

Blue Ridge Landfill Waste Characterization Plan

**Advanced Disposal Services
Blue Ridge Landfill
2700 Winchester Road
Irvine, KY 40336**

July 27, 2016

**Prepared by:
Chase Environmental Group, Inc.
109 Flint Road
Oak Ridge, TN 37830
865-481-8801**

TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	PROJECT MANAGEMENT AND ORGANIZATION.....	1
2.1	Chase’s Corporate Radiation Safety Officer (CRSO)	1
2.2	Director, Radiological Services (DRS)	2
2.3	Field Services Manager (FSM)	2
2.4	Project Manager (PM)	2
2.5	Radiation Control Supervisor (RCS).....	3
2.6	Radiation Control Technicians (RCTs)	4
2.7	Radiation Workers (RWs)	4
2.8	Chase Corporate Project Support	4
3.0	PROJECT TASK MANAGEMENT	4
3.1	Radiation Work Permits (RWP).....	5
4.0	PROJECT TRAINING REQUIREMENTS	5
4.1	Radiological Training.....	5
4.2	Project Specific Training	6
4.3	General Safety Briefings	6
4.4	Transportation Training.....	6
5.0	RADIATION PROTECTION PROGRAM.....	6
5.1	Exposure Control.....	6
5.1.1	Engineering Controls.....	7
5.1.2	Administrative Controls	7
5.1.3	Source Control.....	7
5.1.4	Personal Protective Equipment.....	7
5.2	Notifications	7
5.3	Dosimetry	8
5.4	Air Sampling Program.....	8
5.4.1	Breathing Zone Air Samples	9
5.4.2	General Area Air Samples.....	9
5.4.3	High Volume Air Samples	9
5.4.4	Effluent Monitoring Air Samples	9
6.0	OCCUPATIONAL HEALTH AND SAFETY PROGRAM.....	9
7.0	QUALITY ASSURANCE	9
7.1	Quality Assurance Policy	10
7.2	Quality Assurance Goals	10
7.3	Chase Project Management Policy	10
7.4	Project Organization.....	11
7.5	Training Requirements	11
7.6	Quality Objectives and Criteria for Data Measurement	11
7.6.1	Sample Handling and Custody	11
7.6.2	Analytical Methods	12
7.6.3	Data Collection.....	12
7.7	Instrument/Equipment Testing, Inspection, and Maintenance Requirements	12
7.7.1	Instrument Functional Checks	12
7.7.2	Instrument Calibration and Frequency	13
7.8	Document Control and Quality Assurance Records.....	13
7.9	Nonconformance Control and Corrective Action.....	13
7.10	Quality Assurance Audits.....	14
7.11	Data Quality Assessment (DQA)	14
7.12	Data Verification	14

7.13 External Laboratory Data Validation 15
8.0 SURVEY AND SAMPLE ACTIVITIES 15
8.1 Soil Sampling 15
8.2 Air Sampling 15
9.0 IN-PROCESS SURVEYS 15
10.0 SURVEY INSTRUMENTATION 16

TABLES

Table 12-1: Instrumentation 16

ACRONYMS

ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
COC	Chain of Custody
CRSO	Chase Corporate Radiation Safety Officer
DAC	Derived Air Concentration
DRS	Director of Radiological Services
DQA	Data Quality Assessment
EPA	Environmental Protection Agency
FSM	Field Services Manager
HEPA	High Efficiency Particulate Air
MDC	Minimum Detectable Concentration
NRC	U.S. Nuclear Regulatory Commission
NIST	National Institute of Standards and Technology
PM	Project Manager
PPE	Personal Protective Equipment
QA	Quality Assurance
RCRA	Resource Conservation and Recovery Act
RCS	Radiation Control Supervisor
RCT	Radiation Control Technician
RPP	Radiation Protection Program
RSM	Radiation Safety Manual
RSO	Radiation Safety Officer
RW	Radiation Worker
RWP	Radiation Work Permit
TENORM	Technically Enhanced Naturally Occurring Radioactive Material
TLD	Thermoluminescent Dosimeter

1.0 INTRODUCTION

Advanced Disposal Services (ADS) is conducting a Site Investigation at their Blue Ridge Landfill located in Irvine, KY. The focus of the investigation is an area which coincides with where specific shipments of alleged Technically Enhanced Naturally Occurring Radioactive Material (TENORM) were buried. Site surveys identified an area of elevated surface activity outside the area where the alleged TENORM disposals took place.

