication - - - - -

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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. ~~Cimarron Corporation~~ the Trust Environmental Response Trust 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.


In addition, an ALARA Suggestion Program 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 Responsibilities

The responsibilities of the ALARA Committee include:

- Holding, at a minimum, quarterly meetings
- 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
- Reviewing the effectiveness of the ALARA Program

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- Reviewing plans for new activities to ensure that ALARA principles have been considered
- Annual review of the RPP to ensure compliance and to incorporate any necessary changes
- Evaluate and approve changes to the Decommissioning Plan or the RPP in accordance with License Condition 27(e)

4.4 ALARA Committee Membership

- Minimum of three individuals
- One member shall have expertise in management and shall have managerial and financial responsibility for the decommissioning of the site. This person shall be employed by the licensee or the licensee's parent company.
- One member shall have expertise in decommissioning and shall be responsible for site decommissioning.
- One member shall be the site RSO (or equivalent) and shall ensure conformance to radiation safety and environmental requirements.
- One of the three members described above (typically the RSO) shall chair the ALARA Committee.
- Additional members may be included, as appropriate, to address technical issues such as health physics, hydrogeology, etc.
- Except for the management representative, ALARA Committee members may be consultants.

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5.0 ASSESSMENTS

5.1 Section Overview

Audits and/or surveillances are used to provide a review of radiation protection activities and to ensure that:

- Activities comply with regulatory requirements and license conditions
- Activities are performed by procedures
- Unsatisfactory performance is identified and corrected
- Weaknesses are identified and corrected

5.2 Audits


10 CFR 20.1101(c) requires that a licensee shall, at least annually, review the radiation protection program content and implementation. Various NRC guidance documents (e.g. Appendix L, NUREG-1556, Vol. 7) provide sample forms to assist the licensee 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. Typically, at each of the Committee's quarterly meetings, several sections of the RPP are reviewed by the Committee. This technique allows for Committee review of all RPP sections during every twelve month period. Changes to the RPP shall be documented. Audits shall be documented, as well as program changes indicated by audits.

5.3 Surveillances

A surveillance involves the observation ("witnessing") of an activity as that activity is being performed. Surveillances of Cimarron Site activities are done by, or under the direction of, the Quality Assurance Coordinator and/or the RSO. The goal of surveillance is to determine whether or not the activity is being performed in accordance with applicable procedures, plans, special work permits, etc. Surveillances shall be documented, as well as program changes indicated by surveillances.

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6.0 PERSONNEL MONITORING

6.1 Individual Monitoring of Occupational Dose


NRC regulation 10 CFR 20.1502 requires ~~Cimarron the Trust~~ to monitor 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 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 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 deep dose equivalent in excess of 0.1 rem and/or likely to receive during the entire pregnancy, a committed effective dose equivalent in excess of 0.1 rem.

~~Regulation~~ 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 deep dose equivalent (DDE) from external exposures and the committed effective dose equivalent (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 ~~Cimarron the Trust~~ employees, contractors, and visitors who receive occupational dose at ~~the Cimarron facilities Site~~. Occupational dose is defined as the radiation dose an individual receives in a ~~restricted Restricted area Area~~ and other work-related radiation dose the person receives, but does not include medical dose, dose due to background radiation, or dose received while a member of the public.

6.1.1 Occupational Dose Limits for Adults (10 CFR 20.1201) are as follows:

- Whole Body - The more limiting of a total effective dose equivalent (TEDE) equal to 5 rem or the sum of the deep dose equivalent and committed dose equivalent to any individual organ or tissue, other than the lens of the eye, equal to 50 rem.

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- 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.

6.1.2 Occupational Dose Limits to Minors (10 CFR 20.1207) are as follows:

The dose limits for minors shall be 10 percent of the corresponding limit for adults.

6.1.3 Occupational Dose Limits to Embryo/Fetus (10 CFR 20.1208) are as follows:

The dose to the embryo/fetus of declared pregnant women shall be limited to 500 mrem during the entire time of pregnancy. Substantial variations in dose rate shall be avoided.

6.2 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 above background in a year in ~~restricted~~ Restricted areas ~~Areas~~. In addition, the dose in any ~~unrestricted area~~ Unrestricted Area from external sources shall not exceed 2 mrem above background in any one hour. Members of the public are not subject to individual monitoring, record keeping, and reporting requirements of 10 CFR 20.


6.3 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 Cimarron the Trust until the regulating agency terminates each pertinent license requiring this record and in accordance with the ~~Cimarron~~ The Cimarron Environmental Response -Quality Assurance Manual (QAM).

6.4 Personnel Monitoring for External Radiation

Cimarron the Trust shall issue individual monitoring devices to any individual who is likely to receive a dose in excess of 10 percent of the occupational dose limits in a year.

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Monitoring shall also be performed to measure the dose equivalent to the embryo/fetus during the entire pregnancy, due to the occupational exposure, when declaration of pregnancy is made. When external exposure is determined by measurement with an external personal monitoring device, the deep dose equivalent must 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).

6.5 Internal Exposure Monitoring

Baseline in-vivo and/or in-vitro monitoring shall be performed for all individuals prior to performing radiation work involving respiratory protection equipment or work that could involve an intake of radioactive materials. Additional bioassay sampling shall be performed at the direction of the Radiation Safety Officer (RSO) or designee.


Intakes shall normally be calculated based upon the results of the air monitoring program, unless the time of intake is well defined, the lung Class is known, or bioassay results are significantly higher than detection limits.

In-vivo and/or in-vitro bioassay sampling 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. In-vitro and/or in-vivo bioassay sampling shall also be performed whenever it is likely that an individual may have received an intake of 10 milligrams uranium in any one week. In-vivo and/or in-vitro 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. Determination of internal exposure requirements are listed in 10 CFR 20.1204.

6.6 Declared Pregnant Woman (DPW) Exposure Policy

Based on recommendations of the National Council on Radiation Protection and Measurements (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.

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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. Cimarron the Trust 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.

6.7 ALARA Dose Goals

The ALARA Committee establishes the annual Administrative Dose Goals for the site. In cases where Administrative Dose Goals are exceeded without prior authorization, the RSO ~~or~~ designee shall investigate to determine the cause and prepare a written report.

6.8 Personnel Exposure Reports


An annual summary 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.

Records of individual monitoring shall be kept in accordance with 10 CFR 20.2106 and the Cimarron Trust QAM. 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 and shall clearly and specifically indicate the quantities (e.g., deep dose equivalent) and units (e.g., rem or mrem) of all recorded values.

Records of embryo/fetus dose shall be maintained with those of the mother, including the declaration of pregnancy.

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7.0 RADIATION PROTECTION INSTRUMENTATION

7.1 Calibration

Calibration of radiation monitoring, counting, and air sampling instruments, shall be performed in accordance with their associated radiation protection procedures. These procedures shall be based on the calibration instructions provided by the manufacturer and/or the instrument operations manual and be consistent with regulatory requirements.

The calibration frequency for portable radiation monitoring instruments and portable air sampling equipment shall be at least every ~~6-12 months~~. Semi-portable (e.g., continuous air monitors) and fixed (e.g., count room/laboratory instrumentation, portal monitors) instrumentation shall be calibrated at least annually.

Comment [JJM6]: Change made to reflect ENERCON procedures. Consistent with standard industry practices and standards.

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. Operation and response tests shall be conducted as required in their associated radiation protection procedures.

Comment [JJM7]: Change made to reinforce acceptability of change in calibration frequency made in 7.1.

