



Rocky Mountain Remediation Services, L L C  
protecting the environment

Revision 2

Effective Date: April 15, 1998

# Quality Assurance Program Description (QAPD)

## RMRS-QAPD-001

APPROVED BY *A. Clegg Crawford* *4/15/98*  
Clegg Crawford, RMRS President Date

APPROVED BY *Juan M Hdez. D* *15 APR 98*  
Juan Hernandez, RMRS QA Manager Date

This document supersedes revision 1 of the QAPD, and as a complete re-write, revision bars have not been used

ADMIN RECCRD 1/102



## TABLE OF CONTENTS

<b>RMRS QA Policy</b>	5
1 INTRODUCTION	6
2 PURPOSE	7
3 SCOPE	10
4 RESPONSIBILITIES	10
5 DEFINITIONS	12
6 PROGRAM REQUIREMENTS/IMPLEMENTATION	12
6 1 Quality Assurance Program	13
6 1 1 Requirements	13
6 1 2 Commitments and Origins	13
6 1 3 Mission	14
6 1 4 Management and Organization	14
6 1 5 Principles	15
6 1 6 Graded Approach	16
6 2 Personnel Training and Qualification	16
6 2 1 Requirements	16
6 2 2 Principles	16
6 2 3 Quality Professionals	17
6 3 Quality Improvement	18
6 3 1 Requirements	18
6 3 2 Principles	18
6 3 3 Problem Prevention	19
6 3 4 Surveillance	19
6 3 5 Control of Nonconforming Items and Activities	19
6 3 6 Corrective Action	20
6 3 7 Trend Analysis	20
6 4 Documents and Records	20
6 4 1 Requirements	20
6 4 2 Principles	21
6 4 3 Document Control System	21
6 4 4 Records Administration	22
6 4 5 Computer Software and Hardware	22
6 5 Work Processes	22
6 5 1 Requirements	22
6 5 2 Principles	22
6 5 3 Planning	23
6 5 4 Instructions and Procedures	24
6 5 5 Collection and Evaluation of Environmental Data	24
6 5 6 Maintenance	25
6 5 7 Waste Operations	26
6 5 8 Transportation and Shipment of Waste	26
6 5 9 Decontamination and Decommissioning	26

6 6 Design	27
6 6 1 Requirements	27
6 6 2 Principles	27
6 6 3 Control of Design Processes	27
6 7 Procurement	28
6 7 1 Requirements	28
6 7 2 Principles	28
6 7 3 Procurement Documents	29
6 7 4 Supplier Selection	29
6 7 5 Acceptance of Items and Services	29
6 7 6 Fraudulent Material	29
6 7 7 Identification and Control of Items	30
6 8 Inspection and Acceptance Testing	30
6 8 1 Requirements	30
6 8 2 Principles	30
6 8 3 Receiving Inspection	31
6 8 4 Testing	31
6 8 5 Status Indicators	31
6 8 6 Measuring and Test Equipment	31
6 8 7 Waste Inspection	32
6 9 Management Assessment	32
6 9 1 Requirements	32
6 9 2 Principles	32
6 9 3 Integration	33
6 9 4 Management Assessments	33
6 10 Independent Assessment	33
6 10 1 Requirements	33
6 10 2 Principles	34
7 REFERENCES	34

## APPENDICES

- Appendix 1, TRU Waste Program QA Supplements
- Appendix 2, LLW Program QA Supplements
- Appendix 3, Environmental and Decommissioning Programs QA Supplements
- Appendix 4, QA Program Implementing Documents



Rocky Mountain Remediation Services, L L C  
protecting the environment

## Quality Assurance Program Policy Statement

Rocky Mountain Remediation Services, L L C (RMRS) believes that quality is the result of intelligent management planning, action, and improvement. We will strive to meet the needs and expectations of our customers in the most cost-effective and efficient manner possible.

It is each employee's responsibility to meet the requirements for our products and services, achieve our goals and improve our performance.

Management at all levels are given the responsibility to create a working environment that allows for employee participation in identifying quality problems without fear of reprisal and encourage their participation in identifying opportunities for improving our products and work processes.

The RMRS Quality Assurance Manager is hereby given the responsibility and authority to develop, organize and maintain the RMRS Quality Assurance program and procedures that will provide compliance with this policy. The QA manager has the responsibility and full authority to stop work when necessary to meet contractual requirements, or when further processing would render the quality of a product or service indeterminate.

The Vice-presidents and Directors are hereby given the responsibility and authority to implement the RMRS Quality Assurance Program and procedures.

As President of RMRS, I have overall responsibility for the quality of products and services, and to resolve matters which cannot be resolved by the Quality Assurance Manager, the Director Quality Assurance and Environmental Compliance, and the Vice-presidents. Such resolution will not conflict with established requirements.

*A. Clegg Crawford*  
President  
Rocky Mountain Remediation Services, L.L.C

*4/15/98*  
Date

## 1 INTRODUCTION

Rocky Mountain Remediation Services, L L C (RMRS), as a subcontractor to Kaiser-Hill Company L L C (K-H), is responsible for the waste management, environmental restoration, decommissioning, facilities management, and related engineering and construction activities at the Rocky Flats Environmental Technology Site (Site). The general scope of work is defined and implemented under the provisions of contract no KH00003NS1A.

To meet the contractual obligations and assure that the customers of RMRS are receiving products and services that meet their specifications, RMRS has developed this Quality Assurance Program Description (QAPD) that describes requirements, roles, responsibilities, and methodologies for ensuring compliance with DOE Order 5700 6C, Quality Assurance (Order), and 10 CFR 830 120, Quality Assurance (Rule). Since the Order and Rule are inclusive of the same criteria, RMRS incorporates the requirements into a single QAPD. The primary distinction between the two requirements is the enforcement and applicability. Enforcement is defined in 10 CFR 820 Subpart B and F, which indicates the potential remedies afforded DOE up to and including personal criminal prosecution and fines assessed against the company. From the perspective of applicability, 10 CFR 830 120 applies only to activities with the potential to cause radiological harm. Currently, the following hazard category 2 and 3 facilities, managed by RMRS, are considered nuclear facilities and subject to enforcement action under 10 CFR 830 120 (Ref K-H QA Program document in Site Quality Assurance Manual).

Building 569	Building 664 (Waste Storage/Shipping)
Building 991	750/904 Pads (Mixed Waste Storage)
Building 440	Building 881
Building 886	Building 906 (Waste Storage)
Building 991	Building 771/774
Building 776/777	Building 779

*NOTE The list of hazard category 2 and 3 facilities as defined in DOE Order 5480 23, Nuclear Safety Analysis Reports, and the description of the Master Activity List are provided to describe the primary areas to which 10 CFR 830 120 will apply. Applicability of 10 CFR 830 120 is not limited to hazard category 2 and 3 facilities. The Rule is applicable to activities that have the potential for causing radiological harm, without regard to where the radiological risks occur.*

In addition to the 10 CFR 830 120 applicability to RMRS facilities and activities defined above, RMRS activities with the potential to cause radiological harm are subject to enforcement action under 10 CFR 835. The affected activities, enforceable under both 10 CFR 830 120 and 10 CFR 835, include environmental restoration activities, engineering, construction, decontamination and decommissioning activities, and waste operations activities, as defined in the Site Master Activity List (MAL). As more determinations are made with regard to the applicability of 10 CFR 830 120, and as baseline assessments continue, the RMRS QAPD will be modified to reflect the most current decisions concerning applicability in the specific buildings and activities referenced above.

5/18/98  
J Horz

To meet the waste acceptance criteria and associated requirements of the Waste Isolation Pilot Project (WIPP) and the requirements of Nevada Test Site (NTS), the RMRS QA program is inclusive of controls to meet the requirements of ASME NQA-1. To the maximum extent practical, common management systems are used to satisfy the requirements of both sets of requirements. Table 1, RMRS QA Program Elements Comparison to NQA-1, depicts the alignment between the programs, and where requirements from NQA-1 correspond to the RMRS QA Program. Appendix 1, TRU Waste Program QA Supplements discusses the additional controls that are employed specifically to meet the requirements of NQA-1 within the TRU waste management programs and projects. Equally, Appendix 2, LLW Program QA Supplements discusses the additional controls that are employed specifically to meet the requirements of NQA-1 within the LLW management programs and projects.

To meet the requirements of the Rocky Flats Cleanup Agreement (RFCA), and other state and EPA agreements, the RMRS QA program is inclusive of controls to meet the requirements on ANSI/ASQC-E4. To the maximum extent practical, common management systems are used to satisfy the requirements of both sets of requirements. Table 2, RMRS QA Program Elements Comparison to ANSI/ASQC-E4, depicts the alignment between the programs, and where requirements from E4 are addressed in the RMRS QA Program. Appendix 3, Environmental and Decommissioning Programs QA Supplements discusses the additional controls that are employed specifically to meet the requirements of E4 within environmental and decommissioning programs and projects.

This QAPD will be reviewed annually and revised as necessary by the RMRS Quality Assurance (QA) organization. Generally, this QAPD was developed using, as guidance, 1-C40-QAP-02 01, Preparation of Quality Assurance Program Plans. This QAPD is controlled and distributed under an approved, document control system.

## **2. PURPOSE**

This QAPD defines the requirements, strategy and controls currently employed and implemented by RMRS to consistently deliver products and services that meet or exceed the requirements of customers/stakeholders.

The QAPD serves as a map between the quality requirements discussed above, and the implementing controls employed by RMRS. Currently, RMRS implements a combination of controls established by the integrating management contractor (IMC), the previous contractor, and new controls developed and implemented by RMRS. Appendix 4, QA Program Implementing Documents defines the documents used in implementing the RMRS QA Program. Due to the difference in mission, the program developed and deployed by the previous contractor organization is not specifically aligned or suited to the current and future operational responsibilities of RMRS. Accordingly, RMRS monitors program and project scope for effectiveness of controls and develops and implements changes to those controls as resources are made available. Known infrastructure deficiencies have been identified and corrective actions delineated through implementation plans submitted to K-H and DOE-RFFO (Ref: DOE Correspondence AME TA EDR 08057, November 4 1996), or through corrective action plans submitted to Colorado Department of Public Health and Environment (CDPHE), Nevada Test Site, or the DOE Carlsbad Area Office (CAO). The implementation plans define the required actions, the required budget, and scheduled completion date.

Programmatic deficiencies have been reported through the Plant Action Tracking System for tracking to closure Accordingly, this QAPD does not include further implementation tasks or milestones

**Table 1, RMRS QA Program Elements Comparison to NQA-1**

ANSI/ASME NQA-1		1 Program	2 Personnel Training & Qualification	3 Quality Improvement	4 Documents and Records	5 Work Processes	6 Design	7 Procurement	8 Inspection and Acceptance Testing	9 Management Assessment	10 Independent Assessment
Organization		●	●	●	●	●	●	●	●	●	●
QA Program		●	●	●	●	●	●	●	●	●	●
Design Control								●			
Procurement Doc Control					●	●					
Instc, Proced, and Draw					●			●			
Document Control								●			
Control of Purchased Serv						●					
Ident of Controlled Items						●					
Control of Processes								●	●		
Inspection								●	●		
Test Control						●		●	●		
Control of M&TE						●					
Handling, Storage, Shipping								●	●		
Insp, Test & Oper Status				●							
Contr of Nonconform Items				●							
Corrective Action					●						
Records										●	●
Audits											
Software Quality Assurance											●

Legend ● Corresponding Requirements, But in Some Cases, Not Specifically The Same



### 3. SCOPE

This QAPD is relevant and applicable to the specific operations of RMRS and its subcontractors, and where applicable, to the interface controls between RMRS and K-H, and between RMRS and other K-H subcontractors

RMRS shall execute all work assigned in the areas of environmental restoration (ER), waste management (WM), related engineering and construction, decontamination and decommissioning, facility maintenance/operations, and such other related activities as directed by the K-H Contracting Officer, provided sufficient funds are made available. As required, RMRS organizations will develop Letters of Intent, or other agreement based documentation, to state agreed upon methods for interfacing and for delivery of products and services between K-H and other subcontractor organizations

### 4. RESPONSIBILITIES

Additional responsibilities may be identified in program specific management plans and project specific quality documents (TRU Waste Management Plan, LLW Management Plan, etc )

- 4.1 The RMRS President is responsible for
- Establishing overall policy and management direction for the RMRS QA Program
  - Serving as the final decision authority for QA issues which cannot be resolved at lower management levels
  - Ensuring that contract modifications are formally reviewed to determine RMRS capabilities and effectiveness in meeting contract change
- 4.2 The RMRS Vice Presidents are responsible for
- Providing funding necessary to implement all the elements of the RMRS QA Program,
  - Developing, implementing and assessing controls to meet QA Program requirements applicable to RMRS work,
  - Implementing the RMRS quality assurance policy and program,
  - Providing leadership for implementing process and quality improvement, and
  - Defining and implementing training and qualification requirements for subordinate employees
- 4.3 All RMRS Directors and Management are responsible for
- Providing resources necessary to implement the QA Program,
  - Ensuring timely QA involvement in project/program planning, including budget and document reviews,
  - Complying with Site infrastructure, including quality, Price Anderson Amendments Act (PAAA), and corrective action systems,
  - Ensuring that QA and PAAA requirements are incorporated in documents that govern quality affecting activities, and the procurement of items and services,
  - Ensuring timely corrective action for identified quality problems and improvement opportunities,
  - Ensuring that applicable QA requirements are passed down to lower tier sub-contractors, as appropriate,

- Providing timely response to requests for reviews of documents controlling quality affecting activities,
  - Ensuring that their employees and subcontractors are trained, qualified, and competent to complete activities assigned, before initiating the work,
  - Performing management assessment responsibilities, and
  - Ensuring the effective implementation of business service and finance controls
- 4 4 The Director, Program Compliance, is responsible for
- Developing and providing compliance training,
  - Coordinating Radiological Technician qualifications and scheduling,
  - Directing the RMRS Radcon Program,
  - Directing the RMRS Fire Safety Program,
  - Directing the RMRS Nuclear Safety Program,
  - Directing the RMRS Criticality Safety Program,
  - Directing the RMRS Authorization Basis Program,
  - Directing the RMRS Occurrence Reporting Program
  - Directing the RMRS Lessons Learned Program,
  - Directing the RMRS Operational Review Committee (ORC) program,
  - Serving as the RMRS point-of-contact for PAAA issues, and
  - Assisting line organizations in developing PAAA notifications, responses, inspections, investigations and reports
- 4 5 The RMRS General Counsel, is responsible for
- Advising RMRS management concerning PAAA issues,
  - Participating in reviews of training materials related to PAAA,
  - Negotiating with K-H on inter-company PAAA issues,
  - Defending the company in PAAA investigations and enforcement actions, and
  - Assisting line organizations in PAAA fact findings, and investigations
- 4 6 The RMRS Director, Quality Assurance and Environmental Compliance is responsible for
- Providing resources to the QA organization necessary to implement QA Program responsibilities, and
  - Providing direction and guidance on QA program development and implementation
- 4 7 The Manager, RMRS Quality Assurance, is responsible for
- Developing, preparing and maintaining the RMRS QA Program to meet the requirements of 10 CFR 830 120, DOE Order 5700 6C, ANSI/ASQC E4-1994, NQA-1 and contractually mandated requirements,
  - Obtaining Kaiser-Hill approval of the RMRS QAPD,
  - Establishing direction and guidance for defining, implementing, and maintaining the RMRS QA Program,
  - Ensuring establishment of QA procedures and instructions to meet requirements of the RMRS contract and Site Quality Assurance Program,
  - Serving as the RMRS Subject Matter Expert on QA, including PAAA issues,
  - Participating, or delegating participation, on the Site QA Council,
  - Identifying, reviewing, and approving selected procedures to implement the RMRS QA Program,

- Directing the conduct of independent assessments and surveillances of organizations for compliance with established quality requirements and achievement of quality objectives,
- Ensuring, in coordination with the responsible implementing organizations, that programs/projects which are not in compliance with the QA Program, are properly identified and corrected,
- Providing organizational assistance, and indoctrination and training in quality practices, procedures, and regulations,
- Supporting Design Review and Readiness Review activities,
- Exercising stop work authority to control further activities when significant conditions adverse to quality require immediate corrective action,
- Serving as the RMRS point-of-contact for deficiencies in PATS,
- Providing technical direction to the RFETS Waste Inspectors,
- Developing and providing reports on the status of the QA Program indicators to RMRS Management and K-H, and
- Assigning responsibility for service as the TRU Waste QA Officer

4.8 All RMRS personnel are responsible for

- Performing activities in accordance with approved documents,
- Identifying and participating in quality improvements,
- Knowing customers, suppliers, and processes with which associated,
- Exercising stop work authority due to safety concerns and over significant conditions adverse to quality, and
- Attending training and knowing their qualification status

## 5. DEFINITIONS

Definitions are provided in the Site Quality Assurance Program Glossary of Terms, administered by K-H (Ref Site Quality Assurance Manual)

## 6. PROGRAM REQUIREMENTS/IMPLEMENTATION

This section of the QAPD identifies the QA elements of the RMRS QA Program and defines them in the context of implementing programs and controls. While infrastructure is inferred for the activities identified in the following sections, specific procedures are identified in Appendix 4 which presents Site and RMRS controls available to RMRS as they align with the DOE Order 5700 6C and 10 CFR 830.120 criteria. RMRS will delete, revise, and develop company specific procedures, as required, to eliminate redundancy and develop specific control strategies for implementing the RMRS QA policy and philosophy.