ADS contracted Chase Environmental Group, Inc. (Chase) to characterize the area of elevated activity to develop a profile for disposal. Project activities will be conducted under the Chase Commonwealth of Kentucky Radioactive Materials License 201-605-15 and in accordance with this Plan. On-site activities are expected to be conducted on Wednesday July, 27, 2016, weather permitting. If there is a schedule change, Chase will notify the Cabinet.

The goals of this plan are to estimate the volume of materials and characterize the material for radioactivity and any Resource Conservation and Recovery Act (RCRA) concerns.

2.0 PROJECT MANAGEMENT AND ORGANIZATION

2.1 Chase's Corporate Radiation Safety Officer (CRSO)

The CRSO is responsible for the management of the radiation protection program and for directing the program to limit occupational radiation exposures to levels that are ALARA. The CRSO is also responsible for the development and implementation of a program for monitoring project activities and conditions to determine their status of compliance with the radioactive materials license and relevant regulations. The CRSO reporting chain is separate from the project and site management reporting chain. In this independent role, the CRSO provides a mechanism by which any worker can report potentially unsafe conditions or safety concerns. The CRSO will promptly assess and resolve any reported concerns. The CRSO will have access to all levels of operational management as necessary for execution of the CRSO duties. The CRSO has the authority to immediately terminate any activity that is found to be an imminent threat to health, safety, or property, or that is likely to violate the license conditions or radiation safety program requirements, and this authority cannot be revoked. Specific duties of the CRSO include, but are not limited to, the following:

- Establishing company policy to comply with state and federal statutes, rules, regulations, and license conditions regarding occupational safety and health

- Providing selection criteria for equipment, supplies, and services for radiological work and personnel exposure monitoring
- Establishing standards for personnel protection to assure that exposures to ionizing radiation and radioactive contamination are ALARA
- Implementing the radiological control and safety audit program
- Ensuring the quality of protective equipment for personnel and prescribing usage standards
- Establishing procedures for radiological protection and monitoring, including the ALARA program

Chris Echterling is the CRSO and can be reached at 865-603-2618.

2.2 Director, Radiological Services (DRS)

The DRS reports to the Chase Board of Directors and is responsible for providing corporate and technical support to field projects including health physics, occupational safety, legal and/or administrative support. The DRS may choose to provide these support capabilities through permanent staffing or by subcontracting through outside organizations.

The DRS is also responsible to ensure projects are completed under the direction of Project Managers in full compliance with the requirements of all applicable licenses, permits, and regulations.

John O'Neil is the DRS and can be reached at 865-384-7555.

2.3 Field Services Manager (FSM)

The FSM directs all aspects of operations including radiological activities. The FSM establishes policies and procedures to assure regulatory compliance and oversees all aspects of health physics operations to ensure regulatory compliance and adherence to the ALARA principle. As the alternate Radiation Safety Officer, the FSM will act as RSO in the absence of the RSO named on the license.

The FSM is responsible for assigning PMs to individual projects and for providing technical support to projects. Technical support encompasses health physics, occupational safety, and /or administrative support. The FSM reports to the DRS.

Dave Culp is the FSM and can be reached at 865-207-3664.

2.4 Project Manager (PM)

The Project Manager is responsible for project operations from initiation through completion. The PM's duties include the following:

- Maintaining compliance with conditions of site operating licenses, permits, rules, and regulations
- Maintaining working conditions which assure health, safety, and protection for all employees and visitors
- Providing physical examinations for employees as required by company policy, local, state, and federal regulations
- Ensuring that employees are instructed regularly, or as required by law, on precautions, procedures, and practices to be followed to minimize exposure to radioactive materials and to conduct operations safely
- Notifying the CRSO, applicable State agency or the NRC, promptly, of any operation or condition which appears to present a radiological hazard to employees, the public, or the environment
- Furnishing proper personnel protective equipment, ensuring that employees are instructed in its proper use, and enforcing rules for the equipment's utilization
- Ensuring that sufficient staffing for the project is present and consists of individuals able to conduct daily operations in compliance with regulatory requirements and to maintain a safe working environment
- Maintaining project radiation exposures ALARA.

Mike Culp is the PM and can be reached at 865-850-2767.