7.3 Maintenance and Repair


Maintenance and repair of radiation protection instrumentation shall be performed by qualified personnel or an approved vendor. All maintenance and repair 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. Quality Assurance (QA) for laboratory instrumentation shall be proceduralized and consistent, to the extent practicable, with the requirements of USNRC Regulatory Guide 4.15, "Quality Assurance for Radiological Monitoring Programs (Normal Operations) - Effluent Streams and the Environment."

QC for instruments shall be incorporated into an instrument's operating procedure based on manufacturer's instructions and be consistent with regulatory requirements.

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Review and evaluation of instrumentation operability shall be performed on an on-going basis by the Radiation Safety Officer ~~or~~ or designee.

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8.0 ACCESS CONTROL

8.1 Section Overview

This section provides the access control requirements for entry into and exit from Restricted Areas (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. Restricted Areas are areas within the Cimarron ~~Facility Site~~ boundary for which access is controlled for the purpose of protecting individuals against undue risk from exposure to radiation and/or radioactive materials


8.2 Restricted Area Access Controls

RAs require the completion of specific training prior to entry. Only properly trained or escorted personnel shall be permitted inside any RA. Personnel who enter RAs can be required to wear dosimetry. RAs include Radioactive Materials Areas, Radiation 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.

8.3 Posting Requirements

Each RA shall be posted in accordance with 10 CFR 20.1902 ~~as required~~. Exceptions to posting requirements found in 10 CFR 20.1903 shall be approved by the RSO ~~or Designee~~ designee.

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Section 9.0	SPECIAL WORK PERMITS	Page 9 - 1

9.0 SPECIAL WORK PERMITS

9.1 Section Overview

A Special Work Permit (SWP) is a document or series of documents prepared by the Activity Supervisor or ~~Designee~~designee, with input and approval from appropriate personnel, to inform individuals of the conditions that exist in the work area and radiological and non-radiological job safety requirements. SWPs are required only when hazardous or radioactive materials are present in quantities that could result in health or safety hazards due to the work to be performed. An SWP may not be needed if the activities are covered by a Standard Operating Procedure (SOP) or Activity Plan which includes the information described in Section 9.2.


9.2 SWP Preparation and Requirements

The SWP job description and job location shall be consistent with the activities or task to be performed.

SWP documentation shall consider all health and safety considerations, radiological hazards, and protective equipment needed for the work. SWPs shall, as a minimum, include information on:

- the nature of the work,
- equipment needed to perform the job,
- procedures,
- plans,
- Health & Safety requirements,
- personal protective equipment,
- radiological requirements, surveys and conditions,
- health physics requirements,
- training requirements,

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- special sampling requirements.

9.3 SWP Approval and Close Out

SWPs must be approved prior to implementation by:

- Quality Assurance Coordinator (or designee),
- Radiation Safety Officer (or designee), and the
- Activity Supervisor (or designee).

Approval signatures indicate agreement with the provisions of and intent to comply with requirements set forth in the SWP.

Close out (termination) of an SWP shall be approved by:

- Radiation Safety Officer (or designee) and the
- Activity Supervisor (or designee).

Close out signatures indicate an agreement that the SWP work requirements and post work housekeeping have been adequately completed.


9.4 SWP Training

Each individual who performs work governed by a SWP shall receive training regarding the SWP by the Activity Supervisor or ~~Designee-designee~~ prior to starting work. SWP training shall be documented by having the worker sign a form acknowledging that training was received.

9.5 Record Keeping

The Quality Assurance Coordinator is responsible for maintaining the SWP and all related documents in accordance with QA procedures.

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10.0 RADIATION PROTECTION SURVEYS

10.1 General Requirements

Survey information is used:


- to assist in the development of Special Work Permits (SWP) and Activity Plans (AP),
- to inform individuals of the radiological conditions/hazards in the area,
- to determine area postings (if required),
- to determine the type(s) of personnel protective equipment necessary, and
- to ensure personnel exposures to radiation and radioactive materials are maintained ALARA.
- to determine the decommissioning status of material, equipment, and/or environmental media, and
- to determine compliance with regulatory and/or license criteria.

Cimarron the Trust shall conduct radiation and contamination surveys, perform air sampling, and take samples when required to assess radiological conditions and to establish specific radiological controls for work to be performed. Decommissioning surveys shall be performed in accordance with the NRC-approved Site Decommissioning Plan and subsequent revisions, as required.

Contact dose rates are used to locate and identify radiation levels detected within 1 cm (~~1/2~~ (0.5 in) from the surface being surveyed.

General dose rates are used to identify radiation levels detected at approximately 30 cm (1 ft) from the surface being surveyed.

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Indirect (smears or removable) and direct (fixed) contamination surveys are performed to detect and/or quantify radioactive contaminants. Removable contamination surveys should be performed when necessary to ensure that radioactive contamination has not inadvertently spread.

U.S. NRC Regulatory Guide 8.25, "Air Sampling in the Workplace" shall be an acceptable method for meeting certain survey and dose assessment requirements of 10 CFR 20. Air samples shall be collected whenever the airborne activity levels are expected to exceed 10 percent of the Derived Air Concentration (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 Radiation Safety Officer (RSO) or designee shall conduct an investigation and take corrective actions to reduce airborne contamination levels.

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

10.2 Routine Surveys

Surveys shall be conducted at a frequency commensurate with the hazards present and the personnel occupancies in a given area and/or as directed by the SWP/AP and/or RSO ~~or~~ designee.


10.3 Investigative Surveys

Investigative surveys shall be performed as soon as practicable following the discovery or indication of abnormal radiological conditions.

10.4 Personnel Contamination Monitoring

Personnel shall routinely perform contamination monitoring (frisking) prior to exiting Restricted Areas that have the potential for spreading contamination or per SWP/AP requirement. At a minimum, hands and feet shall be frisked when exiting these areas.

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10.5 Survey Training and Documentation

Surveys shall be performed by personnel who have been trained commensurate with the type of surveys to be performed. Training will address the following, as applicable:

- the appropriate instrumentation to be used,
- operational and response checks for survey instrumentation,
- survey methods, recording of data,
- calculations, data evaluation,
- ~~and action levels,~~
- ~~as applicable.~~

Radiation and contamination surveys performed for compliance purposes, or to demonstrate that decommissioning criteria have been met, shall be documented and maintained in accordance with 10 CFR 20, Subpart L and the Quality Assurance Manual.

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11.0 RADIOACTIVE MATERIALS CONTROL

11.1 Section Overview

Radioactive material (RAM) controls are established to provide positive control of radioactive material, prevent inadvertent release of radioactive material to ~~unrestricted area~~Unrestricted Area, ensure protection of members of the public and workers, and to minimize the amount of radioactive waste generated during decommissioning operations. This section of the ~~Plan-RPP~~ addresses receipt, labeling, storage, shipment, transfer, controls, theft and loss of radioactive materials.

11.2 Receipt, Labeling, and Storage of RAM

All radioactive materials shall be received in accordance with radioactive material license possession limits and 10 CFR 70.19. The individual responsible for radioactive material receipt shall perform all surveys as required by 10 CFR 20.1906 and review shipment paperwork to ensure compliance with 49 CFR. Each container of radioactive material shall be labeled as required by 10 CFR 20.1904.

Radioactive material shall be secured against unauthorized access or removal. Radioactive material storage areas shall be posted and controlled using appropriate barriers and radiological postings.


11.3 Shipment and Transfer of Radioactive Material

RAM shipments shall comply with NRC (10 CFR) and U.S. Department of Transportation (49 CFR) regulations. Low-level radioactive waste shipments transferred for disposal shall be accompanied by a shipment manifest prepared in accordance with 10 CFR 20.2006. Radioactive material shall only be transferred to authorized individuals in accordance with the appropriate regulations in 10 CFR 20, and 10 CFR 70.