## **6.1 Quality Assurance Program**

### **6.1.1 Requirements**

10 CFR 830.120 (c) (1) (i) for Nuclear Facilities/Activities

"A written quality assurance program (QAP) shall be developed, implemented, and maintained. The QAP shall describe the organizational structure, functional responsibilities, levels of authority and interfaces for those managing, performing, and assessing the work. The QAP shall describe management processes, including planning, scheduling, and resource considerations."

DOE Order 5700.6C, 9 b (1)(a) for Non-Nuclear Activities

"Organizations shall develop, implement, and maintain a written Quality Assurance Program (QAP). The QAP shall describe the organizational structure, functional responsibilities, levels of authority, and interfaces for those managing, performing, and assessing adequacy of work. The QAP shall describe the management system, including planning, scheduling, and cost control considerations."

### **6.1.2 Commitments and Origins**

Commitment to the RMRS QA Program is evidenced by organizational review and comment concurrence retained in the Document History File. The QAPD is binding on all RMRS personnel. RMRS personnel understand the program's impact from training, indoctrination, and the commitment evidenced by management. This QAPD is, by design, intended to be revised, as RMRS increases efficiency and effectiveness, and as our customers continue to define requirements in the RMRS scope of work.

RMRS requires that activities be appropriately planned in accordance with the provisions of this document, and that when activities deviate from planned outcomes and indicate significant conditions adverse to quality or safety, RMRS personnel are required to stop the process until corrections can be made. In addition to the provisions of ANSI/ASQC E4, RMRS requires that work activities be inclusive of measurable elements which are represented in performance measurement documentation.

The RMRS QA Program, defined herein, is comprised of the RMRS contract (KH00003NS1A), this QAPD, the existing infrastructure controls listed in Quality Assurance Program Infrastructure Documents List, the QAPJP (EG&G Rocky Flats, Inc.), and program specific Quality Assurance Plans to support Nevada Test Site (NTS), Waste Isolation Pilot Plant (WIPP), and other waste recipient site's waste acceptance criteria. The RMRS QA Program, while maintaining consistency with the Site QA Program, will undergo revisions to enhance overall effectiveness and alignment with the RMRS scope of work.

The Site, including RMRS, has begun implementation of an Integrated Safety Management System (ISMS) through which ongoing and future activities that have the potential to cause radiological harm to the workers, public, and environment are identified and evaluated. The ISMS integrates safety and environmental management standards/requirements into the work planning and execution processes, and when implemented effectively protects the workers, the public, and the environment.

ISMS embodies five basic functions: 1) Define the scope of work, 2) Identify and analyze the hazards, 3) Identify and implement controls, 4) Perform the work, and 5) provide feedback.

The Site *ISM Manual*, where these five functions and associated controls are identified, became effective September 30, 1997, with full implementation scheduled for September 30, 1998. The implementation strategy is defined in an implementation plan that focuses on ensuring that personnel are trained in the concepts of ISMS and understand how ISM applies to their work.

### **6.1.3 Mission**

The mission of RMRS at the Site is to provide environmental restoration, waste management and decommissioning services. The highest priority of RMRS, while accomplishing the mission, is to accomplish our work in a manner that assures employee safety and value to our customers and stakeholders. RMRS contends that safety, a core value, and quality are integral components to the successful accomplishment of our mission. Accordingly, a rigorous Quality Assurance Program will be implemented to ensure that compliance with applicable laws, regulations, and DOE orders is achieved, and that such compliance is appropriately documented and maintained.

To achieve the mission, it is the commitment of RMRS to meet the needs of the Site stakeholders by providing products and services that consistently exhibit a high degree of inherent quality. RMRS will also accomplish the mission in a manner that is efficient and meets the predetermined performance standards.

### **6.1.4 Management and Organization**

#### *General*

The RMRS organization is depicted in a controlled document available through RMRS Human Resources. The management of each organization, in conjunction with the Human Resources Manager or designee, are responsible for hiring competent personnel and providing any additional skills required prior to assigning the employee specific project duties. Each RMRS employee and subcontractor working directly under the RMRS QA Program, shall be trained to the requirements of this QAPD.

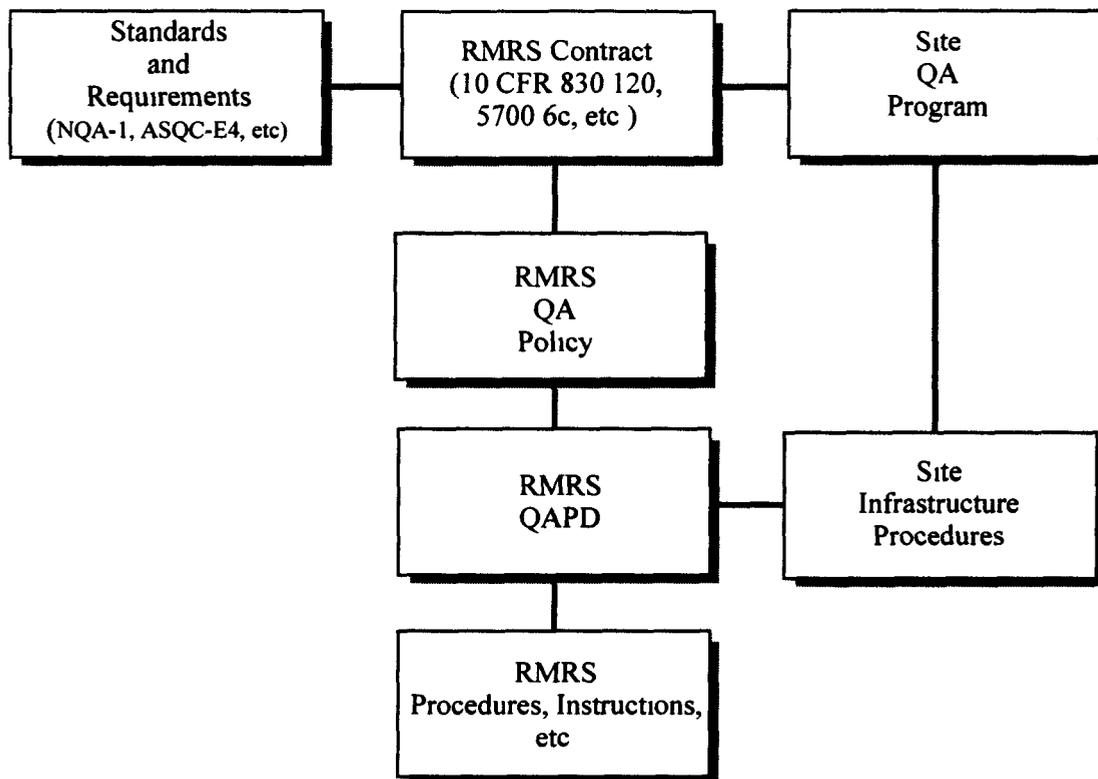
#### *RMRS QA Organization*

The RMRS QA Manager is designated by the RMRS President as the representative for quality assurance activities, and is responsible and authorized to stop work when significant conditions adverse to quality are detected. The QA Manager reports directly to the RMRS Environment and Quality Director, and is responsible for assessing the effectiveness and compliance of RMRS to the quality concepts, requirements, and directives identified in this QAPD and associated implementing procedures. At the discretion of the QA Manager, QA issues may be directly reported and resolved with the RMRS President. The RMRS QA Manager is also responsible for documenting identified deficiencies, facilitating appropriate corrective actions, verifying corrective action effectiveness, and tracking deficiencies to preclude recurrence and promote continuous improvement.

The RMRS QA organization plans and performs independent assessments and quality surveillances of RMRS activities and processes to determine the health and effectiveness of the RMRS QA Program and determine compliance with QA requirements.

Quality related assessments and surveillances are conducted by trained qualified personnel who are afforded autonomy in the RMRS organizational structure and report to the QA Manager Independent assessment and quality professionals are afforded full access to records, procedures, program plans, and responsible management

**Figure 1 Document Hierarchy**



### 6.1.5 Principles

In the context of the specific scope of work presented in Section 3, RMRS is contractually obligated to develop and implement a QA program that complies with DOE Order 5700 6C for all activities that are not, by definition, a nuclear activity Further, RMRS is responsible to develop and implement a QA program that complies with 10 CFR 830 120 for all RMRS activities that have, by definition, the potential to cause radiological harm In addition to these requirements, RMRS identifies and implements best practices and standards to enhance the overall effectiveness of the RMRS QA Program

The RMRS QA Program is inherent with the work being performed This is accomplished during the planning of work, through the participation of quality professionals The RMRS QA Program places emphasis on QA professionals participating in the work planning process The primary principle supported is that the achievement of quality is embedded in the work processes, and that assessment should only be a tool for monitoring performance and supporting continuous improvement

## **6.1 6 Graded Approach**

As indicated, RMRS follows the graded approach developed by K-H, as described in the K-H QA Program, that is inclusive of the following considerations

- Relative importance to safety, safeguards, and security
- Magnitude of any hazard involved
- Life cycle stage of a facility
- Programmatic mission of a facility
- Particular characteristics of a facility
- Other relevant factors as deemed appropriate

To implement the graded approach, RMRS during the origination or revision of procedures, incorporates varying degrees of control, appropriate for the activity. The TRU Waste Characterization Program utilizes WIPP-006, QA Grading to control and apply graded approach

## **6.2 Personnel Training and Qualification**

### **6.2.1 Requirements**

10 CFR 830 120 (c) (1) (ii) for Nuclear Facilities/Activities

"Personnel shall be trained and qualified to ensure they are capable of performing their assigned work  
Personnel shall be provided continuing training to ensure that job proficiency is maintained "

DOE Order 5700 6C, 9 b (1)(b) for Non-Nuclear Activities

"Personnel shall be trained and qualified to ensure they are capable of performing their assigned work  
Personnel shall be provided continuing training to ensure that job proficiency is maintained "

### **6.2.2 Principles**

Personnel shall be competent to perform their respective tasks based on a combination of related experience, education, and training. Key job descriptions are contained in the TIPs and are supported with job and task analyses performed by the first-line supervisor. Qualification maintenance shall be established through controlled measures and ensure that employees remain competent for the tasks they are assigned. Education and experience shall constitute the primary means of qualification. RMRS will consider that the defensible competency of individuals performing the work is also a factor in the mitigation of risk and will include qualification as a risk mitigator in the graded approach methodology.

Training shall be appropriate for the complexity and hazards of the work involved. Typical training methods include computer based training (CBT), classroom instruction, required reading, and on-the-job training.

Qualification requirements and training records shall be maintained and retrievable through RMRS managers, procurement and contractual agreements. Original records are retained at a centralized training record repository, maintained and operated by Kaiser-Hill Training and Scheduling Records (TSR)

Evidence of qualification shall be established through documented records, such as sign-in sheets, certificates, transcripts, registrations, and specific training records in accordance with the applicable RMRS controlling document

The Training User's Manual (TUM), administered and controlled by K-H, establishes the requirements for management to determine and document employee qualifications, including education, training, experience, and certifications needed to perform assigned tasks. RMRS establishes the process for implementing the provisions of the TUM and controls company specific training activities through the RMRS Training Manual and lower tier procedures

The qualification and training process is designed to enable RMRS to determine and document job-specific and general training requirements for each employee, and to ensure that qualifications and training are maintained current for their work assignment. Training methods include formal training conducted by qualified instructors, briefings conducted by management approved personnel, required readings, workshops, seminars, and awareness training

QA indoctrination is provided to RMRS personnel as part of orientation to the Company and every two years thereafter. The briefing is provided by the RMRS QA organization, with development support by the RMRS training organization. Records of briefings are documented in the same manner as for other employee training, in accordance with TUM requirements. Line management plans and budgets for QA training as part of work and project planning. Building or Area-Specific-Training is conducted to familiarize personnel with the facilities they use, including safety, security, and support systems. Additionally, mandatory training addressing environmental, safety and health, and other applicable requirements and issues are to be completed by RMRS employees

### **6.2.3 Quality Professionals**

The RMRS QA Manager establishes requirements for the competency of individuals planning, developing, assessing, and inspecting QA related work activities. Assessors, inspectors, quality engineers, and personnel conducting surveillances shall have training, qualifications, technical knowledge, and experience commensurate with the scope and complexity of the activities being evaluated. Evidence of competency, and maintenance of competency is established and recorded under approved processes

### **6.3 Quality Improvement**

#### **6.3.1 Requirements**

10 CFR 830 120 (c)(1)(iii) for Nuclear Facilities/Activities

"Processes to detect and prevent quality problems shall be established and implemented Items, services, and processes that do not meet established requirements shall be identified, controlled, and corrected according to the importance of the problem and the work affected Correction shall include identifying the causes of problems and working to prevent recurrence Item characteristics, process implementation, and other quality-related information shall be reviewed and the data analyzed to identify items, services, and processes needing improvement "

DOE Order 5700 6C, 9 b (1)(c) for Non-Nuclear Activities

"The organization shall establish and implement processes to detect and prevent quality problems and to ensure quality improvement Items and processes that do not meet established requirements shall be identified, controlled, and corrected Correction shall include identifying the causes of problems and preventing recurrence Item reliability, process implementation, and other quality-related information shall be reviewed and the data analyzed to identify items and processes needing improvement "

#### **6.3.2 Principles**

Several approaches shall be implemented to continuously improve the quality of RMRS products and services These approaches include the following

Management will foster a *no-fault* attitude where all personnel are encouraged to identify and report problems to the appropriate level of management for the purpose of corrective action Personnel are encouraged to stop work and immediately contact supervision or management when conditions adverse to quality are identified

Management shall empower personnel to eliminate ineffective management systems and improve performance by driving decision-making authority to the lowest effective organizational level where the maximum expertise is localized

When appropriate, management will encourage the use of established management tools, such as statistical methods, to improve and substantiate confidence in program and project decision-making

Personnel are authorized to stop work when significant conditions adverse to quality are identified

Management shall track, monitor, and facilitate the disposition of quality deficiencies through RMRS-QA-03 01, Corrective Action The extent of causal analysis and corrective action shall be commensurate with the significance of the failure or problem Lessons learned shall be communicated to staff from management when appropriate

### **6.3.3 Problem Prevention**

RMRS management prevents quality problems by the implementation of this QAPD, organizational structure, in-depth project planning, independent and management assessments, various self-assessment tools, surveillance, monitoring, corrective action, and deficiency recurrence control

Specifically, Quality Engineers, matrixed to the line organizations, participate in the planning process, review work control packages prior to implementation, and conduct surveillances of work as it is being performed. QA and line management monitor performance through assessments, trend analysis and periodic reports, and make adjustments to processes to continuously limit the number of item and process failures. Problem prevention, is a strategy that is facilitated through the other programs, procedures, plans and instructions defined herein, of which training and the employment of competent individuals is a key factor. RMRS continues to improve processes and related controls through the development and implementation of self-assessment activities. Self-assessment within RMRS relies on worker involvement and promotes empowerment to facilitate change and enhance effectiveness. RMRS pilots self-assessment program elements to determine their effectiveness prior to full implementation and deployment of procedural controls (i.e. Continuous Improvement Through You program)

RMRS subscribes to the Site lessons learned program, and uses information from the program as a means of preventing problems. Additionally, RMRS fully discloses known deficiencies and occurrences as a means of supporting the prevention of similar situations in other organizations at the Site and across the DOE complex.