2.5 Radiation Control Supervisor (RCS)

RCS reports directly to the PM and is responsible for the implementation of the Radiation Protection Program (RPP) at the project. Responsibilities may include but are not limited to the following:

- Monitoring site conditions to ensure compliance with the RPP and the Chase Radioactive Materials License
- Determining appropriate personal protective equipment (PPE)
- Ensuring that the CRSO is notified of conditions or situations that present a radiological hazard, concern, or exceed limitations set forth in the RSM or applicable procedures and work plans
- Issuing and maintaining RWPs
- Maintaining records related to the RPP in an auditable condition for the duration of the project.

Due to the limited scope of the project, the PM will be the RCS.

2.6 Radiation Control Technicians (RCTs)

RCTs report to the RCS and act as the RCS's representatives in specifically implementing the RPP. Responsibilities may include but are not limited to the following:

- Performing and documenting radiological surveys
- Maintaining, inspecting, and performing operational checks of field instrumentation
- Identifying and controlling radiation protection hazards
- Performing job coverage duties, (i.e., surveys, contamination control, air sampling, sample analysis, environmental sampling, custody control, etc.).

2.7 Radiation Workers (RWs)

Radiation Workers are responsible for performing removal/remediation activities and removing, packaging and transporting waste to the appropriate waste stream. Specific aspects of RW duties include:

- Conducting work according to RCT instructions and in compliance with all project and site radiological controls, industrial safety, industrial hygiene and quality requirements
- Possessing a working knowledge of emergency procedures, location of evacuation routes, and ability to readily contact the appropriate emergency response personnel
- Reporting all deficiencies, non-conformances, or suspected procedure violations to the RCT, RCS, or PM
- Issuing stop work orders when work practices or conditions have or may lead to unsafe conditions.

2.8 Chase Corporate Project Support

The project will be supported by corporate personnel that will provide input and oversight to project activities to ensure that operations are conducted in strict accordance with all health physics, industrial safety and health, industrial hygiene, quality assurance, human resources, accounting, and administrative requirements.

3.0 PROJECT TASK MANAGEMENT

Project activities will be conducted under the provisions of the Chase radioactive materials license and in accordance with this Plan. Activities will be conducted in accordance with written and approved procedures, radiation work permits (RWP), and/or survey packages to ensure adequate worker protection and to comply with the radioactive materials license and this Plan.

3.1 Radiation Work Permits (RWP)

RWPs will be prepared, reviewed and authorized in accordance with the RWP procedure that addresses request, initiation, development, issuance, and termination of an RWP. The RWP contains the location and description of the task to be performed, expected contamination and radiation levels, radiological monitoring requirements, Personal Protective Equipment (PPE) requirements, and special work instructions necessary to complete the work in a safe and compliant manner.

RWP development will include specific identification of the radiological conditions and radiological protection requirements (e.g. clothing, respiratory protection, dosimetry, monitoring, and training). Also, hold points and special instruction may be described on the RWP. The RWP form contains items such as the job description, location, known radiological conditions, protective clothing requirements, respiratory protection, dosimetry, training, health physics monitoring requirements, and any other special instructions. RWP development also includes creating a sign-in/out sheet for use by the authorized users. After development, the RWP must be approved for issuance by the RCS. Issuance includes a review of the RWP with the authorized users, as required. A pre-job meeting may also be prerequisite to issuance of the RWP.

During use, a copy of the RWP will be maintained at the worksite, and authorized users will be required to sign-in/out when participating in the subject activity, indicating their understanding of the requirements of the RWP. RWPs will be terminated upon completion of the activity by signature on the RWP and completion of a form indicating the reason for termination and confirmation of final radiological survey of the activity or area. Upon termination of the RWP, the RWP package will be completed and filed. The package generally contains the completed RWP, sign-in sheets, applicable radiological surveys, and any other documents pertinent to the job. If radiological conditions or requirements change, appropriate changes to the RWP may be made by the RCS or designee. Alternatively, a new RWP may be issued.

4.0 PROJECT TRAINING REQUIREMENTS

ADS will provide personnel with site specific Contractor HSE/Site Orientation Training. Chase will provide all project personnel with radiation worker training required by the radioactive materials license, as well as training for project-specific programs, plans, and procedures.

4.1 Radiological Training

Radiological training will be completed and documented in accordance with the Section 7 of the Chase Radiation Safety Manual (RSM) and Chase license

requirements. The PM will maintain a copy of each individual's certification on site in the project file.