11.4 Controls for Radioactive Sources

The Radiation Safety Officer (RSO) shall approve all requisitions for radioactive sources and ensure that source inventories are performed on a quarterly basis. Radioactive sources shall be tested for leakage and/or contamination upon receipt and on a quarterly basis. The RSO shall approve locations for storage of radioactive sources.


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Radioactive source storage areas shall be secured against unauthorized removal or access of licensed radioactive material and posted per 10 CFR 20.1902.

11.5 Theft or Loss of Radioactive Material

Any individual who discovers that radioactive material is lost, stolen, or missing shall immediately notify the RSO. The RSO shall evaluate the physical and radiological characteristics of the missing material and the potential hazards to workers and the general public, initiate an investigation to locate the material, and perform a root cause evaluation of the incident. The RSO shall determine the need for notifications to regulatory authorities and make notifications as necessary per 10 CFR 20.2201.

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Section 12.0	CONTAMINATION CONTROL	Page 12 - 1

12.0 CONTAMINATION CONTROL

12.1 Section Overview

The purpose of contamination control is to prevent and/or minimize the spread of radioactive contamination to individuals, areas, and equipment. Control of radioactive surface contamination minimizes possible inhalation or ingestion of radioactivity by personnel, skin dose from small particles of radioactivity, and the spread to or build-up of radioactivity in the facility or environment from decommissioning operations. Controls to prevent the spread of contamination shall be proposed by the Activity Supervisors and approved by the ~~Radiation Safety Officer~~ RSO (and or designee) prior to implementation.

12.2 General


Cimarron the Trust shall maintain buildings and equipment located within a ~~restricted Restricted or radiological controlled area~~ Area below the removable contamination limit of 5,000 dpm/100cm² alpha. In addition, Cimarron the Trust shall establish Contaminated Area controls, including posting, whenever removable contamination in an ~~unrestricted area~~ Unrestricted Area exceeds 1,000 dpm/100cm² alpha or beta-gamma. Cimarron the Trust shall incorporate the ALARA philosophy when selecting decontamination methods and practices.

Comment [JIM8]: Change made for consistency throughout RPP. "RCA" is not a term used other than as a definition.

As a general rule, decontamination is performed by working from areas of low contamination to areas of high contamination if possible. Decontamination materials should be limited to the minimum required for the task. All decontamination materials shall be collected, monitored, and properly dispositioned.


12.3 Contaminated Personnel

Decontamination of personnel shall be performed under the guidance of health physics personnel and shall incorporate good health physics practices and ALARA principles. Cimarron the Trust shall not allow an individual whose skin or personal clothing is found contaminated above background to exit a ~~controlled~~ Controlled area Area without prior approval of the RSO. Appropriate surveys and monitoring shall be performed to evaluate dose to the individual resulting from contamination.

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12.4 Spill of Radioactive Material

A spill of radioactive material requires immediate actions which include stopping the spill, warning other personnel, isolating the area, and minimizing radiation exposure. Supplementary actions should include the performance of radiological surveys in immediate and adjacent areas, including downwind.

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13.0 UNCONDITIONAL RELEASE OF MATERIALS

13.1 Section Overview

Cimarron the Trust is authorized to unconditionally release tools, equipment, parts, and materials provided that radiation levels and surface contamination levels do not exceed the limits as stated in the Cimarron Trust license. Such surveys will be performed and documented by qualified individuals.)

13.2 Survey Instrumentation

Instruments used to perform release surveys must be calibrated using 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.

13.3 Release Surveys of Materials

Release surveys will consist of direct (fixed) and indirect (removable ~~for~~ smearable) monitoring. Cimarron the Trust is authorized to release materials provided that the direct and removable-indirect levels do not exceed the limits stated in the Cimarron Trust license and summarized below. Such surveys will be performed and documented by qualified individuals.

Comment [JJM9]: Corrected terminology to be consistent with usage throughout the RPP.


13.3.1 Surfaces of buildings and equipment

- Direct – 15,000 dpm/100cm² alpha or beta/gamma, maximum over 1 m²
- Direct – 5,000 dpm/100cm² alpha or beta/gamma, averaged over 1 m²
- ~~Removable-Indirect~~ – 1000 dpm/100cm² alpha or beta/gamma

13.3.2 Soils

- Natural Uranium - 10 pCi/g total uranium
- Enriched Uranium – 30pCi/g total uranium

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- Depleted Uranium – 35 pCi/g total uranium
- Natural Thorium – 10 pCi/g total thorium

13.3.3 Exposure Rates

- a. Surface of buildings and equipment
 - 5µR/hr – above background at 1 meter
- b. Soils
 - 10µR/hr – average above background at 1 meter
 - 20µR/hr – maximum above background at 1 meter


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14.0 RESPIRATORY PROTECTION

14.1 Section Overview

Respiratory protection measures shall be employed when necessary to protect workers from airborne hazards. At this time, respiratory protection requirements to support the activities at the Cimarron ~~Facility Site~~ are no longer needed. As future conditions change and the ~~Radiation Safety Officer~~ RSO or designee determines, through review of field conditions or anticipated work functions, that respiratory protection is required, procedures and controls will be instituted in accordance with the requirements found in 10 CFR 20, Subpart H, "Respiratory Protection and Controls to Restrict Internal Exposure in Restricted Areas" for radiological hazards and the Code of Federal Regulations Title 29 Part 1910.134 for non-radiological hazards.

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Section 15.0	ENVIRONMENTAL MONITORING	Page 15 - 1

15.0 ENVIRONMENTAL MONITORING

15.1 Section Overview

Environmental monitoring shall be performed at various locations to monitor the migration of licensed material from former (now decommissioned) sources through environmental media. Final surveys have demonstrated that buildings and soils have been decommissioned. Licensed material exceeds decommissioning criteria in groundwater in three areas: Burial Area #1, the Western Upland Area, and the Western Alluvial Area. Cimarron the Trust shall maintain an environmental monitoring program in these three areas until superseded by a groundwater remediation work plan.

15.2 Surface and Groundwater Monitoring

Surface and groundwater samples are collected annually and are analyzed for Fluoride, Nitrates/Nitrites, gross alpha activity, gross beta activity, and uranium isotopes. The ~~following~~ locations identified in Table 15-1 shall be sampled on an annual basis:

15.3 Quality Control in Sampling

Sample collection, preservation, shipping, and analysis shall be conducted in accordance with the site-specific Sampling and Analysis Plan and associated procedures. Data review, reporting, and management will be conducted in accordance with the Data Management Plan and the Cimarron Trust Quality Assurance Manual and associated procedures.

15.4 Reporting

Environmental monitoring results shall be reported to NRC within 30 days of the completion of data review.

Comment [JJM10]: Information was moved into a stand-alone table rather than embedded in text. Content was not changed.



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TABLE 15-1

SURFACE AND GROUNDWATER MONITORING LOCATIONS

BURIAL AREA #1	WESTERN UPLAND AREA
1314	1351
TMW-08	1352
TMW-09	1354
TMW-13	1356
02W06	
02W08	
02W09	WESTERN ALLUVIAL AREA
02W16	MWWA03
02W17	MWWA09
02W27	T-62
02W28	T-64
02W32	T-70R
02W35	T-76
02W42	T-77
02W43	T-79
02W44	T-82
SURFACE WATER	
1201 Cimarron River Upstream	
1202 Cimarron River Downstream	

Comment [GW11]: Have we verified these are all correct?
JM: These are the locations in the current RPP.