### **6.3.4 Surveillance**

As previously indicated, the RMRS QA organization consists of personnel who participate at the line level and are matrixed to the line organizations. These personnel conduct surveillance activities as a continuous barometer of quality requirement compliance, implementation, and program effectiveness. Surveillances are planned on an annual basis and are conducted in accordance with approved instructions. Personnel conducting surveillances are qualified in the areas being surveilled.

### **6.3.5 Control of Nonconforming Items and Activities**

Items that do not meet established requirements are identified, segregated, controlled, documented, analyzed and corrected in accordance with approved procedures.

Activities and processes that do not meet established requirements are identified and corrected in accordance with the corrective action process described in Section 6.3.6.

Wastes being submitted for certification that do not meet certification requirements are identified through the NCR process and corrected according to specific waste management approved processes.

### **6.3.6 Corrective Action**

Conditions adverse to quality are identified and corrected utilizing RMRS-QA-03 01, Corrective Action. The causes of deficiencies are determined, to the degree appropriate for the condition, using approved processes.

When conditions adverse to quality are identified and require the cessation of operations to prevent continued deficiencies, the stop work or work pause process is initiated. The process will be continued only after appropriate analysis and actions are taken to preclude recurrence of the adverse condition or appropriate controls have been initiated to mitigate potential consequences to an acceptable risk level, pending final resolution. Additionally, products or services deployed under the adverse condition will be identified and corrected as appropriate in accordance with the provisions for nonconformances.

Operational deficiencies that are evaluated and determined to be enforceable under PAAA, are reported to the Noncompliance Tracking System (NTS), which is administered by K-H. All PAAA reportable deficiencies are subject to a root cause analysis determination prior to development of the corrective action plan, and will be independently verified for completion by RMRS QA personnel prior to closure.

### **6.3.7 Trend Analysis**

The RMRS QA organization is responsible for timely analysis of item and service quality. Information to support trending is gained through audit reports, inspection reports, surveillance reports, corrective actions, management assessments, performance indicators, and lessons learned. Trending of deficiency types includes cause assignment, equipment, management systems, procedures, personnel, work environment, etc. Trends related to the responsiveness to deficiencies is developed and controlled on a monthly basis by K-H and is inclusive of revising scheduled completion dates, deficiencies that are open over 30 days, etc.

## **6.4 Documents and Records**

### **6.4.1 Requirements**

10 CFR 830.120 (c)(1)(iv) for Nuclear Facilities/Activities

"Documents shall be prepared, reviewed, approved, issued, used, and revised to prescribe processes, specifications requirements, or establish design. Records shall be specified, prepared, reviewed, approved, and maintained."

DOE Order 5700.6C, 9 b (1)(d) for Non-Nuclear Activities

"Documents shall be prepared, reviewed, approved, issued, used, and revised to prescribe processes, Specifications, requirements, or establish design. Records shall be specified, prepared, reviewed, approved, and maintained."

## 6.4.2 Principles

Quality affecting documents, such as work plans (including Integrated Work Control Packages), standard operating procedures, health and safety plans, etc , shall be controlled, where control is constituted by the following criteria

- documents are prepared in accordance with approved processes
- documents receive the required reviews and approvals
- documents are uniquely identified and their distribution controlled,
- personnel who need the documents to perform work receive the latest approved versions of the document
- superseded or voided documents are removed from control

Essential policies, plans, procedures, decisions, data, and transactions of RMRS will be documented to an appropriate level of detail and receive management, peer, parallel and QA reviews, as appropriate. The objective shall be to maximize the utility of records and data for accomplishment of performance objectives while minimizing the cost of information management and paperwork for RMRS and its lower tier contractors

Quality records, as defined by approved processes and subordinate plans, including digital data stored electronically, are prepared and managed to ensure that information is captured, legible, retained, and retrievable. Quality records resulting from direct measurements or sampling activities shall be authenticated by the originator and subsequently approved.

Data that are input from quality records shall be reviewed by someone other than the data entry person, and the hard-copy must be authenticated by the reviewer. Errors on quality records shall be documented and corrected in accordance with approved instructions, and information on the error and correction will be retained for trending purposes. Authentication is also required for corrections. Evidence of authentication is retained as a quality record.

## 6.4.3 Document Control System

Documents that affect the quality or safety of RMRS operations are controlled. Sitewide Document Control is responsible for administration and control of Site level controlled documents.

RMRS controls company specific documents in accordance with approved procedures. RMRS project budget documents are controlled in accordance with the existing Management Control System procedures.

To ensure broad access to current infrastructure (controlled documents), RMRS has implemented a "Model Office" process, which provides a comprehensive collection of controlled documents. The "Model Offices" are strategically located for access by personnel involved in RMRS operations.

#### **6.4.4 Records Administration**

RMRS records are defined in procedures, compliance agreements, permits and regulations and are captured, indexed, protected, and maintained in accordance with approved processes, unless specifically excluded by Contract KH00003NS1A, Section H 4 Records are maintained and protected by RMRS until the record is deemed appropriate for archival Records identified for archival are formally transmitted to Site Records Management for long term storage The DOE-RFFO is responsible for the CERCLA Administrative Record which is processed by RMRS WIPP records are maintained and protected by RMRS until transferred to WIPP in Carlsbad, New Mexico

#### **6.4.5 Computer Software and Hardware**

A Sitewide Software Management Program (SMP), in conjunction with specific program plans to meet NTS and WIPP requirements, implement software quality assurance controls The application of software quality assurance controls to specific software is dependent on the importance of its use Uses range from ordering office supplies to monitoring Vital Safety Systems Software control also considers costs (purchase, development, replacement, and lifetime maintenance), and the consequence of failure, impact to safety, and potential liabilities Software quality assurance is achieved through the implementation of approved procedures

### **6.5 Work Processes**

#### **6.5.1 Requirements**

10 CFR 830.120 (c)(2)(i) for Nuclear Facilities/Activities

"Work shall be performed to established technical standards and administrative controls using approved instructions, procedures, or other appropriate means Items shall be identified and controlled to ensure their proper use Items shall be maintained to prevent their damage, loss, or deterioration Equipment used for process monitoring or data collection shall be calibrated and maintained "

DOE Order 5700.6, 9 b (2)(a) for Non-Nuclear Activities

"Work shall be performed to established technical standards and administrative controls Work shall be performed under controlled conditions using approved instructions, procedures, or other appropriate means Items shall be identified and controlled to ensure their proper use Items shall be maintained to prevent their damage, loss, or deterioration Equipment used for process monitoring or data collection shall be calibrated and maintained "

#### **6.5.2 Principles**

RMRS processes and activities shall be controlled to a degree commensurate with the risks associated with the process or activity Controlled conditions shall include, as appropriate to the process, the following

- Documented and approved instructions that control processes and activities,

- The use of suitable, approved equipment in a suitable, approved working environment,
- Compliance with reference standards, workmanship criteria, quality plans or other requirements,
- Monitoring and control of process characteristics,
- Maintenance of process equipment, and
- Competent workers with traceable qualifications

Process qualification and product acceptance criteria are defined and documented, and are utilized for determining effectiveness of processes. As processes consistently reflect improvement, in-process inspections are reduced. Accordingly, when processes exhibit variations beyond specified tolerances, in-process inspections increase.

Each organization, through planning and participation on teams, shall document processes and related controls within their respective programs. Figure 2 depicts the application of controls in a process context. The figure indicates the primary elements of any process, which include suppliers providing data or materials to an organization that adds value or otherwise changes the data or materials and then passes the new product or data to a customer. Each of these recipients of the data or material provide feedback on ways to improve on the delivery.

As indicated in the figure, requirements, including specifications, orders, regulations, contracts, or laws, result on the development and implementation of controls. Implementing the controls, including documentation, results in records that evidence the activity was completed as prescribed.

### **6.5.3 Planning**

Work is planned and authorized as described in the Site Management Control System procedures and in accordance with the provisions of the RMRS contract. During the budget call, RMRS identifies specific activities required to be accomplished to meet contract provisions. Work activities are planned, scheduled, resource loaded, and documented in work packages that are approved and tracked, and implemented through Project Authorization Directives (PADs). Work activities are then identified and defined in the Master Activity List (MAL).

The MAL identifies activities as 1) a baseline activity necessary for performance due to the presence of hazards, 2) a mission program activity authorized for performance, 3) a mission program activity authorized for planning only, or 4) a currently unauthorized mission program activity. The MAL contains the cut list of nuclear activities, however, not every listed activity is a nuclear activity.

Work is planned and performed in accordance with approved processes, including the Integrated Work Control Program (IWCP). Documentation related to the conduct of work includes acceptance criteria and describes inspection/testing requirements to assure the acceptability of work. Work planning and performance documents, except for minor maintenance, are reviewed by QA, prior to implementing the work, to ensure that customer's QA requirements are adequately addressed and appropriate QA resources to support the requirements are allocated. In addition to the applicability of QA requirements, facility operations comply with the defined Authorization Basis for the operation.

Each RMRS project controlling document shall reference the specific instructions that are applicable to the activities addressed in this document. Line managers and work package managers include tasks and resources within work packages to achieve compliance with the customer's QA requirements. In the event that an activity described in a controlling document is not adequately addressed by an existing instruction, a new instruction or a temporary or permanent change to an existing instruction shall be prepared, or controls will be specified in the approved project controlling document.

#### **6.5.4 Instructions and Procedures**

Quality affecting activities are prescribed by and performed according to documented instructions, procedures, and drawings. The methods for creating and revising procedures are controlled (Ref 6.4). Specifically, RMRS subscribes to the design control process for the development of instructions and procedures, by which specific inputs and outputs are considered.

The extent of detail is contingent on the complexity and risk of the activity, the experience of the users, and the frequency of performance. Creation and control of drawings is described in the Conduct of Engineering Manual. Maintenance tasks are controlled under the procedures in the Integrated Work Control Program Manual. Work planning and control tasks are controlled under the Management Control System procedures.

#### **6.5.5 Collection and Evaluation of Environmental Data**

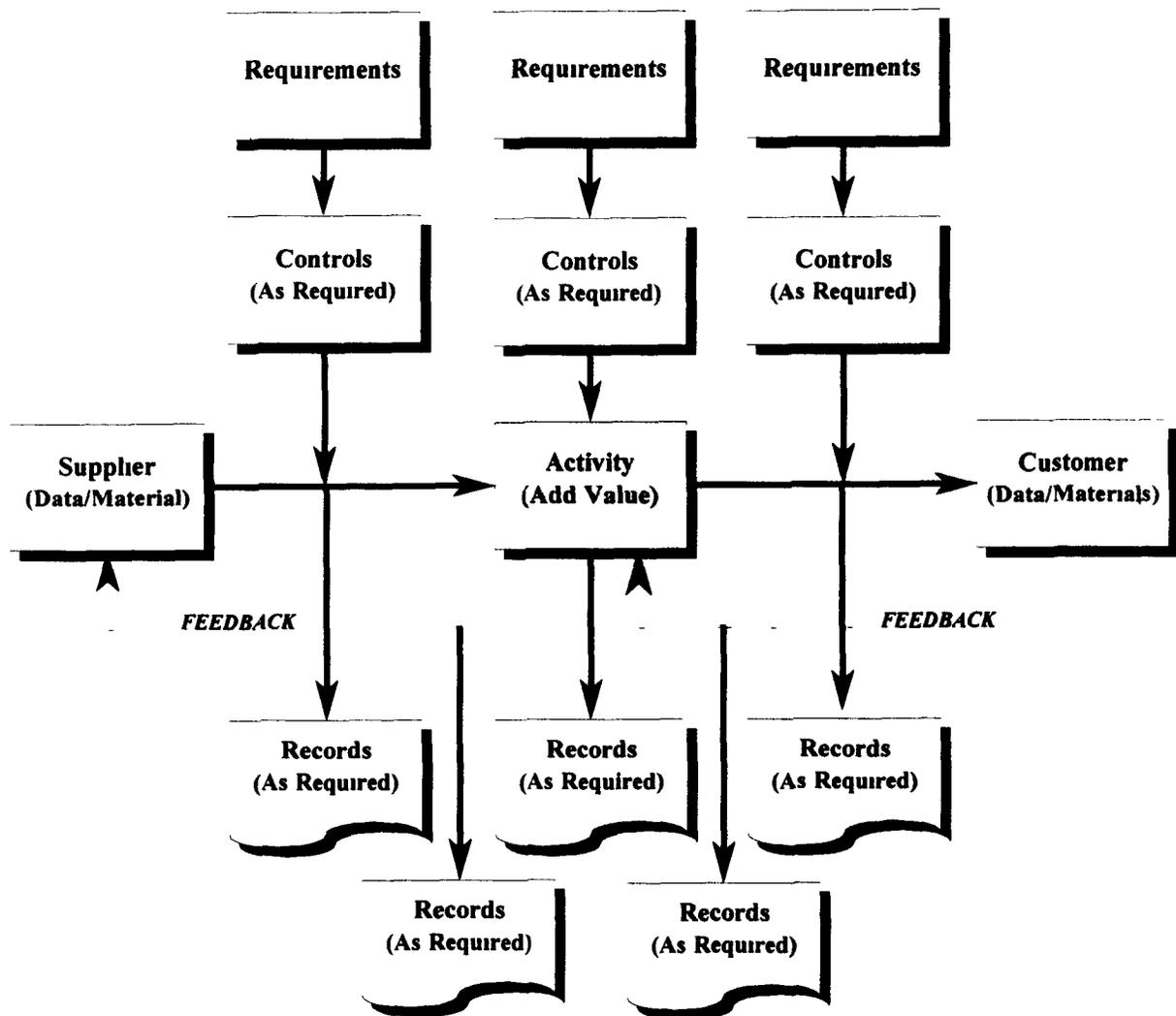
Activities related to the measurement and data acquisition process include collecting environmental samples, collecting decommissioning samples and data, and generating analytical and measurement data. In order to ensure that quality data are being generated, quality control is incorporated into the sampling and analytical process through sampling and analysis plans, and field sampling. Data, upon which environmental response, decommissioning, and area/facility/equipment release decisions will be based, must be reduced, validated, and reported in a manner that leaves the data defensible.

Calculations and models in which data are used to reach decisions must be completed, reviewed, and documented in a manner consistent with this QAPD. Personnel performing calculations must be qualified and must document the calculation in such a manner that a qualified individual could repeat the calculation, and achieve the same results, without consulting the author.

Each project controlling document shall include a description of the implementation process and the data quality objectives, as appropriate. The document shall ensure that the activity is conducted in a manner that achieves the project goals while minimizing the cost and impacts on the worker, public health, safety, and the environment, to the extent practicable.

Data Quality Objectives (DQOs) should reflect the current guidance established by the EPA (EPA QA/G4), and shall be developed in the planning stage of all environmental data collection efforts. The DQO process is integrated with the development of sampling and analysis plans included in the specific work controlling process. Where data, not generated under the auspices or control of RMRS, are used to support ER, E/C/D/F, and WM operations decisions, specific verification processes will be employed to assure the data are defensible and appropriate for the application.

Figure 2 Controls Over Processes



### 6.5.6 Maintenance

RMRS maintenance is planned, implemented, and controlled through the Site work control processes. Work control to support maintenance is initiated by building and/or operations managers who receive a notification of a deficiency through Site processes, or when a request for a modification is received. Building and/or operations prioritize their work for their facility and work is further prioritized for RMRS with the highest emphasis placed on Safety and Compliance related items. Maintenance to equipment, systems, structures, and components are controlled to ensure configuration control.

Maintenance and modification work is reviewed and controlled to ensure compliance with all applicable safety, nuclear, radiological and environmental controls and regulations.