4.2 Project Specific Training

Prior to project start-up, personnel will attend an initial project-specific training session conducted by the PM. The training session will include the following items:

- Review of the Plan
- Discussion regarding the scope of work and planned work activities
- Review of chemical, physical, and radiological hazards associated with the project
- Discussion of posting requirements
- Types and use of available personal protective equipment
- Project security control and operational work zones
- Emergency response and site evacuation procedures
- Project communications
- General safe work practices
- Data quality and chain of custody procedures
- Review of applicable regulatory standards as applied to project operations

4.3 General Safety Briefings

General safety meetings will be held by the PM at the beginning of each work shift. The purpose of these meetings will be to discuss project status, potential problem areas, general safety concerns, and to reiterate project requirements. Additional meetings will be held if conditions warrant.

4.4 Transportation Training

Persons who prepare hazardous materials for transportation or are otherwise responsible for safely transporting hazardous material will be trained in accordance with the requirements of 49 CFR 172, Subpart H.

5.0 RADIATION PROTECTION PROGRAM

The radiation protection program (RPP) will be implemented commensurate with the scope and extent of licensed activities at the site. This program and associated operating procedures are the primary means used to administratively establish safe radiation work practices and ensure compliance with regulatory requirements. The following sections provide a description of the primary elements that will be used to realize this commitment.

5.1 Exposure Control

Personnel exposure to radioactive material will be controlled by application of engineering, administrative, and personnel protection provisions in the order of priority listed below.

5.1.1 Engineering Controls

Engineering controls will be used, as practicable, to minimize or prevent the presence of uncontained radioactive material. Appropriate controls will be specified in the RWP to control airborne particulate radioactivity and fugitive dusts during invasive activities.

5.1.2 Administrative Controls

Administrative controls will be used to control work conditions and work practices and are predominantly comprised of the following:

- *Access Control:* Routine access to work areas will be limited to personnel necessary to accomplish tasks or activities. Access will also be controlled with respect to training and use of specified personnel protection equipment.
- *Postings and Barriers:* Postings will be used to inform personnel of relevant hazards or conditions and associated access requirements. Barriers will be used to prevent unauthorized access. Due to the site layout, Chase plans to use personnel to guard the area and control access.
- *Procedures:* Written procedures will be used to describe specific radiation protection requirements necessary for safe performance of tasks.
- *Radiation Work Permits:* RWPs will be used to describe specific or special worker protection requirements for specific activities involving radioactive material

5.1.3 Source Control

Action levels and limits for radiation surveys will be used to control the levels of radioactivity on equipment and in areas. These limits will be communicated via procedures, RWPs, and/or survey packages.

5.1.4 Personal Protective Equipment

Personal protective equipment will be used to control personnel exposure to radioactive material when administrative controls are not sufficient and engineering controls are not effective or practical. Personal protective equipment may include clothing, gloves, protective shoes or shoe covers, eye protection, and/or respiratory protection. Engineering controls are expected to be sufficient to control airborne radioactivity levels.

5.2 Notifications

Project personnel will notify the RSO of conditions or situations that present a radiological hazard, concern or exceed limitations set forth in this Plan or the

radiation protection program. The RSO will then make notifications to the Cabinet as required.

5.3 Dosimetry

Radiation doses from internal and external sources are expected to be well below 10% of the occupational dose limits, so external and internal dosimetry procedures are not expected to be required. However, Radiation Workers will be monitored for external doses by thermoluminescent dosimeter (TLD) and internal doses by air sampling and/or bioassay. The RWP process includes an analysis of the requirements for dosimetry monitoring, air sampling, and respiratory protection.

Results of internal and external monitoring shall be used to calculate total organ dose equivalent and total effective dose equivalent to workers for which monitoring is required.

5.4 Air Sampling Program

Concentrations of radioactive material in air will be determined by sampling. Air samples will be collected under known physical conditions (e.g., sample time, flow rate). Air sampler flow meters will be calibrated at least annually and following repair and/or modification.

Airborne particulate sampling will be performed during invasive work to assess the potential for internal exposures.

Following air sample collection, the filter media will be counted for radioactivity and then stored for decay of short-lived radon progeny before recounting to achieve required sensitivity. If airborne radioactivity levels indicate that assignment of internal dose may be required, the RSO will make the dose assessment based on actual nuclide distribution data. This may be performed using isotopic concentrations of solid samples obtained during characterization or by isotopic analysis of air sample filters from each area. Bioassays are not expected to be performed unless air sampling indicates a potential to exceed 10% of the internal dose limit.