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16.0 DEFINITIONS

Absorbed Dose: Energy imparted by ionizing radiation per unit mass of irradiated material. The units of absorbed dose are the rad and the gray (Gy). 1 Gy = 100 rad

Access Control Point: An area established to provide control over the entry to and exit from a Radiologically Controlled /Restricted Area. An access control point can also function as a contamination control boundary between zones of differing contamination levels.

Accuracy: The degree of agreement of a measured value with the true or expected value of the quantity of concern.

Activity: Rate of disintegration (transformation) or decay of radioactive material. The units of activity are the curie (Ci) and the becquerel (Bq). Bq = 1 (dps) disintegration per second; Ci = 3.7×10^{10} dps

Administrative Changes: Administrative changes to documents are defined as editorial corrections (e.g., grammatical, typographical, etc.) or other administrative changes such as personnel title changes, changes in procedure names, or other changes that do not alter the technical or procedural content of a document.

Administrative Controls: Procedures and/or rules established by ~~Cimarron~~Cimarron Environmental Response Trust management to ensure safety and controlled operation of the facility in accordance with licenses, regulations, corporate policy, and the ALARA policy.

Administrative Dose Limit: A radiation dose limit established by ~~Cimarron~~Cimarron Environmental Response Trust management for the purpose of maintaining radiation dose below regulatory limits.

Adult: An individual 18 or more years of age.


Airborne Radioactive Material or Airborne Radioactivity: Radioactive material dispersed in the air in the form of dusts, fumes, particulates, mists, vapors, or gases.

Airborne Radioactivity Area: A room, enclosure, or area in which airborne radioactive materials, composed wholly or partly of licensed material, exists in concentrations:

- (1) in excess of the derived air concentrations (DAC) specified in appendix B of 10 CFR 20.1001 – 20.2401, or

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Comment [JJM12]: Note: There are a number of terms that are no longer used in the RPP, but have been retained for historical purposes; e.g., they may have been used in the past.

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- (2) to such a degree that an individual present in the area without respiratory protection equipment could exceed, during the hours an individual is present in a week, an intake of 0.6% of the Annual Limit on Intake (ALI) or 12 DAC hours.

Air-purifying respirator: A respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.


ALARA: An acronym for "As Low As is Reasonably Achievable". ALARA means making every reasonable effort to maintain exposures to radiation as far below the dose limits in 10 CFR 20 as is practical consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest.

ALARA Committee: The Cimarron Site ALARA Committee that has responsibility for overall coordination of the ALARA Program. The Committee is composed of members as described in Section 4.0 of this RPP and meets on a regular basis (typically, quarterly) to review the status of the ALARA Program and to approve changes to the Radiation Protection Plan (Annex A) and Decommissioning Plan.

Alpha Particle: A positively charged particle ejected spontaneously from the nuclei of some radioactive elements. It is identical to a helium nucleus that has a mass number of 4 and an electrostatic charge of +2, i.e. two protons and two neutrons.

Annual Limit on Intake (ALI): The derived limit for the amount of radioactive material taken into the body of an adult worker by inhalation or ingestion in a year. ALI is the smaller value of intake of a given radionuclide in a year by the reference man that would result in a committed effective dose equivalent of 5 rems (0.05 Sv) or a committed dose equivalent of 50 rems (0.5 Sv) to any individual organ or tissue. (ALI values for intake by ingestion and by inhalation of selected radionuclides are given in Table 1, Columns 1 and 2, of appendix B to 10 CFR 20.1001 thru 20.2401).

Assigned Protection Factor (APF): The expected workplace level of respiratory protection that would be provided by a properly functioning respirator or a class of respirators to properly fitted and trained users. Operationally, the inhaled concentration can be estimated by dividing the ambient airborne concentration by the APF.

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Atmosphere-supplying respirator: A respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

Audit: An audit is an evidence gathering process. Audit evidence is used to evaluate how well audit criteria (procedures, requirements, policies) are being met. Audit evidence is used to determine how well policies are being implemented, how well procedures are being applied, and how well requirements are being met.

Atomic Number (Symbol Z): The number of protons in the nucleus of an atom.

Background: Ambient signal response recorded by measurement instruments that is independent of radioactivity contributed by the radionuclide being measured in the person or sample.

Background Radiation: Radiation from cosmic sources; naturally occurring radioactive material, including radon (except as a decay product of source or special nuclear material); and global fallout as it exists in the environment from the testing of nuclear explosive devices or from past nuclear accidents such as Chernobyl that contribute to background radiation and are not under the control of the licensee. "*Background radiation*" does not include radiation from source, byproduct, or special nuclear materials regulated by the Commission.


Becquerel (Bq): The term used to describe one disintegration per second (dps).

Beta Particle: Beta particles are emitted by the nucleus of an atom to attain stability. Beta particles are usually negatively charged, and are emitted from the nucleus of atoms with an excess of neutrons and serve to reduce the number of neutrons in the nucleus. Some beta particles are positively charged. These positively charged beta particles, known as positrons, are emitted from a nucleus and result in an increase in the number of neutrons in the nucleus. Negatively charged beta particles and positively charged positrons have a mass equal to 1/1837 that of a proton. Beta particles are easily stopped by a thin sheet of metal or plastic.

Bioassay (radiobioassay): The determination of kinds, quantities or concentrations and, in some cases, the locations of radioactive material in the human body, whether by direct measurement (in vivo counting) or by analysis and evaluation of materials excreted or removed from the human body.

Biological Half-Life (T_b): The time required for a biological system, such as a person, to eliminate by natural processes (other than radioactive decay) one-half of any amount of a substance (primary concern is radionuclides) that has entered the system.

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Body Burden: The total quantity of a radionuclide in the whole body.


Breathing Zone: The breathing zone is that region adjacent to a worker's mouth and nostrils from which air is drawn into the lungs while he/she is performing assigned work.

Breathing Zone Air Sample: Air which is drawn through or into the sample media and is a fair representation of the workers "Breathing Zone."

Byproduct material:

- (1) Any radioactive material (except special nuclear material) yielded in, or made radioactive by, exposure to the radiation incident to the process of producing or using special nuclear material;
- (2) The tailings or wastes produced by the extraction or concentration of uranium or thorium from ore processed primarily for its source material content, including discrete surface wastes resulting from uranium solution extraction processes. Underground ore bodies depleted by these solution extraction operations do not constitute "byproduct material" within this definition;
- (3)
 - (i) Any discrete source of radium-226 that is produced, extracted, or converted after extraction, before, on, or after August 8, 2005, for use for a commercial, medical, or research activity; or
 - (ii) Any material that—
 - (A) Has been made radioactive by use of a particle accelerator; and
 - (B) Is produced, extracted, or converted after extraction, before, on, or after August 8, 2005, for use for a commercial, medical, or research activity; and
- (4) Any discrete source of naturally occurring radioactive material, other than source material, that—
 - (i) The Commission, in consultation with the Administrator of the Environmental Protection Agency, the Secretary of Energy, the Secretary of Homeland Security, and the head of any other appropriate Federal agency, determines would pose a threat similar to the threat posed by a discrete source of radium-226 to the public health and safety or the common defense and security; and

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(ii) Before, on, or after August 8, 2005, is extracted or converted after extraction for use in a commercial, medical, or research activity.

Calendar Quarter(s):

- First quarter - January 1 through March 31
- Second quarter - April 1 through June 30
- Third quarter - July 1 through September 30
- Fourth quarter - October 1 through December 31.

Calendar Year: From January 1 through December 31.

Calibrate: To adjust and/or determine:

- (1) The response or reading of an instrument relative to a series of conventionally true values; or
- (2) The strength of a radiation source relative to a standard or conventionally true value.