Incorporation of the ISM and EWP principles into the work control processes ensures that safety is built in and not added on

### **6.5.7 Waste Operations**

The generation, characterization, treatment, storage, and disposal of wastes are governed by requirements that depend upon the type of waste being generated. These requirements have been established in regulations, DOE orders, the RCRA permit, and the respective disposal site waste acceptance criteria. Procedures and other controls are established to ensure that the generation and handling of wastes meet governing requirements.

The Waste Isolation Pilot Plant (WIPP) in Carlsbad, New Mexico, is the designated disposal site for TRU/TRU Mixed Waste generated at RFETS. The WIPP requires specific program documents to address their QA program requirements. The RFETS TRU Waste Management Plan and the RFETS WIPP TRU Waste Characterization QA Project Plan address the requirements of the WIPP QA Program Document and the WIPP Characterization QA Program Plan respectively (Reference Appendix 1).

The Nevada Test Site (NTS) is a disposal site for RFETS low level waste. NTS requires documentation of the QA program implemented to meet their QA program requirements. The RFETS Low Level Waste Management Plan describes programmatic elements and requirements to meet NVO-325 (Reference Appendix 2).

### **6.5.8 Transportation and Shipment of Waste**

The K-H Traffic Department has programmatic responsibility for the quality and regulatory compliance with respect to transfer, shipping, and transportation of waste materials. The Rocky Flats Transportation Safety Manual, which includes the On-Site Transportation Manual and the Off-Site Transportation Manual, provides shipping and transfer requirements and instructions. RMRS provides proper packages for on-site and off-site shipments and provides information for the hazardous waste manifest.

### **6.5.9 Decontamination and Decommissioning**

Decommissioning project control documents shall ensure that the activity is conducted in a manner that achieves the project goals while minimizing the cost and impacts on the worker and public health and safety, the work, and the environment, to the extent practicable. For decommissioning activities, the project controlling documents are normally a decommissioning plan and subordinate implementing plans that cover specific subject areas. For example, the DQO management plan, the Quality Assurance Project Plan, RFCA/CERCLA documents, etc.

Decommissioning plans shall be consistent with DOE Orders 5400 5 and 5820 2A, and the *DOE Decommissioning Handbook*. Decommissioning plans shall consider the guidance in NUREG/CR-2082, *Monitoring for Compliance with Decommissioning Termination Survey Criteria*, NUREG/CR-5512, *Residual Radioactive Contamination from Decommissioning Technical Basis for Translating Contamination Levels to Annual TEDE*, and NUREG/CR-5849, *Guidance Manual for Conducting Radiological Surveys in Support of License Termination*. Decommissioning plans include a description of the checks and balances that are used during execution of work to ensure compliance with work control documentation and acceptance criteria.

## **6.6 Design**

### **6.6.1 Requirements**

10 CFR 830.120 (c)(2)(ii) for Nuclear Facilities/Activities

"Items and processes shall be designed using sound engineering/scientific principles and appropriate standards. Design work, including changes, shall incorporate applicable requirements and design bases. Design interfaces shall be identified and controlled. The adequacy of design products shall be verified or validated by individuals or groups other than those who performed the work. Verification and validation work shall be completed before approval and implementation of the design."

DOE Order 5700 6C, 9 b (2)(b) for Non-Nuclear Activities

"Items and processes shall be designed using sound engineering/scientific principles and appropriate standards. Design work, including changes, shall incorporate applicable requirements and design bases. Design interfaces shall be identified and controlled. The adequacy of design products shall be

### **6.6.2 Principles**

Sound engineering and scientific principles, and appropriate technical standards shall be incorporated into designs to assure intended performance. The Site infrastructure programs provide controls for the design of items and processes. Design work includes incorporation of applicable requirements and design bases, identification and control of design interfaces, and verification or validation of the adequacy of design products by individuals or groups other than those who performed the work. The verification and validation is completed before approval and implementation of the design.

### **6.6.3 Control of Design Processes**

The design control processes are established for the control of design inputs, outputs, verifications, reviews, changes, modifications, and configuration change control. Design control requirements for procured design and engineering services are incorporated into procurement specifications. The design control program provides documented controls that ensure design interfaces between participating and interacting design organizations. Controls include relative responsibilities, reviews, design basis, deliverables, and associated concurrence and approvals.

Assessments are scheduled based on the risk and QA performance indicators of the activities being conducted. Except for management assessments, assessments are conducted by independent RMRS personnel qualified to assess the area being considered. The results of assessments are documented, brought to the attention of appropriate RMRS management, and are tracked to verify development and effective implementation of corrective actions. In accordance with DOE Order 5700 6C, the RMRS QA system will be fully assessed on an annual basis.

### **6.9.3 Integration**

RMRS integrates the full scope of assessments through the Site Integrated Oversight Plan that encompasses the varying degree of assessment rigor, and takes into account assessments being performed by various stakeholders.

### **6.9.4 Management Assessments**

RMRS management shall periodically evaluate the organization to determine the effectiveness of the RMRS QA Program and overall RMRS organization performance. These assessments shall be conducted by management and not delegated. Management assessments are documented through reports, periodic status reports, or other suitable reporting mechanisms.

Line and senior management periodically assess their operations to determine the adherence to the Quality Assurance Program. Improvements or corrections to operations and performance are documented and implemented. The RMRS Management Assessment Program provides the methodology, and a combination of RMRS processes (RMRS-QA-03 01, Corrective Action) and the Site Corrective Action process provides the methodology for documenting findings and implementing corrective actions.

### **6.10 Independent Assessment**

#### **6.10.1 Requirements**

10 CFR 830.120 (c)(3)(ii) for Nuclear Facilities/Activities

"Independent assessments shall be planned and conducted to measure item and service quality, to measure the adequacy of work performance, and to promote improvement. The group performing independent assessments shall have sufficient authority and freedom from the line to carry out its responsibilities. Persons conducting independent assessments shall be technically qualified and knowledgeable in the areas assessed."

DOE Order 5700 6C, 9 b (3)(b) for Non-Nuclear Activities

"Planned and periodic independent assessments shall be conducted to measure item quality and process effectiveness and to promote improvement. The organization performing independent assessments shall have sufficient authority and freedom from the line organization to carry out its responsibilities. Persons conducting independent assessments shall be technically qualified and knowledgeable in the areas assessed."

## 6.10.2 Principles

Independent assessments, in contrast to management assessments, are performed by personnel who are in an RMRS organization (QA) separate from the organization/activity under evaluation for the purpose of maximizing objectivity

### Independent assessments

- are based on the RMRS QAPD, and other controlling documents as necessary
- evaluate and measure the performance of work, item, and service quality beyond the mere review of documents and records
- act as management advisory functions
- are conducted such that the organization being assessed is the *customer* of the assessment results
- produce useful feedback on RMRS assets and liabilities with respect to the RMRS mission and performance objectives

The ESH&Q organization within RMRS, afforded autonomy and sufficient authority by the President of RMRS, performs assessments to determine the performance and degree of item and service quality achieved through implementation of the RMRS QA Program. These assessments are coordinated and scheduled, at a Site level, to avoid duplication of external independent assessments. RMRS assessments may be scheduled by management to determine the adequacy of performance in particular areas of operations prior to evaluations by other organizations. Findings are addressed through the RMRS Quality Condition Report (QCR) process and are evaluated in accordance with cause analysis and lessons learned programs, as required.

The K-H organization performs oversight of RMRS activities, and assesses operations to independently determine the status of implementation and effectiveness of the RMRS QA program. The methods for these assessments and the qualifications of the assessors are as described in approved procedures.

## 7. REFERENCES

The following references are utilized as sources for obtaining appropriate control requirements and should not be inclusively construed as applicable to all RMRS operations. As indicated in this QAPD, RMRS will, during the planning of specific activities, assess and adopt the necessary and sufficient standards.

DOE Order 5700 6C, Quality Assurance, August 21, 1991

DOE-ER-STD-6001-92, Implementation Guide for Quality Assurance Programs for Basic and Applied Research

10 CFR 830 120, Quality Assurance Requirements, May 1994

10 CFR 820, Procedural Rules for DOE Nuclear Activities, August 1993

DOE, 1994 T P Grumbly Memorandum to Distribution, Institutionalizing the Data Quality Objectives Process for EM's Environmental Data Collection Activities, September 7, 1994

EPA, 1994a EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations, EPA QA/R-5, Quality Assurance Management Staff

EPA, 1994b Guidance for the data quality objectives process, EPA QA/G-4

EPA, 1994c Guidance for the data quality analysis process, EPA QA/G-9

Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs, ANSI/ASQC E4-1994, January 1994

DOE Order 490, General Environmental Protection Program, DRAFT, March 1995

Implementation Guide for use with DOE Order 490 General Environmental Protection Program, DRAFT, March 1995

NUREG/CR-5849, Manual for Conducting Radiological Surveys in Support of License Termination, DRAFT June 1992

ASTM C1009, Standard Guide for Establishing A Quality Assurance Program for Analytical Chemistry Laboratories Within the Nuclear Industry, 1989

NVO-325, Nevada Test Site (NTS) Defense Waste Acceptance Criteria, Certification, and Transfer Requirements, latest release for low level waste (LLW) processing, handling, and transportation to NTS

Envirocare Material Acceptance Process Manual

U S Department of Energy, "Waste Acceptance Criteria (WAC) for the Waste Isolation Pilot Plant," WIPP/DOE-069, April 1996

U S Department of Energy, CAO, "Transuranic Waste Characterization QAPP," CAO-94-1010

U S Department of Energy, "Quality Assurance (QA) Plan for the Transportation and Receipt of Transuranic (TRU) Waste," DOE/WIPP 89-102, February 1990

U S Department of Energy, Carlsbad Area Office, Quality Assurance Program Document, CAO-94-1012, April 1996

RFETS WIPP Transuranic Waste Characterization Program QAPjP, 95-QAPjP-0050

94-RWP/EWQA-0014, Low Level Waste Management Plan

DOE 1324 2A, Records Disposition, latest release

DOE 5400 1, General Environmental Protection Program, latest release for CERCLA investigations

Final Rocky Flats Cleanup Agreement, 7/19/96

SW-846, Test Methods for Evaluating Solid Waste Physical/Chemical Methods (Laboratory Manual), latest release for waste characterization sampling analysis and statistical modeling

Part IV of the RCRA Part B permit, Resource Conservation and Recovery Act, latest release

10 CFR 71, Subpart H, Quality Assurance, latest release for user's of the TRUPACT-II vessel and for any other radioactive waste package required to be licensed by the Nuclear Regulatory Commission (NRC)

DOE/HR-0066, Total Quality Management Implementation Guidelines, December 1993

RMRS Contract with Kaiser-Hill No KH00003NS1A, July 1995

Kaiser-Hill Team Quality Assurance 10 CFR 830 120 Implementation Plan, August 1996

Contents of the Site Quality Assurance Manual

Kaiser-Hill Quality Assurance Mission and Vision, February 1996

Kaiser-Hill Quality Assurance Program, August 1996

Kaiser-Hill Quality Assurance Program Glossary of Terms, February 1996

Kaiser-Hill Quality Assurance Program Infrastructure Documents List, May 1996

Kaiser-Hill Quality Assurance Program Criteria, August 1996

1-C40-QAP-02 01, Preparation of Quality Assurance Program Plans

RMRS-97-040, RMRS Training Manual

Master Activity List (MAL)

RMRS Quality Assurance Program Documentation Binder

## **Appendix 1**

### **TRU Waste Program QA Supplement**

## Table of Contents

1	QUALITY ASSURANCE PROGRAM	4
1 1	Packaging and Waste Segregation Overview	4
1 2	Personnel Training and Qualification	5
1 3	Work Processes	5
2	DESIGN CONTROL	5
2 1	Regulated Waste Storage Areas	7
2 2	Waste Packages and Associated Hardware	7
2 3	Radiation Detection Instruments	7
2 4	Radioactive Assay Equipment	7
3	PROCUREMENT DOCUMENT CONTROL	8
3 1	Quality Review	8
3 2	Purchasing	9
4	INSTRUCTIONS, PROCEDURES, AND DRAWINGS	9
5	DOCUMENT CONTROL	9
6	CONTROL OF PURCHASED ITEMS AND SERVICES	9
7	IDENTIFICATION AND CONTROL OF ITEMS	10
7 1	Content Code	10
7 2	Item Description Code (IDC) Number	11
7 3	Process Number	11
7 4	Characteristic Constituent Code	11
7 5	EPA Hazardous Waste Number	11
7 6	Waste Package Numbers	11
7 7	Tamper Indicating Device (TID) Number	12
7 8	Material Transfer and Storage Label	12
7 9	Employee Numbers	12
7 10	Radioactive On-Site Transfer Label	12
7 11	Other Procedures for Item Identification and Control	12
8	CONTROL OF PROCESSES	12
8 1	Waste Sampling and Analysis Plans & Data Quality Objectives	13
8 2	Solid Radioactive Waste Packaging - Untreated Wastes	13
8 3	Waste Treatment or Packaging Processes - Process Control Plans	14
8 4	Process and Equipment Qualification	14
8 5	Radioactive Waste Measurement - NDA	14
8 6	Special Processes	15
8 6 1	Real-Time Radiography (RTR)	15
8 6 2	Leak Testing of the TRUPACT-II Package	15
8 6 3	Supporting Processes	15
9	INSPECTION	15
10	TEST CONTROLS	16
11	CONTROL OF TEST AND MEASURING EQUIPMENT	17
11 1	Process Equipment and Radioactive Sources Calibration	17

11 2 Nondestructive Assay Radiometric Counters Calibration	18
12 MARKING, HANDLING, STORAGE AND TRANSFER	18
12 1 Handling and Storage	19
12 2 Waste Transfer	19
13 INSPECTION, TEST, AND OPERATING STATUS	19
13 1 Processing	20
13 2 Inspections and Tests	20
13 3 Nondestructive Assay for Radioactive Material Content	20
13 4 Operating Equipment	20
14 CONTROL OF NONCONFORMING ITEMS	21
15 CORRECTIVE ACTIONS	21
16 QUALITY ASSURANCE RECORDS	22
17 INDEPENDENT ASSESSMENT	22
17 1 Audits	22
17 2 Surveillances	23
18 MANAGEMENT ASSESSMENTS	23
19 SOFTWARE QUALITY ASSURANCE (SQA)	23
20 QUALITY IMPROVEMENT	24

This appendix describes compliance with the Quality Assurance requirements defined in the WIPP Quality Assurance Program Document (QAPD), CAO-94-1012. The RMRS QA program elements supporting TRU waste operations is also the QA Program associated with the TRAMPAC for the use, maintenance, and control of the TRUPACT-II. A matrix of the QAPD requirements and RFETS implementing procedures is submitted to the National TRU Waste Program Office. The RFETS QAPD Procedures Matrix is maintained by the RFETS TRU Waste Project Quality Assurance Officer.

The QA requirements for RFETS are identified in the Kaiser-Hill Quality Assurance Program Criteria. RMRS documents compliance with the Kaiser-Hill Quality program in the RMRS Quality Assurance Program Description Document (RMRS-QAPD-001). The QA Program implemented by the TRU Waste Characterization Project, is directed towards DOE CAO QA requirements, as reflected in Figure 1, TRU QA Supplement Document Hierarchy.

## **1. QUALITY ASSURANCE PROGRAM**

The TRU Waste QA program has been implemented through documentation, controls, and training described in this appendix. A graded approach is utilized in implementing the QA program. Procedure WIPP-006, TRU Waste Characterization Project QA Grading, provides instructions for implementing the graded approach, for TRU waste operations.