The RSO shall apply professional judgment and experience to identify air sampling appropriate for the specific situation. Such judgment will be based on historical air sampling and characterization results, quantity of material being handled, potential for release of contaminants based on physical form and activity, type of confinement or containment, and other factors specific to the activity.

The air sampling program may consist of worker breathing zone air samples, general area samples, high volume air samples, and effluent monitoring air samples,.

5.4.1 Breathing Zone Air Samples

Breathing zone air samples (belt mounted pump with sample head affixed to worker's lapel) will be the primary method of monitoring the worker's intake of radioactive material.

5.4.2 General Area Air Samples

Air samples will be collected from general and localized areas when and/or where there is potential for generation of airborne radioactive material. These samples will be used to verify that engineering controls are effective, and provide warning of elevated concentrations for planning or response actions. In each case, the sampling point will be located in the airflow pathway near the known or suspected release point(s). As necessary, more than one air sample location may be used in order to provide a reasonable estimate of the general concentration of radioactive material in air.

5.4.3 High Volume Air Samples

High volume air sampling may be used to obtain sufficient detection sensitivities for nuclides with low DAC values during short duration activities or to estimate radon concentrations by measuring the concentrations of particulate progeny.

5.4.4 Effluent Monitoring Air Samples

General area air samples will be collected at effluent release locations and in the vicinity of outdoor activities as necessary to verify that any radioactive materials released to the environment meet the effluent concentration limits of 10 CFR 20, Appendix B, Table 2, Column 1.

6.0 OCCUPATIONAL HEALTH AND SAFETY PROGRAM

The project will be performed under the Chase Health and Safety Program, and in accordance with ADS Safety Requirements. In addition, radiological work will be performed according to the Chase radioactive materials license and Radiation Safety Manual under the management and supervision of the RSO.

7.0 QUALITY ASSURANCE

All project activities will be conducted in a manner consistent with selectively applied elements of the Chase Quality Assurance Program.

The QA program is developed and organized with emphasis given to maximizing worker safety, eliminating off-site releases, collecting data that meets the DQOs,

and minimizing overall project costs. QA criteria are applied in a graded manner to achieve a balance between the rigor of application of quality assurance measures and the scale, cost, and complexity of the work involved.

7.1 Quality Assurance Policy

Accountability for quality is the responsibility of every person assigned to the project, extending from the PM through established lines of authority to all project personnel, who are responsible for the requisite quality of their own work. Quality Assurance will be implemented by personnel conducting their activities to meet requirements and expectations according to established plans and procedures that reflect the way business is to be conducted on the project.

All project personnel are responsible for executing their work and ensuring that quality-affecting activities within their purview are performed in conformance with applicable plans and procedures. All personnel have the authority and responsibility to stop his/her own work and the responsibility to report such conditions when continuation will produce or conceal results that are not in accordance with prescribed requirements, and/or pose imminent radiological or safety hazard to employees, the environment, or the general public. Project personnel have sufficient freedom, authority, access, and responsibility to:

- Identify quality problems, deficiencies, nonconformance's, and noncompliance with regulatory and performance objectives
- Initiate, recommend, or provide solutions through designated channels
- Verify implementation of the solutions
- Assure that deficient work is stopped or is proceeding under controlled conditions until proper disposition of the unsatisfactory condition is accomplished
- Identify and report opportunities for continuous improvement

7.2 Quality Assurance Goals

The following quality assurance goals have been established for the project:

- Safely perform the project on time and under budget with no quality defects.
- Perform all activities in full compliance with all applicable state, federal and local regulations.
- Ensure technically defensible data are generated to support a dose assessment to aid in determining whether or not the facility meets the dose criteria

7.3 Chase Project Management Policy

All Chase projects shall be managed in a manner consistent with the agreement between Chase and the Customer; Chase principles, values and organizational

philosophy; and approved Chase standard operating procedures and plans. Our project management policy embodies the basic principles listed below:

- Chase's first priority is cultivating worker and workplace safety.
- Our project team is key to our success.
- Quality is defined as meeting all requirements, including environmental, safety and health regulations.
- Project Managers must have a clear understanding of their responsibility, accountability and limits of authority.
- Project Managers have the responsibility and authority to achieve quality, meet schedules, and budget.
- Project Managers have the responsibility and authority for the technical, contractual and financial aspects of the project.