Check Source: A radioactive source, not necessarily calibrated, that is used to confirm the continuing satisfactory operation of an instrument.


Chi-Square Test: A statistical test to determine whether the results of a series of measurements follow the expected statistical distribution. This test determines if fluctuations in measurements are of statistical origin or are possibly caused by a malfunction in some part of the counting system.

Class (Lung Class or Inhalation Class): A classification scheme for inhaled material according to its rate of clearance from the pulmonary region of the lung. Materials are classified as D, W, or Y, which applies to a range of clearance half-times: for Class D (Days) of less than 10 days, for Class W (Weeks) from 10 to 100 days, and for Class Y (Years) of greater than 100 days.

Clean Shaven: No facial hair between an individual's face and the sealing surface of the respirator and no facial hair interfering with valve function of the respirator.

Collective Dose: The sum of the individual doses received in a given period of time by a specific population from exposure to a specific source of radiation.

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Committed Dose Equivalent (CDE) ($H_{T,50}$): Means the dose equivalent to organs or tissues of reference (T) that will be received from intake of radioactive material by an individual during the 50 year period following the intake.

Committed Effective Dose Equivalent (CEDE) ($H_{E,50}$): The sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to these organs or tissues ($H_{E,50} = \sum T W_{T,50}$).

Contact Dose Rate: A radiation dose rate as measured with the detector or instrument case within 1/2 inch of the surface being measured.

Contamination, Radioactive: Deposition of radioactive material in any place where it is not desired. Radioactive contamination may be removable (loose) or fixed.

Contaminated Area: Any area that has radioactive contamination at levels greater than the radioactivity release limits for unrestricted use.

Continuous Air Sampling/Monitoring: A method of sampling used to measure airborne radioactivity levels in routinely occupied areas.

Control Badge: Dosimeters designated for the monitoring of background radiation exposure.

Control Point (CP): A control point is a location central to a work area used as a base of operations for Health Physics personnel to maintain records, documents and equipment and to complete surveys for the purpose of providing radiation protection support.


Controlled Area: An area outside of a restricted area but inside the site boundary, where access can be limited by ~~Cimarron the Trust Corporation~~ for any reason.

Corrective Action(s): Action(s) taken to improve areas of performance or to eliminate causes of adverse trends in performance identified during Audits, Surveillances, and as a response to a Non Conformance Report.

Count: The numeric reading produced by a device designed to detect ionizing events. In this usage, a "count" refers to the number of detected events registered in a given period of time.

CPM (Counts Per Minute): The rate of ionizing event occurrence in one minute recorded by a radiation detection instrument designed to count ionizing events caused by radiation.

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Curie (Ci): A measure of the amount of radioactive material present.

One curie equals 37 billion ($3.7 \text{ E}+10$ or 3.7×10^{10}) becquerels (dps).

Equals 2.2 trillion ($2.2 \text{ E}+12$) radioactive disintegration's per minute (dpm).

A millicurie (mCi) is 2.2 billion ($2.2 \text{ E}+09$) dpm

A microcurie (μCi) is 2.2 million ($2.2 \text{ E}+06$) dpm

A nanocurie (nCi) is 2.2 thousand ($2.2 \text{ E}+03$) dpm

A picocurie (pCi) is 2.2 dpm.

Counting Efficiency: The net number of counts registered by the detector system per unit of time, divided by the number of disintegration's originating in the radioactive source that is being measured during the same unit of time.

Daughter Product: An isotope formed by the radioactive decay of another isotope.

Declared Pregnant Woman (DPW): A woman who has voluntarily informed the licensee, in writing, of her pregnancy and the estimated date of conception. The declaration remains in effect until the declared pregnant woman withdraws the declaration in writing or is no longer pregnant.

Decommission: To remove a facility or site safely from service and reduce residual radioactivity to a level that permits--


- (1) Release of the property for unrestricted use and termination of the license; or
- (2) Release of the property under restricted conditions and termination of the license.

Decontamination: Means the process of removing or reducing the level of contamination on an item or individual.

Deep Dose Equivalent (H_d): The dose equivalent at a tissue depth of 1 cm (1000 mg/cm^2) Applies to external whole body exposure.

Demand respirator: An atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

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Derived Air Concentration (DAC): The concentration of a given radionuclide in air which, if breathed by the reference man for a working year of 2,000 hours under conditions of light work (inhalation rate 1.2 cubic meters of air per hour), results in an intake of one ALI. DAC values are given in Table 1, Column 3, of appendix B to 10 CFR 20.1001-2401.

Derived Air Concentration-hour (DAC-hour): The product of the concentration of radioactive material in air (expressed as a fraction or multiple of the derived air concentration for each radionuclide) and the time of exposure to that radionuclide, in hours. A licensee may take 2,000 DAC-hours to represent one ALI, equivalent to a committed effective dose equivalent of 5 rems (0.05 Sv).

Detector: That portion of an instrument system sensitive to and used for the quantification of ionizing radiation.

Direct Contamination Survey: This method measures fixed and removable levels of surface contamination. A direct frisk is performed by scanning the survey location using a count rate meter.

Direct Reading Dosimeter (DRD): A monitoring device consisting of a collection chamber coupled with an optical lens and calibrated scale. DRD's can be used as a device to provide individuals with an immediate estimate of their external gamma radiation exposure.


Discrete Source: A radionuclide that has been processed so that its concentration within a material has been purposely increased for use for commercial, medical, or research activities.

Disposable respirator: A respirator for which maintenance is not intended and that is designed to be discarded after excessive breathing resistance, sorbent exhaustion, physical damage, or end-of-service-life renders it unsuitable for use. Examples of this type of respirator are a disposable half-mask respirator or a disposable escape-only self-contained breathing apparatus (SCBA).

Disintegration's Per Minute (DPM): Refers to the number of nuclear transformations occurring per minute.

Dose or Radiation Dose: A generic term that means absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, or total effective dose equivalent, as applicable to context and as defined in 10 CFR 20.. The unit for absorbed dose is the rad. 100 rad = 1 Gy

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Dose Equivalent (H_T): Means the product of the absorbed dose in tissue, quality factor, and all other necessary modifying factors at the location of interest. The units for dose equivalent are the Sievert (Sv) and rem.

Dose Rate: The quantity of absorbed dose delivered per unit of time.

Dosimeter: Any of several types of devices used to measure radiation dose. Common types include TLD, OSL, film, and direct reading devices.

Dosimetry Processor: An individual or organization that processes and evaluates individual monitoring equipment in order to determine the radiation dose delivered to the equipment.

Effective Dose Equivalent (H_E): The sum of the products of the dose equivalent to the organ or tissue (H_T) and the weighing factors (W_T) applicable to each of the body organs or tissues that are irradiated ($H_E = \sum W_T H_T$).

Effluent: Material discharged into the environment from licensed operations.

Embryo/Fetus: The developing human organism from conception until the time of birth.

Entrance or Access Point: Any location through which an individual could gain access to radiation areas or to radioactive materials. This includes entry or exit portals of sufficient size to permit human entry, irrespective of their intended use.


Estimated Dose: The unofficial dose that is posted to an individual's radiation dose history. Estimated dose is normally based on results obtained from secondary dosimeters or incomplete bioassay information.

Estimated Dose Letter: A written estimate of the radiation dose received by an individual during the current work assignment and furnished to the individual or the individual's designee at termination.

Examination: An evaluation device used to determine a trainee's competence in a given area. This is generally administered at the completion of a unit, course or program.

Exposure: Means being exposed to ionizing radiation or to radioactive material. The unit of exposure is the roentgen.

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External Dose: That portion of the dose equivalent received from a source of radiation outside the body.