### ***1.1 Packaging and Waste Segregation Overview***

The following provides an overview listing of the quality controls implemented to assure TRU Waste meets requirements:

- Controlled procedures for waste packaging, segregation, inspection, assay, transportation, processing, testing, and certification
- Training and qualification of waste generators, waste handlers, inspectors, chemical operators, nondestructive assay technicians, and NDT technicians
- Completed, documented, and characterized Rocky Flats waste streams published in the "Waste Stream and Residue Identification and Characterization" (WSRIC) building books
- Documented traceability of each item placed in a waste package to the generation point represented by the unique WSRIC process number
- Accountability of individual waste package segregation, characterization, and traceability documentation to the person(s) responsible
- Non-Routine Waste Origination Log completion for wastes not identified by a WSRIC process number
- TRU Waste package access control during all phases of waste generation, packaging, and handling using locked packages and qualified package custodians
- 100% verification of package content compliance achieved by utilizing the generator and a waste verifier during fill operations
- Independent in-process sample inspection of waste packages and contents
- Independent 100% waste package integrity and Waste/Residue Traveler completeness inspections

RTR of waste package contents (unless exempted by a TSDF and Rocky Flats agreement)  
Routine, systematic surveillance of the TRU Waste management activities  
Independent audit of the TRU Waste management activities to Quality Assurance Program requirements  
Sampling and analysis of specified TRU Waste to demonstrate compliance to WIPP Waste Acceptance Characterization QAPP

### ***1 2 Personnel Training and Qualification***

Personnel associated with the generation, handling, packaging, inspection, testing, shipment, processing, and certification of waste shall be trained and qualified to applicable criteria, in accordance with the Training User's Manual (TUM) Training requirements for personnel supporting the TRU Waste Characterization Project are documented in the TRU Waste Characterization Project Training Implementation Plan, PLN-97-007 All RFETS management having employees performing tasks directly in support of the TRU Waste Characterization Project (Performing to procedures on activities described in this manual and the QAPJP) are responsible for ensuring their employees meet the training requirements in PLN-97-007

The RFETS Training, Scheduling, and Records database provides the official records of training

Training development, approval and delivery complies with applicable DOE orders and the WIPP waste acceptance criteria The specific job responsibilities and interfaces involved in training development, delivery, and maintenance are specified in the Trainers Users Manual (TUM)

### ***1 3 Work Processes***

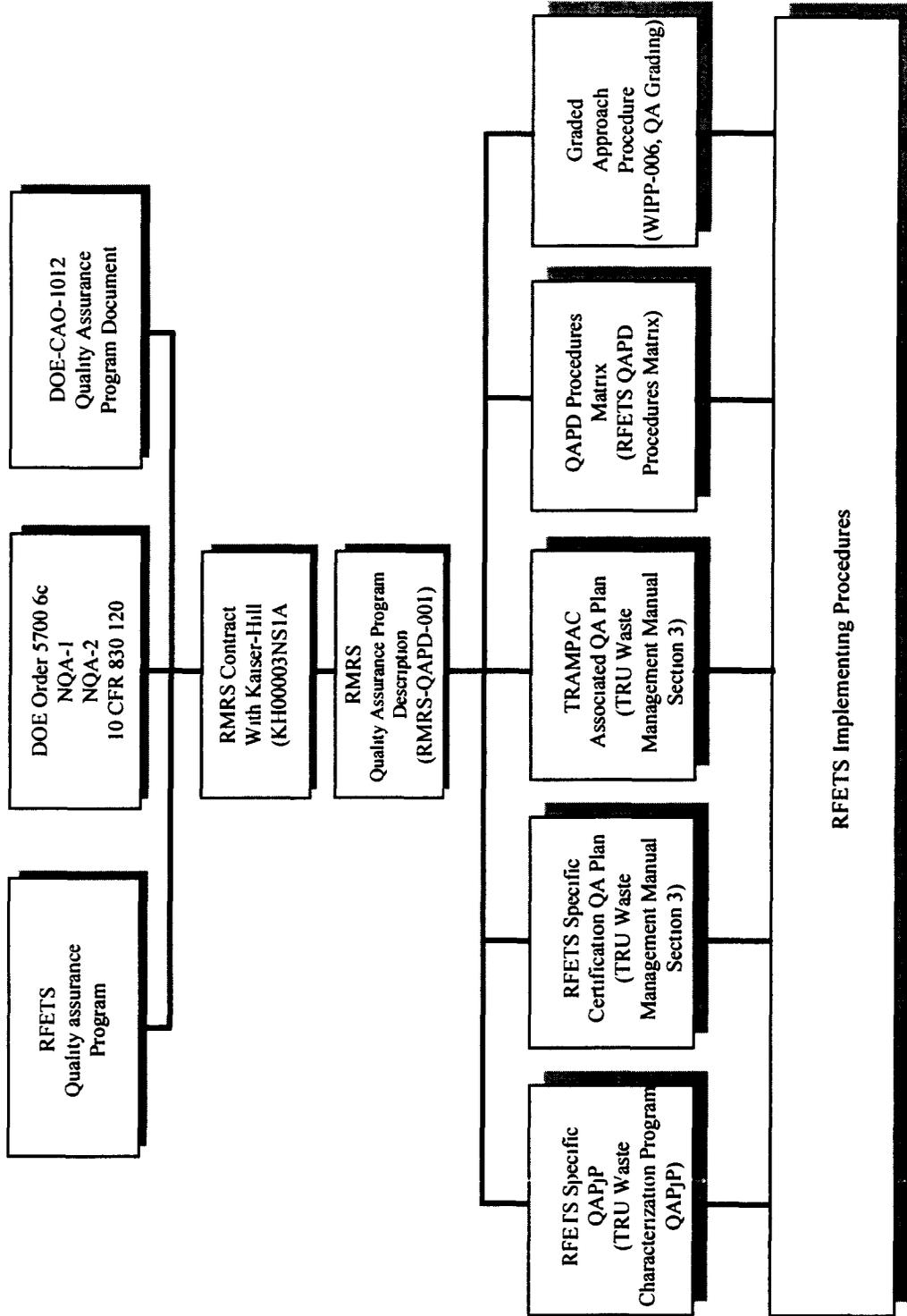
Work on the TRU Waste Characterization Project is performed according to established technical standards and administrative controls (procedures) identified in this document and the Site QAPJP Each person supporting the project is responsible for the quality of his or her work and has the goal of doing work correctly the first time Management of the project has established processes and procedures to ensure that work is planned and performed under controlled conditions by trained personnel These processes and procedures are identified in this document and the Site QAPJP

Work processes on the TRU Waste Characterization Project are performed in compliance with the RFETS Site Quality Assurance Program (SQAP) through procedures implemented to meet the SQAP and DOE CAO-1012 requirements Implemented procedures are listed in this document and the QAPD matrix

## **2. DESIGN CONTROL**

Design processes are controlled at RFETS through procedures and processes identified in the Conduct of Engineering Manual The TRU Waste Characterization Project does not perform design

**Figure 1**  
**TRU QA Supplement Document Hierarchy**



**NOTE** This chart is the same as Figure 3-2 of DOE CAO-2119 with titles of RFETS specific documents included

## ***2 1 Regulated Waste Storage Areas***

Regulated wastes are collected in three areas satellite collection areas, 90-day accumulation areas, and permitted storage areas Management of Rocky Flats hazardous waste storage areas complies with federal requirements 40 CFR Parts 262, 264, and 265 and the associated Colorado state requirements in 6 CCR 1007-3 Parts 262, 264, and 265 Specific RFETS requirements are stated in the Hazardous Waste Requirements Manual, 1-10000-HWR

The satellite and 90-day waste collection areas are managed by Rocky Mountain Remediation Services Other contractors at the site may establish 90-day areas to facilitate waste management activities and assure compliance A master list of the waste collection areas is maintained by Rocky Mountain Remediation Services This list includes information on the location of the area, the waste that can be managed in the area, and the responsible individual Any modification to the existing storage areas should be coordinated with Rocky Mountain Remediation Services

The RCRA Part A and Part B Permits discuss interim status and permitted units that exist at the Site These documents give detailed information on the location, material types, and quantities of hazardous wastes that reside at the Site Rocky Mountain Remediation Services is the responsible company to assure that the Part A and the Part B permits are accurate and contain current information This responsibility includes drawings of the permitted storage units

## ***2 2 Waste Packages and Associated Hardware***

Technical Support Services is responsible to provide design control for waste packaging, hardware, liners, and ancillary equipment The design of white 55 gallon drums, TRUPACT II standard waste boxes, drum rings and associated hardware, rigid polyethylene drum liners, plastic bags and other ancillary equipment is controlled by revision issue and multi-discipline approval signatures for each revision The Conduct of Engineering Manual provides procedures for these activities

All component replacement and maintenance involving TRUPACT-II packages shall be done in accordance with DOE/WIPP 93-1001, TRUPACT-II Procedure and Maintenance Instruction

## ***2 3 Radiation Detection Instruments***

Design of radiation detection instrumentation is controlled through approved, revision controlled drawings maintained by the Technical Support Services department The Radiation Instrumentation department initiates design drawing changes and maintains control of portable assay equipment Design control of radiation instrumentation is specified in procedures in the RFETS Conduct of Engineering Manual, the Configuration Change Control Procedures, Radiation Instrumentation Manual, and the Radiation Instrumentation Quality Program Plan

## ***2 4 Radioactive Assay Equipment***

Nondestructive assay equipment is purchased from commercial vendors according to specifications developed by Safeguards Measurements. The equipment is then controlled according to procedure 4-S58-SMP-ADM-4000, NDA Calibration Program. Safeguards Measurements maintains all drawings and maintenance records.

Design control of NDA equipment is maintained by

- 1 Facilities Engineering through configuration control and design control procedures. These procedures are found in the Conduct of Engineering Manual, and
- 2 Safeguards measurements through selection, validation and qualification of NDA counters and associated documentation
- 3

### **3. PROCUREMENT DOCUMENT CONTROL**

Procurement documents supporting waste management activities include required specifications and acceptance criteria. Procurement documents are reviewed by appropriate organizations, disciplines, and subject matter experts to assure they contain adequate scope of work, technical requirements, supplier quality assurance program requirements and provisions for acceptance. The procurement document control system is defined in 1-W36-APR-111, Acquisition Procedure for Requisitioning Commodities and Services, the Configuration Change Control Program Manual (CCCP), the Conduct of Engineering Manual (COEM), and in the Procurement System Policy Manual. The procurement document controls specified in these manuals apply to

- Waste packages, associated hardware and ancillary packaging materials,
- Capital equipment, piping, treatment units and other installed items used to treat or process waste,
- Radioactivity measuring equipment,
- Waste analysis laboratory chemicals, reagents, materials, and equipment,
- Measuring and test equipment used in waste treatment or processing, and
- Contracted waste management services

#### ***3.1 Quality Review***

Material Engineering develops procurement specifications for waste commodities in accordance with the COEM, and the Metrology Lab reviews requisitions for test and measuring equipment prior to development of procurement specifications.

The Procurement Quality Assurance group performs supplier evaluations and audits per 4-J55-ADM-08 10, Supplier Quality Evaluations and maintains the Approved Suppliers List. Purchase Orders are developed based on procurement specifications, and RC&I performs receipt inspection and verification based also on procurement specifications.

### **3.2 Purchasing**

Management prepares purchase requisitions according to 1-W36-APR-111, Acquisition Procedure for Requisitioning Commodities and Services

The Procurement department prepares solicitations, submits them to suppliers, and receives bids as part of the competitive bidding process, per the Kaiser-Hill Procurement System Policies and Procedures Manuals. When required by the requisition, Procurement lets contracts to successful bidders on the Approved Suppliers List.

## **4 INSTRUCTIONS, PROCEDURES, AND DRAWINGS**

TRU wastes are collected, treated, processed, packaged, inspected, certified, and loaded for shipment according to written approved instructions, procedures, and drawings. The correct execution of these procedures ensures that TRU waste is generated and shipped in compliance with all applicable criteria, including requirements specified by the WIPP, DOT, and DOE. Implementing procedures are developed and maintained at RFETS according to 1-MAN-001-SDRM, Site Document Requirements Manual.

Procedures implementing the TRU Waste Characterization Project QA program are listed in the RFETS QAPD Procedures Matrix. This list is maintained by the RFETS TRU Waste Project Quality Assurance Officer.

## **5. DOCUMENT CONTROL**

The Site Document Control Program is defined in procedure 1-77000-DC-001, Document Control Program. Procedures and documents supporting the TRU Waste Characterization Project are maintained in document control systems that comply with the requirements of this procedure.

Other documents such as lists of qualified waste generators are maintained as controlled documents by operations management. The usual mechanism for controlling and maintaining such items is in the Conduct of Operations Manual, COOP-01, Conduct of Operations, and COOP-10, Control of Operator Aids.

## **6. CONTROL OF PURCHASED ITEMS AND SERVICES**

Items and services purchased to support the TRU Waste Management Project are controlled at all stages of procurement from requisition and purchase order preparation, specification development and approval, approval and selection of suppliers, supplier bid evaluation and award, verification, control of nonconformance and corrective action, acceptance of item or service, and maintenance of records. The system control procedures are found in the Procurement System Policy Manual, COEM procedures, Configuration Change Control Manual, Control and procedure 1-W36-APR-111, Acquisition Procedure for Requisitioning Commodities and Services.

Procurement selects suppliers from the Approved Suppliers List. A supplier evaluation is performed by Procurement Support. This evaluation may be based on evaluation of existing or supplier provided documents or records, or by a direct evaluation of the supplier's facilities, personnel, and quality assurance program. Pre-award bid evaluations may be let to evaluate small quantities of products prior to placing a large order.

Supplied items are purchased, inspected, and certified in accordance with direction and criteria contained in procurement specifications. When items do not conform to requirements they are dispositioned in accordance with applicable NCR procedures.

All component replacement and maintenance involving TRUPACT-II packages is performed under the direct instructions of the following procedure:

DOE/WIPP 93-1001, TRUPACT-II Procedure and Maintenance Instruction

## **7. IDENTIFICATION AND CONTROL OF ITEMS**

Identification and/or traceability of waste streams, waste packages, involved packaging, testing, analytical results, and other items associated with TRU waste management are required. Items such as waste streams and waste packages are uniquely identified from the initial generation or receipt up to and including use, packaging, storage, and transportation to the WIPP. Specific waste characteristics, waste generation sources, applicable chemical analyses, and any inspections, tests, and certifications for wastes are traceable back to the wastes and packages by documentation records maintained in accordance with the records retention requirements of the QAPD. The Waste Characterization Quality Assurance Project Plan identifies quality assurance controls for all waste characterization performed at RFETS.

The key document that records traceability information is the Waste/Residue Traveler (form number RF-47386, procedure 1-C80-WO-1102-WRT, Waste/Residue Traveler Instructions). This data collection form is generated for each waste package and documents the employee numbers of all waste generators, inspectors, and test technicians directly involved with processing that waste package. The form also documents inspection and test results, waste generation source (process number), hazardous constituent number (if applicable), and package serial number. Waste Management personnel control the development of waste identification and characterization information through procedure 1-PRO-079-WGI-001, Waste Characterization, Generation, and Packaging.

The RCRA Uniform Hazardous Waste Manifest records the EPA hazardous waste codes and other required information for RCRA regulated hazardous wastes. More specific definitions of traceable control numbers are defined below.