7.4 Project Organization

The project organization is described in Section 2.0.

7.5 Training Requirements

Project personnel shall be indoctrinated and trained in accordance with the requirements of this plan.

- Indoctrination to the project scope of work shall be provided to all new hire project personnel.
- Project personnel shall be provided sufficient training prior to commencement of the individuals assigned task(s). The extent of training shall be determined by the Project Manager. The extent of training shall be based on the scope, complexity, and nature of the assigned task(s), education, experience, previous training, and proficiency of the individual.
- The training method employed may be one or all of the following:
 - Classroom instruction;
 - Reading assignments;
 - On-the-job; and
 - Practical demonstration
- Education and experience qualifications shall be documented by resume with relevant formal educational training certificates enclosed with the resume.

7.6 Quality Objectives and Criteria for Data Measurement

7.6.1 Sample Handling and Custody

The sample chain-of-custody (COC) maintains the integrity of the sample; that is, there is an accurate record of sample collection, transport, and analysis. This ensures that samples are neither lost nor tampered with, and that the sample

analyzed in the laboratory is actually and verifiably the sample taken from a specific location in the field. Samples sent off-site for analysis will use an approved Chain of Custody Procedure.

Samples will be handled, preserved, and packaged in accordance with procedures specified by an external laboratory for the analyses necessary.

7.6.2 Analytical Methods

Solid samples will be analyzed at an external laboratory. Solid samples will be analyzed by gamma spectroscopy for radioactivity and by EPA, ASTM, or other industry standard methods for potential RCRA hazards.

7.6.3 Data Collection

The data collection process will be defined, controlled, verified, and documented. The general survey approach and methodology is outlined in this Plan. The following activities shall be addressed in the procedures:

- Field sampling methods
- Sample handling and custody
- Analytical operations for bench top laboratory equipment

Procedures shall be of a design which assures data are traceable to the survey and analytical procedures, performance standards, data collectors, analysts and measuring and test equipment.

7.7 Instrument/Equipment Testing, Inspection, and Maintenance Requirements

Radiological instrumentation shall be controlled in accordance with Chase procedures. Instruments shall be calibrated or adjusted in accordance with manufacturer's instructions or by subcontracted licensed calibration facilities. The selection of instruments shall be controlled to ensure that the items are of the proper type, range, accuracy and tolerance to accomplish conformance with specified requirements.

When an instrument is found to be out of calibration or not functioning as expected, evaluations shall be made to assess the validity of the data obtained since the last performance test. This evaluation shall be documented and, if required, processed as a nonconforming condition.

7.7.1 Instrument Functional Checks

Functional checks will be performed at least daily when in use. The background, source check, and field measurement count times for radiation detection instrumentation will be specified by procedure to ensure measurements are statistically valid. Background readings will be taken as part of the daily instrument check and compared with the acceptance range for instrument and site

conditions. If an instrument fails a functional check, all data obtained with the instrument since the last satisfactory check will be evaluated for usability by the PM.

7.7.2 Instrument Calibration and Frequency

Laboratory and portable field instruments will be calibrated at least annually with National Institute of Standards and Technology (NIST) traceable sources, where feasible, and to radiation emission types and energies that will provide detection capabilities similar to the nuclides of concern.

7.8 Document Control and Quality Assurance Records

Project documents shall be reviewed for adequacy and approved by authorized personnel prior to issuance. The document control measures employed shall ensure that only the most current documents are in use during the performance of project activities.

Project documents that have been identified as Quality Assurance Records shall be maintained in accordance with Chase Quality Assurance procedures. Project-specific and supporting Quality Assurance procedures, work instructions, quality plans and other documents which specify quality requirements or prescribe activities affecting quality shall define the required documents or data to be maintained as Quality Assurance Records.

7.9 Nonconformance Control and Corrective Action

All project personnel shall be responsible for notifying their supervisor or the Project Manager of conditions or items that do not meet specified requirements. Project procedures address the following measures:

- Identification or segregation of the nonconformance;
- Documentation of the nonconformance;
- Evaluation of the nonconformance;
- Disposition and justification provisions;
- Notification to affected personnel or organizations, and;
- Verification of disposition

All project personnel are encouraged to identify any activity, process, or procedure that could lead to potential non-conformances or conditions adverse to quality. Corrective Action procedures provide the reporting and evaluation requirements for preventative actions resulting in the elimination of potential quality problems. All non-conformances, corrective actions, and preventative actions shall be documented and maintained in accordance with the appropriate procedures.