Extremity: Means hand, elbow, arm below the elbow, foot, knee, or leg below the knee.

Film Badge: A dosimeter device, usually worn on the worker's body, using packaged, highly sensitive photographic film as a means of detecting radiation.

Final Status Survey (FSS): Measurements and sampling analysis data that helps to describe the radiological conditions of a site or facility, following completion of decontamination activities (if any) and in preparation for release of the site or facility.

Final Status Survey Report (FSSR): The results of the final status survey conducted by a licensee to demonstrate the radiological status of its facility. The FSSR is submitted to NRC for review and approval.

Fission: The splitting of a nucleus into at least two other nuclei and the release of a relatively large amount of energy. Two or three neutrons are usually released during this type of transformation.

Fit factor: A quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

Fit test: The use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual.


Fixed Contamination: Contamination which is embedded, attached or otherwise not readily removed without surface destructive methods (e.g., grinding, sanding, acid baths).

Floodplain: The lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands. Areas subject to a one percent or greater chance of flooding in any given year are included (see 10 CFR 72.3).

Frisk: The performance of a direct survey for radioactive contamination.

Frisker: A radiation detection device used to check or "frisk" an individual or items for contamination.

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Gamma Ray (Gamma Radiation): High-energy, short wavelength electromagnetic radiation (a packet of energy) emitted from the nucleus. Gamma radiation frequently accompanies alpha and beta emissions and always accompanies fission. Gamma rays are very penetrating and are best stopped or shielded against by dense materials, such as lead or uranium. Gamma rays are similar to x-rays, but are usually more energetic.

General Area Dose Rate: A radiation dose rate measured at 30 cm or more from a surface.

Gray (Gy): The SI unit for absorbed dose: 1 Gy = 1 Joule kg⁻¹ = 100 rad. .

~~Ground Water~~**Groundwater:** Water contained in pores or fractures in either the unsaturated or saturated zones below ground level.

Half-Life, Radioactive: The time required for a radioactive substance to lose 50% of its activity by decay. Each radionuclide has a unique half-life.

Hot Spot: The region in a ~~radiation~~**Radiation/contamination-Contaminated area-Area** in which the level of radiation/ contamination is noticeably greater than in neighboring regions in the area.

In-Storage Instruments: Instruments that are in calibration and that are required to be response tested prior to use.

In-Vitro Bioassay (indirect): The estimation of radioactivity in the human body based upon:


- (1) the measurement of radioactivity in excreta or other materials taken from the body, and
- (2) a biological model for the radionuclide movement in body tissues and organs.

In-Vitro Blind Spike: In-vitro samples comprised of natural or artificial urine with a known quantity of a known radioisotope added to it for the purpose of testing a processing laboratory.

In-Vivo Bioassay (direct): The measurement of radioactivity in the human body using instrumentation which detects radiation emitted from radionuclides in the body.

Indirect Contamination Survey: The method used to measure removable contamination. Indirect survey techniques are:

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- (1) Smear Surveys - A smear is obtained by using an absorbent filter disk to wipe with moderate pressure across the area or item to be evaluated. A smear is usually wiped over an area of 100 cm².
- (2) Wipe Surveys - A wipe is obtained by wiping an absorbent pad or towel over a large area or the entire surface of the item being surveyed.

Individual Monitoring: The assessment of dose equivalent by use of devices designed to be worn by an individual; the assessment of committed effective dose equivalent by bioassay or by determination of the time-weighted air concentrations to which an individual has been exposed; or the assessment of dose equivalent by the use of survey data..

Individual Monitoring Devices: Devices designed to be worn by a single individual for the assessment of dose equivalent. Examples include film badges, thermoluminescence dosimeters (TLD's), pocket ionization chambers, and lapel air samplers.

Inhalation Class: See Class

Instrument: A complete system designed to quantify one or more characteristics of ionizing radiation or radioactive material.

Intake: The amount of radioactive material taken into the body by inhalation, absorption through the skin, injection, ingestion, or through wounds.

Intake Retention Fraction: The fraction of the intake that is retained in the body or organ at time (t) following the intake.


Internal Deposition: Radioactive material that has been taken into and deposited in the body through inhalation, ingestion, absorption through the skin, or through wounds.

Internal Dose: That portion of the dose equivalent received from radioactive material taken into the body.

Isotopes: Nuclides having the same number of protons in their nuclei, but differing in the number of neutrons. Isotopes have the same atomic number and different mass numbers.

Laboratory Standard: An instrument, source, or other system or device calibrated by comparisons with a standard other than that of a U.S. National Standard.

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Lapel Sampler: A portable battery operated air sample pump that is worn by an individual. The sample medium is connected to the pump via a flexible hose.

Learning Objective: A statement that specifies measurable behavior that a trainee should exhibit after instruction, including the stated or implied conditions and standards for performance.

Lens Dose Equivalent (LDE): Dose equivalent due to external exposure to the lens of the eye. It is taken as the dose equivalent at a tissue depth of 0.3 cm (300 mg/cm²).

Lesson Plan: The primary training document of an instructor that outlines content and trainee activities and the resources necessary for the conduct of training in a controlled learning environment.

Licensed Radioactive Material: Source material, special nuclear material, or byproduct material received, possessed, used, transferred or disposed of under a general or specific license issued by the NRC.

License: Means the radioactive materials license issued by the NRC to ~~Cimarron the Trust Corporation~~ to possess and/or use radioactive materials. Other licenses may be issued to ~~Cimarron the Trust Corporation~~ by other state or federal agencies.

Licensee: The holder of the radioactive materials license (~~Cimarron the Trust Corporation~~).


Limits (dose limits): The permissible upper bounds of radiation doses.

Low-Level Radioactive Waste (LLRW): Those low-level radioactive wastes containing source, special nuclear, or by-product material that are acceptable for disposal in a land disposal facility. Low-level waste has the same meaning as in the Low-Level Waste Policy Act: that is, radioactive waste not classified as high-level radioactive waste, transuranic waste, spent nuclear fuel, or by-product material as defined in paragraphs (2), (3), and (4) of the definition of *Byproduct material* set forth in 10 CFR 20.1003.

Lung Class: See Class

Man-hours: The combined number of hours (# of persons x # of hours worked by each person) spent performing a task. For the purposes of this procedure, only the hours spent in areas where the work group members are exposed to radiation are considered.

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Man-Rem: The cumulative radiation dose equivalent received by personnel while performing a job or activity.

Man-Rem Estimate: An estimate of the cumulative dose that will be expended while performing a job or activity, from the start to the finish of that task, based on the expected dose rate in the work area, airborne radioactivity concentrations, the estimated time duration to complete the task, the expected scope of activities, and the historical dose information. The types of activities can also be a factor for calculating a man-rem estimate.

Mass Number (Symbol A): The mass of an atom relative to other atoms. The present basis for the scale of atomic weights is carbon; the most common isotope of this element has arbitrarily been assigned an atomic weight of 12. The unit atomic mass is 1/12 the weight of the carbon-12 atom, or roughly the mass of one proton or one neutron. The atomic weight of any element is approximately equal to the total number of protons and neutrons in its nucleus.

Mean Count: The sum of all count values divided by the total number of counts taken. The mean is a statistical measure of central tendency, a value around which groups of counts tend to cluster.

Member of the Public: An individual who is not receiving an occupational dose.

Micro: A prefix meaning "one millionth" (1 E-06), as in microcurie.


Milli: A prefix meaning "one thousandth" (1 E-03), as in millirem, millirad, or millicurie.