### **7.1 Content Code**

The content code is a unique, alpha-numeric code which identifies the generator, the generator's waste stream, and the TRUPACT-II package contents, to personnel at the WIPP. The content codes are

established and controlled by DOE WIPP A list of all shipping content codes can be found in the TRUCON document, DOE/WIPP 89-004

### ***7.2 Item Description Code (IDC) Number***

The IDC number is a three digit number assigned to a waste form type, such as plastics, dry combustibles, light metals, etc These numbers provide accountability, allow for segregation of wastes into identifiable forms for ease of processing, and when assessing nuclear material content during NDA The IDCs from each of the ten DOE sites are translated into content codes so that waste streams can be uniformly identified Approved waste IDCs are documented in Procedure 1-M12-WO-4034, Solid Radioactive Waste Packaging Requirements If a new IDC is created, approval from the RFETS Nuclear Material Control group and DOE WIPP is required A list of RFETS IDCs that have been assigned a content code and that meet the WIPP WAC is contained in Section 6 of this document

### ***7.3 Process Number***

The process number designates the unique RFETS location that generated the wastes Each building has a complete listing of the waste generating processes published in the applicable WSRIC building book

### ***7.4 Characteristic Constituent Code***

The waste characteristic constituent code is an alpha or numeric designator used to identify potential RCRA, TSCA or other hazardous constituents associated with a particular waste stream The numbers are defined by the Waste Management Operations department for use by waste generators in identifying and segregating wastes The waste characteristic constituent code, along with the IDC and process number, are then used to assign the appropriate EPA Hazardous Waste number for storing and shipping of wastes A list of hazardous characteristic constituent codes is provided on the Waste/Residue Traveler

### ***7.5 EPA Hazardous Waste Number***

The EPA Hazardous Waste number is required by Title 40 CFR, Part 261, Subparts C and D This number indicates the characteristic wastes, the nonspecific source wastes, specific source wastes, and commercial chemical products that are regulated as hazardous waste under this statute This number is recorded on each package on the hazardous waste label The generator is responsible for assigning the EPA Hazardous Waste number to all waste packages according to procedures in the Hazardous Waste Requirements Manual

### ***7.6 Waste Package Numbers***

White drums are assigned a unique number and bar code by as they are issued to generator organizations Three identical bar code labels are attached to the drum under the drum ring approximately 120 degrees apart

### ***7 7 Tamper Indicating Device (TID) Number***

The TIDs are strips of mylar tape imprinted with a unique bar code number The TIDs are attached to all sealed drums and SWBs containing Special Nuclear Material (Pu isotopes) The tape cannot be removed without visible damage to the TID The Nuclear Material Control department controls the issue of TIDs per 1-MAN-010-S&A, Safeguards and Accountability Manual

### ***7 8 Material Transfer and Storage Label***

The Material Transfer and Storage Label (RF-46148, sometimes referred to as a "Checkerboard Label") is used to identify individual waste items Each waste item will have a checkerboard label placed on it The label has a block for an identification number The generator is responsible for assigning and recording this number on the label and on the appropriate block on the Waste/Residue Traveler

### ***7 9 Employee Numbers***

The unique employee numbers of waste generators, inspectors, RTR operators, NDA segregating counter operators, Radiation Protection Technologists, and others are recorded during each stage of waste processing on the Waste/Residue Traveler and other associated documents Contractor personnel use Social Security numbers in lieu of the employee number

### ***7 10 Radioactive On-Site Transfer Label***

The Radioactive Material Label, form RSFORMS-09 02-1 is applied to the exterior of waste drums or boxes Requirements for this label are defined in the RFETS Radiological Control Manual

### ***7 11 Other Procedures for Item Identification and Control***

Additional procedures for controlling items are as follows

- 1-A67-QAP-08 01, Identification and Control of Items
- 1-I97-ADM-12 01, Control of Measuring and Test Equipment
- 1-A65-ADM-15 01, Control of Nonconforming Items

## **8. CONTROL OF PROCESSES**

Waste treatment and packaging operations are controlled through use of qualified processes and equipment, approved procedures, qualified personnel, and documentation of operating conditions. This assures that waste processing activities are conducted in a consistent, repeatable, and acceptable manner. Waste treatment process control is the responsibility of operations management with technical support provided by the Waste Disposal group. Specific control criteria for treated wastes, untreated wastes, and associated waste processes are addressed in this section. Process control plans are developed when required in accordance with procedure 1-M60-WPC-001, Waste Process Control.

### ***8.1 Waste Sampling and Analysis Plans & Data Quality Objectives***

The sampling and analysis of RFETS wastes is planned, controlled and performed in accordance with the RFETS WIPP Transuranic Quality Assurance Project Plan, 95-QAPJP-0500. The specific waste streams characterized through sample collection and laboratory analysis must be specified. The results of these efforts are compiled into reports called "Waste Stream and Residue Identification and Characterization" building books which provide information for the RCRA Part B operating permit application and are the source of much of the waste characterization data needed for certification of TRU waste to the WIPP-WAC.

All waste stream analysis data are required to be validated to the DQO criteria, and data sets dispositioned as acceptable, acceptable with qualifications, or unacceptable. The Waste Management Operations organization is required to disposition data sets, initiate corrective actions such as resampling if necessary, and maintain retrievable records of these activities. These requirements for waste sampling and analysis and data quality objectives are defined in the WIPP Waste Characterization QAPP and are reiterated and implemented by the RFETS WIPP Transuranic Waste Characterization Quality Assurance Project Plan, 95-QAPJP-0050.

### ***8.2 Solid Radioactive Waste Packaging - Untreated Wastes***

Process controls for untreated solid radioactive waste packaging are

- Physical control of all TRU waste packages using locking fixtures or limited access cages (including containers used for room trash collection in Radiation Control Areas),
- Controlled access to TRU waste packages, opening packages only during filling, inspection, or repacking operations,
- Approved, revision-controlled solid waste packaging procedures, 1-PRO-079-WGI-001, Waste Generation, Characterization, and Packaging, 1-M12-WO-4034, 4-D99-WO-1100, and 1-C80-WO1102-WRT, Waste Traveler form number RF-47386, drum label, box label, and NDA count sheets,
- Approved, revision-controlled WSRIC reference books issued to Building Operations management,
- Required Waste Generator Training and On-the-Job Training for all waste packaging personnel

These controls assure that wastes are properly identified, and comply with WIPP-WAC

### ***8.3 Waste Treatment or Packaging Processes - Process Control Plans***

Controls that assure waste treatment and packaging operations produce consistent, acceptable wastes are specified in individual process control plans. The process control plan requirements supplement general quality assurance program requirements stated in this plan. The process control plans are developed by operations management in cooperation with Waste Disposal per 1-M60-WPC-001, Waste Process Control.

### ***8.4 Process and Equipment Qualification***

Waste treatment processes and equipment are tested and qualified before being put into routine production. The installed equipment is functionally tested by a "Systems Operation" (SO) test designed and conducted by Technical Support Services, with engineering support from the Waste Disposal department and line management. After the SO test is complete, a designed experiment is conducted. This experiment methodically varies process parameters in trial runs and collects data on the various outcomes. The desired process outcome establishes quantifiable relationships between operating parameters and acceptable product.

Any process determined to be a critical treatment process, a final treatment process, or a special process, and which produces a waste form that must meet a requirement, or whose specified quality and conformance of waste cannot be determined readily by inspection or test before shipment, requires a Process Control Plan.

The responsible manager of the process being evaluated must determine the need for a Process Control Plan in accordance with 1-M60-WPC-001, Waste Process Control. If necessary, the responsible manager will then coordinate the development of the Process Qualification Plan, performance of the process qualification, and development of the Process Control Plan. The end result is a documented, quantified process capability report. The report specifies the required operating parameters, recommends measuring equipment calibration accuracy and precision, and when appropriate, recommends control chart monitoring for critical process parameters.

### ***8.5 Radioactive Waste Measurement - NDA***

The Non Destructive Assay process is controlled through

- Operator training
- Approved procedures
- Calibrated instruments
- Weekly measurement of measurement control samples and evaluation of data
- Daily instrument checks
- Qualification of NDA systems to meet specific data quality objectives

When subcontractor NDA equipment services are used on the TRU Waste Characterization Project the subcontractor is required through the procurement process to document how their processes meet applicable DOE CAO requirements

## **8 6 Special Processes**

### **8.6.1 Real-Time Radiography (RTR)**

Real-Time Radiography is designated as a "special" process due to the skill required to accurately interpret radiographs of sealed waste packages. The RTR operators must be certified prior to conducting waste container radiography. Training and certification of RTR operators is conducted by the NDT department in accordance with standard 5-NDT-TC-1A, Qualification and Certification of Metrology/Nondestructive Testing Personnel. Procedure 4-W30-NDT-00664, "Real-Time Radiography Testing of Transuranic and Low Level Waste," and procedure 4-I19-NDT-00569, "Real-Time Radiography Testing of Transuranic and Low Level Waste," contain instructions for performing verifications of waste packages and packages contents using RTR.

### **8.6.2 Leak Testing of the TRUPACT-II Package**

TRUPACT-II package helium leak testing is designated as a "special" process since the effectiveness of the test is based on operator knowledge which is obtained through formalized training. 4-PRO-028-TPO-WO-5035, TRUPACT-II Verification Leak Check, is the procedure that contains instructions for performing a verification leak test on the TRUPACT-II package.

## **8 6 3 Supporting Processes**

Departmental procedures provide detailed instructions for all routine processes associated with waste generation, inspection, test, certification, and shipping activities. Operations management are responsible to develop procedures which adequately describe and control their operations.

In addition to operations management having procedures for their processes, each building has its own WSRIC book. A WSRIC book has all the routine processes for a building listed in it, along with the waste streams associated with that process. Information about the waste stream also includes whether or not the waste produced is Low Level or TRU.

## **9. INSPECTION**

Inspections are planned and performed at various points from initial waste generation through final shipment. Inspections which verify conformance to certification requirements are performed by personnel other than those who performed the work. Inspections are performed by qualified personnel, the results documented, and the records maintained as part of the certification records. Inspections

evaluate conformance to WIPP waste acceptance and certification criteria, and inspection procedures. Waste inspection procedures establish the inspection points, define the inspector responsibilities, include standards for acceptance and rejection, and provide instructions for inspection performance.

These inspections assess package integrity, package contents conformance, and package documentation, labeling, and marking. Nonconformance to criteria is documented according to 2-U76-WC-4030, Control of Waste Nonconformances on a Nonconformance Report (NCR). The copy of the NCR is attached to the package documentation and returned to the generator or Solid Waste Operations for corrective actions.

The following inspections are performed:

Receiving - conducted to verify vendor products comply with procurement specifications when delivered (4-J44-RC&I-6600, non-Weapons Procured Item Acceptance and Certification),

Pre Use - inspection of drums or SWBs conducted by the waste generator prior to use and documented on the waste traveler (1-PRO-079-WGI-001, Waste Characterization, Generation, and Packaging and 4-D99-WO-1100, Solid Radioactive Waste Packaging),

In Process - performed at management discretion during waste generation, to ensure wastes comply with IDC designation, contain no free liquids, compressed gases or gross levels of particulates or other prohibited materials, includes dock inspection performed on filled and sealed boxes and drums on process building docks to assess package integrity, labeling, handling damage and proper documentation (4-H62-WI-4011, In-Process Waste Inspection and 4-I82-WI-4012, Dock Inspection),

Final Inspection - performed just prior to loading drums or SWBs into the TRUPACT-II package, to ensure proper documentation and package integrity (4-M63-WI-4013, Final and Loading Inspections for Packages and 1-PRO-X05-WC-4018, TRU Waste Certification),

Traffic Management Inspection of TRUPACT-II Boxes - to ensure compliance with applicable requirements (See Section 4.16.13.2 for Traffic procedures related to inspection),  
Traffic Management Inspection of Drums - to ensure compliance with applicable requirements,

TRUPACT-II Vehicle Inspection - to ensure proper loading of vehicle and the condition of the tractor, trailer, and TRUPACT-II packages performed by the carrier, Traffic Management, and the Colorado State Patrol.

## 10. TEST CONTROLS

Inspections and tests performed to verify conformance of an item or activity to specific requirements are planned, controlled and documented to assure consistent, repeatable, and retrievable results. Inspections and tests are performed by qualified personnel using procedures that specify test criteria and conditions for acceptance or rejection of the inspected and tested item. The inspections and tests associated with the TRU Waste Characterization Project are:

Equipment Systems Operations Tests

TRUPACT II Leak Testing (per procedure 4-PRO-028-TPO-WO-5035, TRUPACT-II Verification Leak Check)

## Waste Treatment Process Validation Tests (see Section 3 9 2)

Systems Operations tests are performed for newly installed waste processing equipment. The SO tests validate equipment function and verify performance of equipment to selected design criteria. Systems Operations tests are developed, documented, approved and conducted per the Conduct of Engineering Manual.

Preoperational functional tests for all NDA equipment. NDA operating software incorporates system performance tests such as background measurements and spectral resolution. Operators are instructed to measure standards at the beginning of each shift. These measurements must pass established acceptance criteria before the NDA system can be used for actual measurements.

## 11. CONTROL OF TEST AND MEASURING EQUIPMENT

### *11.1 Process Equipment and Radioactive Sources Calibration*

All test and measurement equipment used is controlled and calibrated in accordance with requirements specified in ASME NQA-1, Section 12, and procedure 1-197-ADM-12 01, Control of Measuring & Test Equipment. Calibration of test and measuring equipment may be performed either internally, using in-house reference standards, or externally by national certifying agencies or manufacturers. All reference standards have valid relationships to nationally recognized standards, for example, NIST, MIL 1. If national standards do not exist, the basis for calibration is documented. All test and measuring equipment are uniquely identified.

Several Rocky Flats organizations, including Metrology, Analytical Services, and Safeguards Measurements, have responsibilities for controlling and calibrating test and measuring equipment. 1-197-ADM-12 01 establishes Metrology as responsible for approving all other calibrating organizations through an active surveillance program. In addition, Metrology is responsible for performing calibrations for a variety of physical, dimensional, chemical, and NDA measurements and for preparing and certifying standards for NDA and the Analytical Laboratories. This is accomplished in accordance with Procedure SOP-MLA-008, Metrology Laboratories Control of Measuring and Test Equipment, which describes the recall system which establishes the traceability of all standards and test and measuring equipment under the purview of Metrology. All calibrating facilities shall have mechanisms in place for evaluating inspections or tests where out-of-tolerance instruments were used. These mechanisms shall include methods for evaluating the data obtained from the use of these instruments, and methods for retesting or correcting the data to ensure data accuracy.

As part of its surveillance program, Metrology assures that all Rocky Flats calibrating organizations comply with 1-197-ADM-12 01. All calibrating organizations must establish a control system for the equipment under their purview, which includes unique identification of test and measuring equipment. All calibrating organizations must also use approved procedures for performing calibrations of test and measuring equipment. Those instruments that are calibrated on site shall be calibrated in an environmentally controlled area and the environmental data recorded and maintained (e.g. temperature, humidity, and dust concentrations). Reference standards must either be certified by the Metrology

Laboratories or be obtained from a nationally recognized source. Calibrating organizations must establish calibration frequencies and a mechanism for ensuring that only calibrated equipment is used for this project.

### ***11.2 Nondestructive Assay Radiometric Counters Calibration***

Solid Waste Operations is responsible for the control and calibration of all NDA equipment used for waste assay and segregation purposes. NDA equipment used for waste assay and segregation purposes is controlled and calibrated in accordance with 3-MAN-006-NDA-1000, Nondestructive Assay Calibration Program Manual.

The Waste NDA calibration program is implemented by procedure 3-MAN-006-NDA-1000, Nondestructive Assay Calibration Program Manual. All NDA counters are defined as "Calibrate Before Use" equipment. The calibration of each counter is verified daily before the counter is used to make measurements. Measurements of calibration standards are performed by Solid Waste Operations personnel according to approved procedures.

The calibration function is established and modified in accordance with 3-MAN-006-NDA-1000, Nondestructive Assay Calibration Program Manual. Solid Waste Operations also determines the acceptance criteria for calibration verification measurements and incorporates these into the operating software.

Solid Waste Operations personnel must measure calibration standards each time the equipment is used. If the calibration verification measurements fail the acceptance criteria, a placard is used to show that the system is under control until the apparent problem has been resolved.

Calibration standards for NDA counters are prepared and certified by Metrology in accordance with procedure S-C-00013, Synthetic and NDA Standards Calibration. Metrology certifies Rocky Flats stream plutonium oxide that has been characterized using measurement systems traceable to NIST and NBL. Balances traceable to NIST are used to weigh quantities of the certified plutonium oxide that are immobilized in RTV silicone foam modules and added to standard drums containing matrix material representative of actual waste matrices. Standard matrix drums can be prepared one of two ways: 1) balances traceable to NIST are used to weigh quantities of certified plutonium oxide which are immobilized in RTV silicone foam modules and added to standard drums containing material representative of actual waste matrices, or 2) standard drums are constructed with vertical tubes inserted through matrix material. Certified Pu sources of varying activities can be placed in the tubes to cover the measurement range.

## **12. MARKING, HANDLING, STORAGE AND TRANSFER**

The following are the primary procedures for controlling the marking, handling, storage, labeling, staging, transfer, and preparation for shipment of waste packages in order to prevent damage or loss, to minimize deterioration, and to assure safety of operations.