7.10 Quality Assurance Audits

The RSO is responsible for planned and periodic audits of project activities. These audits shall be scheduled in a manner that will provide sufficient coverage and coordination of activities throughout the duration of the project. These audits will verify compliance with the requirements specified in this plan, related procedures, plans, and regulatory requirements. These audit activities also provide a mechanism to identify opportunities for continuous improvement.

In addition to this audit activity, the RSO or designee will perform periodic surveillances to monitor and document compliance with this Plan and standard radiological and safety practices.

Identified departures from specified requirements shall be treated as non-conformances and corrected. Management personnel shall take appropriate action to identify root causes, correct deficiencies, prevent recurrences, and determine impacts of audit findings in their area of responsibility. Follow-up actions will be performed as necessary to ensure that appropriate corrective actions have been implemented in a timely manner and are effective.

Due to the short duration of the project, an audit is unlikely.

7.11 Data Quality Assessment (DQA)

All characterization data will undergo a data quality assessment to ensure usability for the intended purpose.

7.12 Data Verification

All data shall be verified and validated. Verification personnel, whether in the line or organizationally independent, have sufficient freedom, authority, access, and responsibility to:

- Identify quality problems, deficiencies in hardware and documentation, and noncompliance with performance objectives.
- Initiate, recommend, or provide solutions through designated channels.
- Verify implementation of the solutions.
- Assure that deficient work is stopped or is proceeding under controlled conditions until proper disposition of the unsatisfactory condition is accomplished.

Field data will be reviewed and validated to ensure:

- Completeness of forms
- The correct type of analyses have been requested from external analytical laboratories

- The detection sensitivity for measurements meets the established data quality objectives; independent calculations will be performed for a representative sample of data sheets and survey areas.
- Instrument calibrations and daily functional checks have been performed accurately and at the required frequency.

7.13 External Laboratory Data Validation

External analytical laboratories will be required to provide their own data validation package for review. The RCS will review the sample data to ensure chain of custody has been preserved, all samples taken having corresponding sample results provided, and limits of detection are at or below criteria specified in this Plan.

8.0 SURVEY AND SAMPLE ACTIVITIES

The types of measurements that may be employed are described below.

8.1 Soil Sampling

Chase will sample subsurface soil to quantify radioactive material content and characterize the material for RCRA hazards. Subsurface sampling will be performed using an excavator. Material will be scanned for radioactivity as it is excavated and samples will be obtained at judgmentally selected locations to define the extent of the material and to conduct representative sampling for waste profiling. Sampling will be performed using a chain of custody procedure for shipment to the off-site laboratory.

8.2 Air Sampling

Air sampling may be performed during invasive activities in accordance with the Chase Radiation Safety Manual as determined by the Project Manager and specified in the RWP.

9.0 IN-PROCESS SURVEYS

Project operations will be conducted to control the spread of contamination and keep personnel exposures ALARA. In-process surveys are conducted in support of project activities to monitor the effectiveness of contamination controls and engineering controls, and to ensure that surrounding areas are not cross-contaminated during removal activities.

Radiological surveys will be performed to describe the radiation types and levels in an area or during a task, to identify or quantify radioactive material, and to evaluate potential and known radiological hazards. In-process surveys will consist of dose rate surveys, airborne radioactivity monitoring, scan surveys, static measurements and removable contamination measurements. Additionally,

personnel and equipment will be surveyed prior to leaving access-controlled areas.

10.0 SURVEY INSTRUMENTATION

The instrumentation used for in-process surveys is summarized in the tables below. Alternate or additional instrumentation with similar detection capabilities may be utilized as needed for survey requirements with RSO approval.

Table 10-1: Instrumentation

Detector Model	Detector Type	Meter Model	Use
Ludlum 44-10	Gamma Scintillation	Ludlum 2221	Gamma Surface Scans
Ludlum 19	Gamma Scintillation	N/A	Exposure Rate Measurements
Bicron MicroRem	Tissue Equivalent Organic Scintillation	N/A	Dose Rate Measurements
Ludlum 44-9	Pancake G-M	Ludlum 2241	Direct Surface Activity Measurements
Ludlum 43-10-1	Dual Alpha Beta	Ludlum 2929	Removable Surface Activity Measurements