Minimum Detectable Activity: The smallest concentration of radioactivity in a sample that can be detected with a 5% probability of erroneously detecting radioactivity, when in fact none may be present (Type I error) and also, a 5% probability of not detecting radioactivity, when in fact it is present (Type II error). Often used interchangeably with Minimum Detectable Concentration, since the difference between the two terms is only one of units conversion.

Minor: An individual less than 18 years of age.

Monitoring (Radiation Monitoring): The measurement of radiation levels, concentrations, surface area concentrations, or quantities of radioactive material and the use of the results of these measurements to evaluate potential exposures and doses.

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Nano: A prefix meaning “one billionth” (1 E-09), as in nanocurie.

National Standard: An instrument, source, or other system or device maintained and promulgated by the U.S. National Institute of Standards and Technology (NIST formerly NBS).

Nationally tracked source: A sealed source containing a quantity equal to or greater than Category 1 or Category 2 levels of any radioactive material listed in Appendix E of 10 CFR 20. In this context a sealed source is defined as radioactive material that is sealed in a capsule or closely bonded, in a solid form and which is not exempt from regulatory control. It does not mean material encapsulated solely for disposal, or nuclear material contained in any fuel assembly, subassembly, fuel rod, or fuel pellet. Category 1 nationally tracked sources are those containing radioactive material at a quantity equal to or greater than the Category 1 threshold. Category 2 nationally tracked sources are those containing radioactive material at a quantity equal to or greater than the Category 2 threshold but less than the Category 1 threshold.

Negative pressure respirator (tight fitting): A respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

Non-Radiation Worker: An individual who does not perform work with radioactive materials.


Nonstochastic Effect: Means health effects which vary in severity with dose and for which a threshold is believed to exist. Radiation induced cataract formation is an example of a nonstochastic effect.

NRC: Nuclear Regulatory Commission or its duly appointed representatives.

Nuclide: Any one of the approximately 1800 isotopes of all the elements, whether radioactive or not. See radionuclide and isotope.

Occupational Dose: The dose received by an individual in the course of employment in which the individual's assigned duties involve exposure to radiation or to radioactive material from licensed and unlicensed sources of radiation, whether in the possession of the licensee or other person. Occupational dose does not include doses received from background radiation, from any medical administration the individual has received from exposure to individuals administered radioactive material and released under 10 CFR 35.75, from voluntary participation in medical research programs, or as a member of the public.

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Occupational Dose Limit: The maximum legally allowable dose to individuals during a specific time period, as defined by 10 CFR 20.

Organ Burden: The quantity of a radionuclide present in an organ of the human body at a specified time.

Overexposure: Means a radiation dose in excess of the allowed regulatory limit.

Particulate: Sometimes used to describe alpha and beta radiations, but most often used to mean dust or droplets containing radioactive material.

Pico: A prefix meaning "one trillionth" (1 E-12), as in picocurie.

Personnel Monitoring Equipment: Devices designed to be worn or carried by an individual for the purpose of measuring the dose received.

Planned Special Exposure: An infrequent exposure to radiation, separate from and in addition to the annual dose limits.

Posting: A standardized sign or label which bears the standard trefoil radiation symbol in magenta or purple or black on a yellow background and information concerning a specific radiological hazard.


Primary Dosimeter: A device worn by an individual to measure the exposure to radiation to that individual.

Protection Factor (PF): The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the worker. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.

Protective Clothing: Clothing provided to reduce exposure and prevent the spread of contamination to personnel clothing or the body while performing work with radioactive materials.

Public Dose: Dose received by a member of the public from exposure to radiation and radioactive material released by ~~Cimarron the Trust Corporation~~, or to another source of radiation either within ~~Cimarron the Trust Corporation's~~ controlled areas or in ~~unrestricted-area~~ Unrestricted Areas. Public dose does not include occupational dose or

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doses received from background radiation, as a patient from medical practices, or voluntary participation in medical research programs.

Qualification: Certification of the fact that an individual possesses the knowledge, capabilities (e.g., physical) characteristics, or abilities gained through experience, training, or on-the-job training that an individual can perform a required task.

Qualified Escort: An individual that meets the Qualified Escort training requirements set forth in Radiation Protection Procedure CIM-RP-14, "Training".

Qualified Individual: An individual who has completed the training and or testing requirements set forth by procedures or regulations, which in turn grants that individual permission to operate specific equipment, instrumentation, or work duties.

Qualified Respirator User: An individual who has successfully completed all requirements for the use of a respiratory protection device.


Qualitative Respirator-Fitting Test: A pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

Quality Factor (Q): The modifying factor (listed in tables 1004(b).1 and 1004(b).2 of 10 CFR 20.1004) that is used to derive dose equivalent from absorbed dose.

Quantitative Respirator-Fitting Test: A person wears a respirator in a test atmosphere containing a test agent in the form of an aerosol, vapor, or gas. Instrumentation samples the test atmosphere and the air inside the respiratory-inlet covering of the respirator and is used to measure quantitatively the penetration of the test agent into the respiratory-inlet covering.

Rad: The special unit of radiation dose. One rad is equal to an absorbed dose of 100 ergs/gram or 0.01 joule/kilogram (0.01 gray).

Radiation (Ionizing Radiation): Alpha particles, beta particles, gamma rays, x-rays, neutrons, high-speed electrons, high-speed protons, and other particles capable of producing ions. Radiation, as used within the context of the Radiation Protection Program does not include non-ionizing radiation such as radio or microwaves and visible, infrared, or ultraviolet light.

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Radiation Area: Defined as any accessible area where the dose equivalent to an individual could exceed 5 millirem (.05 mSv) in any one hour at 30 cm from the radiation source or surface that radiation penetrates.

Radiation Safety Officer (RSO): The individual responsible for development and oversight of radiation protection program policies at the Cimarron ~~facility~~Site. This individual shall meet the requirements set forth in NUREG-1757, Section 17.2.3.1.

Radiation Worker: An individual who has access to the restricted areas to perform work and has completed the training requirements listed in CIM-RP-14.

Radioactive Material (49 CFR 173.403): For purposes of transportation, any material containing radionuclides where both the activity concentration and the total activity in the consignment exceed the values specified in the table in 49 CFR 173.436 or values derived according to the instructions in 49 CFR 173.433.

Radioactive Materials Area: Any area or room which is posted and is used to store or contains for use an amount of licensed material exceeding 10 times the quantity of such material as listed in Appendix C to 10 CFR 20.

Radiologically Controlled Area (RCA): See Restricted Area.

Radiological Occurrence Report (ROR): A report generated to document the facts, record the apparent and/or root cause, track the resolution and aid in trending radiological exposure events.


Radionuclide: Any one of the radioactive nuclides.

Record: A document that provides evidence of the quality of services performed, demonstrates that actions were performed in accordance with radiation protection procedures, or demonstrates conformance of actions to regulatory requirements.

Reference Man: A hypothetical aggregation of human physical and physiological characteristics arrived at by international consensus. These characteristics may be used by researchers and public health workers to standardize results of experiments and to relate biological insult to a common base.

Regulated Material: Radioactive material that may not be handled, transported, or disposed of without a license from the NRC.

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Rem: The special unit for any of the quantities expressed as dose equivalent. The dose equivalent in rems is equal to the absorbed dose in rads multiplied by the quality factor (1 rem = 0.01 sievert).

Removable Contamination: See Contamination

Residual radioactivity: Radioactivity in structures, materials, soils, groundwater, and other media at a site resulting from activities under the licensee's control. This includes radioactivity from all licensed and unlicensed sources used by the licensee, but excludes background radiation. It also includes radioactive materials remaining at the site as a result of routine or accidental releases of radioactive material at the site and previous burials at the site, even if those burials were made in accordance with the provisions of 10 CFR Part 20.