1-PRO-Q11-WO-1221, Controls for the Movement of Waste Containers  
4-D99-WO-1100, Solid Radioactive Waste Packaging  
1-PRO-079-WGI-001, Waste Characterization, Generation, and Packaging  
1-80-WO-1102-WRT, Waste/Residue Traveler Instructions  
1-MAN-010-S&A, Safeguards & Accountability Manual  
4-H30-WO-5030, Handling TRU & TRU Mixed Waste Packages in Bldg 664  
RFETS Transportation Safety Manuals  
Waste generators, inspectors, custodians, field technicians, and certification officials verify and document compliance to these procedures from the initial point of generation to final disposal  
Marking and labeling requirements for off site shipment are defined in 1-T13-Traffic-306, Labeling & Marking TRUPACT Packages

### ***12.1 Handling and Storage***

TRU wastes are stored in approved and designated areas at RFETS. Mixed TRU waste is stored in RCRA Part B permitted storage areas. Wastes scheduled for off-site shipment are processed through the Building 664 staging area by Waste Operations personnel. Nuclear Material Control personnel authorize and track the movement of nuclear material throughout RFETS. Dock inspection, RTR verification, document review, and storage are conducted in accordance with established procedures, drawings, and specifications. The following procedures describe the physical handling and loading of waste packages for off-site shipment in the TRUPACT-II package:

4-H30-WO-5020, Handling TRU & TRU Mixed Waste Packages in Bldg 664  
4-J02-TPO-WO-5030, TRUPACT-II Vessel Preparation in Building 664  
4-K14-TPO-WO-5032, Preparing the TRUPACT-II Drum and Standard Box Shipment in Building 664  
4-H39-TPO-WO-5033, Vessel Inspection, Checking the Spacer Assemblies, and Loading/Unloading the TRUPACT-II Vessel in Building 664  
4-H81-TPO-WO-5034, Lid Replacement on the TRUPACT-II Vessel in Building 664

### ***12.2 Waste Transfer***

The Traffic Management department coordinates the off-site shipment of TRU waste to the disposal site at the WIPP. All TRU waste shipments consigned to the WIPP will be made in accordance with applicable DOT, EPA, state, and local hazardous waste regulations, as well as WIPP transportation requirements. Procedures for waste transfer are specified in the "Rocky Flats Transportation Safety Manuals" and Traffic Management department procedures (e.g., "Certifying Authorized Payloads for TRUPACT-II").

## **13. INSPECTION, TEST, AND OPERATING STATUS**

The status of certification activities is maintained from the point of waste generation through the final shipment inspection through the waste packaging procedures. Required certification activities are identified, described, and referenced in waste certification procedures.

### ***13.1 Processing***

The progress and control of waste packages through the waste stream is maintained by forms, labels and markings which require the performance of specific tasks to ensure compliance of each waste package to the WIPP-WAC. The performance of identified activities is documented by the generator or responsible party affixing their signature at the appropriate location on the documentation. The serialization of each waste package and use of these numbers on all documentation ensures traceability through the system. The inspection status of waste is clearly marked on the forms, labels and marking attached to the waste packages.

### ***13.2 Inspections and Tests***

Inspection points in the waste stream verify the performance of required activities. Passage of a waste package through an inspection point is verified by the inspector signing and/or stamping the Waste/Residue Traveler. Waste items found nonconforming must be tagged with a yellow Waste Nonconformance Status Tag (RF-47841) and physically segregated from conforming waste items.

### ***13.3 Nondestructive Assay for Radioactive Material Content***

Measurement control procedures and the controlling software of each NDA counter system ensure proper operating status of the NDA counter.

Operators of NDA counters must measure a working standard daily before using the counter for actual assays. If the daily working standard measurement does not pass acceptance criteria encoded in the controlling software, the system shuts down and instructs the operator to contact management. Placards are placed on NDA systems to indicate the systems are not available for use.

In addition, NDA operators must measure calibration standards on a weekly basis. These measurements must also pass acceptance criteria.

The weekly calibration standard measurements are documented on the NDA System Measurement Control Review Form.

### ***13.4 Operating Equipment***

The operating status of equipment associated with waste management activities is clearly designated and documented to prevent inadvertent use of malfunctioning or otherwise defective equipment. The

required controls for this system are defined in the Facilities Engineering Systems Operation test procedure, in 1-15320-HSP-2 08, Lockout/Tagout

#### **14. CONTROL OF NONCONFORMING ITEMS**

Procedure 2-U76-WC-4030, Control of Waste Nonconformances, addresses the system to control waste nonconformances. Nonconforming waste packages are identified by affixing the waste nonconformance status tag to the waste package showing the package ID number and the unacceptable condition. The waste package is then segregated from the processing stream until corrective action is completed, documented, and verified. Nonconforming waste packages are tracked in the WEMS system.

Packages not meeting certification requirements may be returned to the waste generating organization for corrective action. Return of the rejected waste package to its originating organization is dependent upon area storage capacity, 90 day storage limitations, and radiation and chemical protective equipment requirements. Waste generators disposition waste NCRs by describing the corrective action to be taken, using the space provided on the NCR. Independent verification of the corrective action is performed by Waste Certification & Oversight prior to closure.

The Non-Conformance Reports (NCR) pertaining to TRUPACT-II packages will be submitted to CAO per the requirements of DOE/WIPP-93-1001 for review, final disposition, and approval.

Control of nonconformances that are not waste nonconformances are controlled according to 1-A65-ADM-15 01, Control of Nonconforming Items. These NCR's are tracked in the Plant Action Tracking System according to 1-P04-PATS-16 00, Plant Action Tracking System.

#### **15. CORRECTIVE ACTIONS**

Conditions adverse to waste acceptability are identified promptly through inspections, tests, surveillances, and audits and corrected as soon as practical. The site corrective action program is defined in 1-MAN-012-SCARM, Site Corrective Action Requirements Manual.

Corrective actions are initiated and documented in accordance with procedure 3-X31-CAP-001, Corrective Action Process. Corrective Actions are tracked utilizing 1-P04-PATS-16 00, Plant Action Tracking System. Stop work orders are issued according to procedure 1-V10-ADM-15 02, Stop Work Action. Deficiencies resulting in Stop Work Actions must be corrected prior to resuming waste processing.

Significance is determined in accordance with instructions in 3-X31-CAP-001, Corrective Action Process. Significant adverse trends must be evaluated for root cause and actions taken to address root cause in order to preclude recurrence. Cause analysis is performed when significant adverse conditions are identified (RFETS procedure 1-11000-ADM-16 03, Cause Analysis). Significant adverse conditions may result in issuance of a stop work order by the Waste Certification Official, the TRU Waste Site Project Manager, or the RMRS QA organization.

## **16. QUALITY ASSURANCE RECORDS**

QA records are maintained in order to furnish documented evidence that wastes are generated, packaged, inspected, assayed, analyzed, tested, and shipped according to the applicable requirements

The RFETS procedure for the control of records, 1-V41-RM-001, Records Management Guidance for Records Sources refers generators of TRU Waste Characterization Project records to procedure 1-PRO-077-WIPP-005, Management of WIPP Information Prior to Transmittal to the WIPP Project File This procedure provides instructions for maintenance of TRU Project Records in compliance with the CAO QAPD Procedure 4-Q31-WP-4710, WIPP Project Office Records, provides instructions for the TRU Waste Project Data Officer's handling of records

Paper records pertaining to the TRU Waste Characterization Project are defined by type and are only considered valid records if they are signed and dated by authorized personnel from the applicable organizations

A Records Inventory Disposition Schedule (RIDS) required by DOE CAO-1010, QAPP Section 1 7 is developed and maintained in accordance with DOE CAO-1001, Information Management Plan

## **17. INDEPENDENT ASSESSMENT**

The independent assessment program implemented for the TRU Waste Characterization Project is described in this section It is implemented as part of overall RFETS independent assessment activities Operations and functional managers are required to provide audit and surveillance personnel free access to documents, work areas, workers, and supervision during independent assessment activities

### ***17.1 Audits***

An independent assessment of the TRU Waste Characterization Project is performed annually by the Kaiser-Hill Quality Program group Procedure 4-S72-QAA-10 01, Quality Assurance Audit Program is used to plan and perform the assessment and report the audit results Corrective actions are managed according to the requirements of 1-MAN-012-SCARM, Site Corrective Action Requirements Manual Procedure 3-X31-CAP-001, Corrective Action Process, defines the site level process for documenting and characterizing corrective actions identified during the assessment Procedure 1-P04-PATS-16 00, Plant Action Tracking System provides for tracking of corrective actions

The annual audit is scheduled according to 1-W37-IA-002, Integrated Planning and Scheduling of Independent Assessment Activities

Personnel performing audits are qualified according to procedure 1-N92-ADM-02 03, Training, Qualification and Certification of Independent Auditors and Assessors

Responses and follow-up to audits by management of the audited organization is directed by the requirements in 1-MAN-012-SCARM, Site Corrective Action Requirements Manual

Audit records are controlled according to 1-V41-RM-001, Records Management Guidance for Records Sources

Technical specialists for the independent audit teams are supplied for the audit team by the TRU Waste Characterization Project as requested by the Kaiser-Hill audit team leader. The technical specialists supplied shall be independent of the processes to be audited.

### ***17.2 Surveillances***

Surveillances of the project are performed by TRU Waste Project QA Officer or personnel under the QA Officer's direction. The surveillances are performed according to RMRS Procedure RMRS-QA-10 02, Conduct of QA Surveillances. An annual schedule of surveillances is issued by the TRU Waste Project QA Officer and submitted to the TRU Waste Site Project Manager and the RMRS Manager of Quality Assurance. Corrective actions are documented and tracked according to 3-X31-CAP-001, Corrective Action Process and 1-P04-PATS-16 00, Plant Action Tracking System.

Surveillances are performed to 1) monitor work in progress, 2) verify compliance with established requirements and procedures, 3) identify actual and potential conditions adverse to quality, 4) obtain timely corrective action commitment from cognizant managers for identified conditions adverse to quality, 5) provide notification to responsible managers of the status and performance of work under surveillance, and 6) verify timely implementation of corrective action.

Audits and surveillances of activities performed by other organizations are reviewed by the TRU Waste Project QA Officer for applicability to project activities. These audits and surveillances may substitute for project surveillances when project affecting activities are evaluated. Conditions adverse to quality identified in these surveillances are monitored in project trending of conditions adverse to quality.

## **18. MANAGEMENT ASSESSMENTS**

The RFETS program for management assessment is defined in 1-MAN-013-SIOM, Site Integrated Oversight Manual. Managers at all levels of the project periodically assess performance of their organizations to determine the effectiveness of QA program provisions. The TRU Waste Site Project Manager schedules and performs management assessments per RMRS-QA-09 01, Management Assessments. Kaiser-Hill management of the project performs management assessments per 3-W24-MA-002, Kaiser-Hill Management Assessment Program.

## **19. SOFTWARE QUALITY ASSURANCE (SQA)**

Three software systems support TRU Waste management operations and are controlled during development, use, and maintenance, to ensure that the software performs reliably and to expectations. The site procedure that controls the purchase or development and maintenance of computer software is 1-MAN-004-CSMM, Computer Software Management Manual. These software programs also comply

with the requirements of Section 6 - Software Requirements of CAO-94-1012, U S DOE CAO, Quality Assurance Program Document Each user identifies how their system complies with the requirements of Section 6 - Software Requirements The TRU Waste Project QAPD Procedures Matrix, Section 6, lists the controls implemented for each system to be in compliance with the requirements

The following describes these software systems and software QA compliance

The Waste and Environmental Management System (WEMS) is a multi-user software package that operates on the unclassified VAX cluster This system tracks all waste types (TRU/TRU Mixed, LLW/LLW Mixed, and Hazardous) from "cradle-to-grave" and is the responsibility of the Re-Engineering & Operations Services group The WEMS software tracks individual waste packages during the waste generation, packing, storage, and shipping process and is used to prepare load lists to waste disposal sites Re-Engineering & Operations Services is responsible for maintaining 4-F72-WEM-WP1205, Waste and Environmental Management System (WEMS) Software Quality Assurance Compliance, for the WEMS which addresses Software QA Software validation testing for WEMS is performed according to the procedure 4-F72-WEM-WP1205

The software used to control RFETS NDA systems is executed by multiple users, and is controlled and maintained by Solid Waste Operations Executable codes are distributed to various computers controlling these NDA systems at RFETS Each of these software packages are both automated and interactive and control the process by which drums, filters, and crates are assayed They operate by prompting the user for pertinent information such as operator identification number, package number, IDC, etc Upon final assay of the drums, filters, or crates, the software automatically calculates and prints such information as the date of assay, net and gross weight, IDC, radionuclide assay results, and LLW/TRU designation The Solid Waste Operations organization maintains a software quality assurance procedure for waste NDA software at RFETS Refer to the QAPD Procedures Matrix for specific information on compliance with requirements

The third software system supporting TRU Waste management activities is the data management system utilized and maintained by the Analytical Laboratories This software is part of the analytical instrumentation used for analysis in the Radioactive Laboratories Software Quality Assurance on this software is described in L-4031, Software Quality Assurance Plan for the Radioactive Laboratories Refer to the QAPD Procedures Matrix for specific information on compliance with requirements

## **20. QUALITY IMPROVEMENT**

Quality Improvement is achieved through the management assessment, surveillance, independent assessment, nonconformance, and corrective action processes Improvement or corrective actions are identified, root cause analysis performed, action plans defined, and actions implemented

Performance on waste packaging is monitored by the Waste Certification and Oversight group and monthly reports are issued showing the number and status of Waste NCR's The PQAO trends conditions adverse to quality related to the TRU Waste Characterization Project according to procedure

---

WIPP-007, TRU Waste Characterization Project Conditions Adverse to Quality Trending and Analysis, and identifies opportunities for improvement

A lessons learned program has been implemented through procedure 1-MAN-017-LLGI-RM, Site Lessons Learned/Generic Implications Requirements Manual

Periodically Waste Certification & Oversight may review the radioactive waste management activities of any building WC&O may selectively utilize a Waste Quality Action Report (WQAR) to identify programmatic issues and deficiencies or significant adverse trends which could affect the certifiability of waste. The WQAR progressive corrective action process is described in 94-WC&O/QAMP-0018, WC&O Quality Assurance Management Plan, and can lead from suspension of waste package movement and generation to removal of the authorization to ship waste. Alternatively, a Stop Work Action may be issued per procedure 1-V10-ADM-15 02, Stop Work Action

## **Appendix 2**

# **Low Level Waste (LLW) Program QA Supplement**

**Table of Contents**

1	QUALITY ASSURANCE PROGRAM	4
1 1	Personnel Training and Qualification	4
2	DESIGN CONTROL	6
2 1	Procurement Document Control	6
2.1 1	Waste Packaging Procurement	6
2 1 2	Procurement	7
3	INSTRUCTIONS, PROCEDURES, AND DRAWINGS	7
4	DOCUMENT CONTROL	7
5	CONTROL OF PURCHASED ITEMS AND SERVICES	8
6	IDENTIFICATION AND CONTROL OF ITEMS	8
6 1	Item Description Code (IDC) Number	9
6 2	Process Number	9
6 3	Chemical Constituent Code	9
6 4	Employee Numbers	9
6 5	EPA Hazardous Waste Code	10
6 6	Material Transfer and Storage Label	10
6 7	Tamper Indicating Device (TID) Number	10
6 8	Waste Package Numbers	10
6 9	Waste Stream Number	10
7	CONTROL OF PROCESSES	11
7 1	Radioactive Waste Measurement - NDA	11
7 2	Solid Radioactive Waste Packaging - Untreated Wastes	11
7 3	Liquid Radioactive Waste Packaging	12
7 4	Special Process Real-Time Radiography (RTR)	12
7 5	Supporting Processes	12
7 6	Process and Equipment Qualification	12
8	INSPECTION	13
9	TEST CONTROLS	13
9 1	Control of Test and Measuring Equipment	14
9 2	Nondestructive Assay	14
9 3	Process Equipment and Radioactive Sources Calibration	15
9 4	Real-Time Radiography	16
10	MARKING, HANDLING, STORAGE AND TRANSFER	16
10 1	Hazardous Liquid Waste Transfer and Storage	16
10 2	Storage	16
10 3	Waste Transfer	17
11	INSPECTION, TEST AND OPERATING STATUS	17
11 1	Inspections and Tests	17
11 2	Nondestructive Assay for Radioactive Material Content	17
11 3	Processing	18
12	CONTROL OF NONCONFORMING ITEMS	18