Respirator: An apparatus used to reduce the individual's intake of airborne radioactive materials


Respirator Sealing Tests: To ensure proper protection, the wearer of a respirator equipped with a facepiece shall check the seal of the facepiece prior to each entry into a hazardous atmosphere. This may be done using procedures recommended by respirator manufacturers or by negative pressure or positive pressure seal test.

Response Time: The time interval required for the instrument reading to change from 10% to 90% of the final reading (or vice versa) following a step change in the radiation field (i.e., signal) at the detector.

Restricted Area: An area having access controlled by [Cimarron the Trust](#) for the purpose of protecting individuals against undue risk from exposure to radiation and radioactive materials. Restricted area does not include areas used as residential quarters, but separate rooms in a residential building may be set apart as a restricted area.

Sealed Source: Any by-product material that is encased in a capsule designed to prevent leakage or escape of the by-product material.

Self-contained breathing apparatus (SCBA): An atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

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Shallow Dose Equivalent (SDE): The dose equivalent at a tissue depth of 0.007cm (7mg/cm²), averaged over an area of one square centimeter. It applies to external exposure of the skin of the whole body or of an extremity.

Sievert (Sv): The SI unit of any of the quantities expressed as dose equivalent. The dose equivalent in sieverts is equal to the absorbed dose in grays multiplied by the quality factor. 1 Sv = 100 rem.

Site Decommissioning Management Plan (SDMP): The program established by NRC in March 1990 to help ensure the timely cleanup of sites with limited progress in completing the remediation of the site and the termination of the facility license. SDMP sites typically have buildings, former waste disposal areas, large volumes of tailings, ground-water contamination, and soil contaminated with low levels of uranium or thorium or other radionuclides.

Site Boundary: The line beyond which the land or property is not owned, leased, or otherwise controlled by [Cimarron the Trust Corporation](#).

Skin Dose Factor: A factor which gives the skin dose rate to the skin at a depth of 0.007 cm from a unit level of contamination on the skin or clothing measured in cpm with a pancake type G-M detector.

Skin of the Whole Body: The skin of the whole body, exclusive of skin of the extremities.


Smear: A radiation survey technique which is used to determine levels of removable surface contamination. A medium (typically filter paper) is rubbed over a surface (typically of area 100 cm²), followed by a quantification of the activity on the medium. Also known as a swipe.

Smearable Contamination: Radioactive material which can easily be removed from a surface (e.g. soap and water, light brushing, wiping).

Source Material:

- (1) Uranium or thorium or any combination of uranium and thorium in any physical or chemical form; or
- (2) Ores that contain, by weight, one-twentieth of 1 percent (0.05 percent), or more, of uranium, thorium, or any combination of uranium and thorium. Source material does not include special nuclear material.

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Special Nuclear Material:

- (1) Plutonium, uranium-233, uranium enriched in the isotope 233 or in the isotope 235, and any other material that the Commission, pursuant to the provisions of section 51 of the Act, determines to be special nuclear material, but does not include source material; or
- (2) Any material artificially enriched by any of the foregoing but does not include source material.

Special Work Permit (SWP): A document which specifies the controls required for protection of workers while performing jobs or tasks and may involve radioactive and/or hazardous materials. SWPs require specific training and acknowledgment of content prior to entry into areas covered by the SWP.

Stochastic Effects: Health effects that occur randomly and for which the probability of the effect occurring, rather than its severity, is assumed to be a linear function of dose without threshold. Hereditary effects and cancer are examples of stochastic effects.

Supplied-air respirator (SAR) or airline respirator: An atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

Survey: An evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive materials or other sources of radiation. When appropriate, such an evaluation includes a physical survey of the location of a source of radiation and measurements or calculations of levels of radiation or concentrations or quantities of radioactive material present.


Thermoluminescent Dosimeter (TLD): An integrating detector where radiation energy is absorbed (trapped) and can be read out later by thermal excitation of the detector.

Time Weighted Average (TWA): Refers to the time weighted average concentration for a normal 8 hour workday and a 40 hour workweek.

Total Effective Dose Equivalent (TEDE): The sum of the deep dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures).

Total Organ Dose Equivalent (TODE): The sum of the deep dose equivalent and the committed dose equivalent to the organ receiving the highest dose.

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Trained Individual: See Qualified Individual

Unrestricted Area: Any area to which access is not limited or controlled for purposes of protection of individuals from exposure to radiation and radioactive materials.

Uptake: Quantity of a radionuclide taken up by the systematic circulation (e.g., by injection into the blood, by absorption from compartments in the respiratory or gastrointestinal tracts, or by absorption through the skin or through wounds in the skin).

Uranium (Natural, Depleted and Enriched):

Natural Uranium: Uranium found in nature. Natural uranium contains 0.71 weight percent U-235, 99.3 weight percent U-238, and a trace of U-234.

Depleted Uranium: Uranium in which the U-235 isotope represents less than 0.71 weight percent of the mass of the material. Depleted uranium is less radioactive than natural uranium.

Enriched Uranium: Uranium in which the U-235 isotope represents greater than 0.71 weight percent of the mass of the material. The alpha emission rate increases from 1.5 E3 dpm per mg at 0.71 weight percent enrichment to 1.4 E5 dpm per mg at 93% enrichment.

Visitor: An individual who is not an employee or contractor of [Cimarron the Trust Corporation](#).

Week: Seven consecutive days starting on Sunday.


Weighting Factor (W_T): The proportion of risk of stochastic effects resulting from irradiation of the organ or tissue to the total risk of stochastic effects when the whole body is irradiated uniformly.

Whole Body (WB): Means, for purposes of whole body exposure, the head, trunk (including male gonads), arms above the elbow, or legs above the knee.

Year: The period of time beginning on January 1 and ending on December 31 that is used to determine compliance with the NRC.

X-Ray: Penetrating electromagnetic radiation having a wavelength much shorter than that of visible light. X-rays are usually produced by a excitation of the electron field around certain nuclei. In nuclear reactions, it is customary to refer to photons originating in the electron field of the atom as X-rays.

This document must be verified with a Controlled Copy prior to use

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	Radiation Protection Plan	
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17.0 REFERENCES

1. 10 CFR 19, "Notices, Instructions and Reports to Workers; Inspection and Investigations"
2. 10 CFR 20, "Standards for Protection Against Radiation"
3. 10 CFR 30, "Rules of General Applicability to Domestic Licensing of By-Product Material"
4. 10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Waste"

5. 10 CFR 70, "Domestic Licensing of Special Nuclear Material"

5-6. NUREG-1556, Vol. 7, "Consolidated Guidance About Materials Licenses, Program-Specific Guidance About Academic, Research and Development, and Other Licenses of Limited Scope Including Gas Chromatographs and X-Ray Fluorescence Analyzers," Appendix L, "Sample Audit Program"

Comment [JJM13]: Added reference specifically cited in RPP.

6-7. NUREG 1757, "Decommissioning Process for Materials Licensees"

8. NCRP 87-1987, "Use of Bioassay Procedures for Assessment of Internal Radionuclide Deposition"

9. Regulatory Guide 4.15, "Quality Assurance for Radiological Monitoring Programs (Normal Operations) - Effluent Streams and the Environment."

Comment [JJM14]: Added reference specifically cited in RPP.

7-10. Regulatory Guide 8.25, "Air Sampling in the Workplace"

Comment [JJM15]: Added reference specifically cited in RPP.

11. ~~Cimarron~~The Cimarron Environmental Response Trust ~~Corporation~~ Special Nuclear Material License (SNM-928)

8-12. Order Transferring License No. SNM-928 for the Cimarron Site