---

13 CORRECTIVE ACTIONS	18
14 QUALITY ASSURANCE RECORDS	19
15 INDEPENDENT ASSESSMENTS	21
16 SOFTWARE QUALITY ASSURANCE (SOA)	21
17 QUALITY IMPROVEMENT	22
18 SURVEILLANCE	22

This appendix describes compliance with the Quality Assurance requirements defined in the Hanford Site Solid Waste Acceptance Criteria (WHC-EP-0063-4), and the Nevada Test Site Waste Acceptance Criteria Document (NVO-325 )

The QA requirements for RFETS are identified in the Kaiser-Hill Quality Assurance Program Criteria RMRS documents compliance with the Kaiser-Hill Quality program in the RMRS Quality Assurance Program Description Document (RMRS-QAPD-001) The QA Program implemented by the LLW Program, is directed towards Nevada Test Site QA requirements

## **1 QUALITY ASSURANCE PROGRAM**

This section describes the overall quality assurance program that provides controls to assure that LLW and LLMW shipped from Rocky Flats meets all applicable acceptance criteria and regulations The quality assurance program for LLW and LLMW is a subset of the RFETS Quality Assurance program and meets RFETS requirements and disposal site requirements A summary of the LLW Quality Assurance Program requirements is as follows

### ***1.1 Personnel Training and Qualification***

Personnel associated with the handling, packaging, inspection, testing, shipment, processing, and certification of waste shall be trained and qualified to applicable criteria, in accordance with the Training User's Manual (TUM), 1-10000-TUM Training and qualification shall result in achieving compliance with the TSDF waste acceptance criteria, as well as all other applicable requirements Retraining and re-qualification intervals are delineated in the TUM for the general and specific Job Classification Training TUM procedure 1-S52-T&Q-TR-004 provides general, area-specific, job-specific, and continuing training requirements for the Rocky Flats Environmental Technology Site

Process specific training and qualification are required of all operators prior to conducting work Building Operations and functional managers are responsible to assure personnel are trained and qualified in accordance with specified program requirements prior to conduction work They may choose to maintain duplicate, retrievable personnel qualification records for all tasks and job descriptions within their area of authority

The Waste Generator All Areas Training and Qualification Program, which consists of the classroom training, on-the-job training (OJT), final qualification, and the distribution of the Waste Generator Qualification Badge (which must be worn to verify the generator is qualified to generate and pack waste), has been developed for all personnel involved in waste management activities This includes all waste generators, waste item handlers, and supervisors responsible for personnel directly involved in waste item handling and packaging of low-level waste Site employees meeting the definition of DOT Hazmat Employees are trained in accordance with 49 CFR 172 Subpart H

Training development, approval, and delivery complies with applicable DOE orders and the TSDF waste acceptance criteria The specific job responsibilities and interfaces involved in training development, delivery, and maintenance are specified in procedure 1-S52-T&Q-TR004 "Training Requirements" and procedure 1-S50-T&Q-QC-002 "Qualification and Certification"

Westinghouse Hanford Company provides an "Offsite Generator's Information Exchange", which covers general requirements from the Washington Administrative Code - Dangerous Waste Regulations (WAS-173-303), and Hanford Site Solid Waste Acceptance Criteria (WHC-EP-0063-4) Key personnel involved in the management of waste streams that could be disposed of at Hanford (e g , LL/LLM Waste Projects, Waste Inventory and Documentation, Waste Certification and Oversight, and Traffic Management) shall remain knowledgeable in the Hanford criteria by attending this exchange or independently reviewing the documents as needed Personnel responsible for the proper designation of waste destined for Hanford must also remain knowledgeable of these criteria

In addition to the applicable site training courses referenced in the TUM, specific waste training courses for the listed job classifications are also required as follows

- Waste Certification Official (WCO)
  - Qualification Standard Package for WCO (067-200-01)
  - Qualification Standard Package for Alternate WCO (067-210-01)
  
- Waste Package Certifiers
  - Qualification Standard Package for Waste Package Certifier  
(Qualification Package still under development )
- Waste Inspector
  - Inspection Procedure Indoctrination
  - Qualification Document (030-279-01)
  
- Customer Support Representatives (CSR)
  - Qualification Standard Package for CSRs
  - Qualification Standard Package for Alternate  
(Qualification Package still under development )
  
- Nondestructive Testing Technician
  - Training and certification per RFQ-TC-1A
  
- Nondestructive Assay Chemical Operator
  - Material Handling
  - HEPA LOSAC Counter
  - LOSAC Counter
  - PADC Counter
  - Crate Counter
  - 371 SGS Counter
  - Ring Removal, Replacement and Inspection
  
- Radiation Control Technician (RCT)
  - RCT Training Progression Program Requirements
  - Radiological Operating Instructions Indoctrination

## **2 1 2 Procurement**

The Performance Oversight group performs supplier evaluations and audits in conjunction with subject matter experts from Kaiser-Hill subcontractors and maintains the Approved Suppliers List. Procurement's role in procurement document control is specified in the Procurement System Policy Manual.

The quality controls developed and applied to the items is in accordance with a graded approach which considers the complexity of the item, the risk of item failure, and the performance of item suppliers. Items to be procured will be identified by "Procurement Levels", as defined in 2-C93-COEM-DES-273, Engineering Standards for Procurement. Specific inspection/acceptance criteria are delineated in Procurement specifications.

Procurement documents require suppliers to provide products that meet the QA requirements identified in this document.

## **3 INSTRUCTIONS, PROCEDURES, AND DRAWINGS**

Low level wastes are collected, treated, processed, packaged, inspected, certified, and loaded for shipment according to written approved procedures. The correct execution of these procedures ensures that LLW is generated, shipped, and disposed of in compliance with all applicable criteria, including applicable requirements specified by the TSDF, the Department of Transportation, and the Department of Energy. Procedures include specified process instructions which direct a trained operator to perform the task at hand in a consistent and repeatable manner. Design of systems, processes, and equipment associated with the LLW Management Plan are specified by approved, controlled drawings. The instructions, procedures, and drawings supporting the LLW program are specified in Appendix 5, Implementation Matrix of Quality Assurance Requirements.

## **4 DOCUMENT CONTROL**

Records, generated relating to the generation and final disposition of low level waste (i.e., travelers, NDA data, RTR data, certification records, and other QA records) shall be retained for five years.

The sitewide Document Control Program is defined in procedure 1-77000-DC-001, Document Control Program. The procedures directly related to and many indirectly related to the LLW program are within the sitewide document control system.

Other documents such as lists of qualified waste generators are maintained as controlled documents by operations management. The usual mechanism for controlling and maintaining such items is the Conduct of Operations Manual, COOP-01, Conduct of Operations, and COOP-10, Control of Operator Aids.

## **5 CONTROL OF PURCHASED ITEMS AND SERVICES**

Items and services purchased to support the LLW Management Plan are controlled at all stages of procurement from requisition and purchase order preparation, specification development and approval, approval and selection of suppliers, supplier bid evaluation and award, verification, control of nonconformance and corrective action, acceptance of items or service, and maintenance of records. The system control procedures are found in the Procurement System Policy Manual, COEM procedures, and the Site QA Procedures Manual. The specific quality controls applied are based on the assigned procurement level of the item or service. The RCI department verifies and Supplier Quality Assurance evaluates supplier QA programs through onsite audits, product performance data, or certificates of conformance to specification.

Procurement selects suppliers from the Approved Suppliers List. A supplier evaluation is performed by Procurement Support. This evaluation may be based on evaluation of existing or supplier provided documents or records, or by a direct evaluation of the supplier's facilities, personnel, and quality assurance program. Pre-award bid evaluations may be let to evaluate small quantities of products prior to place a large order.

Supplier performance evaluation is conducted for all suppliers of Procurement Levels 1 and 2 items and may involve any of the following measures: source surveillance and inspection, product receiving inspection or test or review of supplier work instructions, and certificates of conformance or other documents. Acceptance criteria may be specified by Procurement Engineering in Procurement Specification and/or QIDs. Acceptance is based on supplier certificates of conformance, source verification, receiving inspection or test, or a combination of any of these.

When a supplied item or service does not conform to procurement document requirements, the non-conforming condition is documented, evaluated, and dispositioned as to usability (such as use as is, return to supplier for rework, rework at Rocky Flats, or reject and return to supplier).

RCI in Building 130 Receiving Warehouse generates supplier related Nonconformance Reports. RCI maintains inspection and certification records of accepted items including Nonconformance Reports with appropriate disposition.

## **6 IDENTIFICATION AND CONTROL OF ITEMS**

Identification and traceability of waste streams, waste packages, involved packaging, testing, and inspection, analytical results, and other items associated with LLW management are required.

Items such as waste streams and waste packages are uniquely identified from the initial generation or receipt up to and including use, packaging, storage, transportation, and emplacement at a waste disposal facility.

Specific waste characteristics, waste generation sources, applicable chemical analyses and any inspections, tests, and certifications for wastes are traceable back to the wastes and packages for an indefinite period after final burial of the TSDF.

The key document that records traceability information is the Waste/Residue Traveler (RF-47386)

This data collection from (Waste/Residue Traveler) is generated for each waste package, and it documents the employee numbers of all waste generators, inspectors, and test technicians directly involved with processing that waste package. The Waste/Residue Traveler also documents inspection and test results, waste generation source (process number), and hazardous constituent number (if applicable)

Other information is recorded on the Uniform Hazardous Waste Manifest. The Uniform Hazardous Waste Manifest records the EPA number and other required information for RCRA regulated hazardous wastes.

More specific definitions of traceable control numbers are defined in the following sections:

#### ***6.1 Item Description Code (IDC) Number***

The IDC number is a three- or four-digit number assigned to a waste form type (e.g., plastics, dry combustibles, or light metals). These numbers allow for segregation of wastes into identifiable forms for ease of processing and also that appropriate matrix specific calibrations are used for when assessing nuclear material content during NDA.

#### ***6.2 Process Number***

The process number designates the unique location that generated the wastes. Each facility has a complete listing of the waste generating processes published in the applicable WSRIC building book.

#### ***6.3 Chemical Constituent Code***

The chemical constituent code is an alpha or numeric designator used to identify potential RCRA hazardous constituents associated with a particular waste stream. The numbers are defined by the Radioactive & Regulatory Waste Programs department for use by waste generators in identifying and segregating wastes. The waste characteristic constituent code, along with the IDC and process number, are then used to assign the appropriate EPA Hazardous Waste.

#### ***6.4 Employee Numbers***

The unique employee numbers of waste generators, inspectors, RTR operators, NDA segregating counter operators, RCT, and others are recorded during each stage of waste processing on the Waste/Residue Traveler and other associated documents. Subcontractor personnel who do not have RFETS employee number use Social Security numbers in lieu of the employee number.

### **6.5 EPA Hazardous Waste Code**

The EPA Hazardous Waste code is required in accordance with Title 40 CFR and/or CDPHE 6 CCR 1007-3. This number indicates the characteristic wastes, nonspecific source wastes, specific source wastes, and commercial chemical products that are regulated as hazardous waste under this statute. This number is recorded on the standard Uniform Hazardous Waste Manifest by Traffic Management. The generator is responsible for assigning the EPA Hazardous Waste code to all waste packages.

### **6.6 Material Transfer and Storage Label**

The Material Transfer and Storage Label (RF46148, sometimes referred to as a "Checkerboard Label") is used to identify individual waste items. Each waste item will have a checkerboard label placed on it. The label has a block for an identification number. The generator is responsible for assigning and recording this number on the label and on the appropriate block on the Waste/Residue Traveler.

### **6.7 Tamper Indicating Device (TID) Number**

The TIDs are strips of mylar tape imprinted with a unique bar code number. The TIDs are attached to all sealed drums containing Special Nuclear Material (Pu isotopes). The tape cannot be removed without visible damage indicating tampering has occurred.

Safeguards & Accountability controls the issue of TIDs in accordance with the Nuclear Material Safeguards (NMS) Manual, Section 7.

Each waste package shall have a TID applied to it. If the TID is not present or the existing TID has been damaged, a TID shall be applied in accordance with requirements in the NMS manual prior to shipment to the TSDF.

### **6.8 Waste Package Numbers**

White drums are assigned a unique number and bar code by building Warehouse personnel as they are issued to generator organizations.

The bar code label is attached to the drum in a visible location under the drum ring.

Full- and half-crate waste boxes are assigned a unique number and bar code by Supply Branch personnel after they have passed a visual acceptance inspection.

The bar code label is attached to the box in a visible location as specified by the TSDF.

### **6.9 Waste Stream Number**

The waste stream number is a unique, thirteen-character, alpha numeric code which identifies the generator and the generator's waste stream to personnel at the NTS disposal facility. A portion of this number, the IDC, is used routinely by Rocky Flats personnel to segregate wastes. This number is not the same as the WSRIC waste stream number.

## 7 CONTROL OF PROCESSES

Waste treatment and packaging operations are controlled through use of qualified processes and equipment, approved procedures, qualified personnel, and documentation of operating conditions. This assures that waste processing activities are conducted in a consistent, repeatable, and acceptable manner. Waste treatment process control is the responsibility of Operations management. Process control plans are developed when required in accordance with procedure I-M60-WPC-001, Waste Process Control.

### 7.1 *Radioactive Waste Measurement - NDA*

The Non Destructive Assay process is controlled through

- Operator training
- Approved procedures
- Calibrated instruments
- Weekly measurement of measurement control samples and evaluation of data  
daily instrument checks
- Qualification of NDA systems by Safeguards Measurements to meet specific data quality objectives

### 7.2 *Solid Radioactive Waste Packaging - Untreated Wastes*

The following controls ensure that wastes are properly identified and comply with Waste Acceptance Criteria (WAC)

- Physical control of all LLW boxes and drums using locking fixtures or limited access cages (including containers used for room trash collection in Radiation Control Areas)
- Controlled access of LLW boxes and drums, opening packages only during filling, inspection, or repacking operations
- Approved, revision controlled procedures: 1-M12-WO-4034, Radioactive Waste Packaging Requirements, 4-D99-WO-1100, Solid Radioactive Waste Packaging, 1-C80-WO1102-WRT, Waste/Residue Traveler Instructions, and additional procedures identified in other sections of this document. Approved, revision controlled Waste Stream and Residue Identification and Characterization (WSRIC) reference books
- Required Waste Generator Training and Building process-specific OJT for all waste packaging personnel
- Utilization of Waste Generator Instructions as defined in procedure 1-PRO-079-

---

WGI-001, Waste Characterization, Generation, and Packaging

**7.3 *Liquid Radioactive Waste Packaging***

Liquid waste packaged in packages other than tanks shall comply with the provisions of the Rocky Flats Transportation Safety Manuals

The external-to-building (inter-building) transfer of liquid wastes shall be approved by the On-Site Transportation Committee

**7.4 *Special Process. Real-Time Radiography (RTR)***

Real-time radiography (RTR) is designated as a "special" process due to the skill required to accurately interpret radiographs of sealed waste packages. The RTR 1 operators must be certified prior to conducting waste package radiography. Training and certification of RTR operators are conducted by the nondestructive testing group within the Metrology department in accordance with Certification Procedure RFQ-TC-1A

**7.5 *Supporting Processes***

Departmental procedures provide detailed instructions for all routine processes associated with waste generation, inspection, test, certification, and shipping activities. Each department is responsible to develop procedures which adequately describe and control their operations.

In addition to each department having procedures for their processes, each building has its own WSRIC book. WSRIC books, as described in Section 5.1.5 of this document, have all the routine processes for that building listed in it, along with the waste streams associated with that process. Information about the waste stream also includes whether or not the waste produced is LL or TRU.

**7.6 *Process and Equipment Qualification***

Waste treatment processes and equipment are tested and qualified before being put into routine production. The installed equipment is functionally tested by a "Systems Operation" (SO) test designed and conducted by Technical Support Services, with engineering support from the Radioactive & Regulatory Waste Programs department and line management. After the SO test is complete, a designed experiment is conducted. This experiment methodically varies process parameters in trial runs and collects data on the various outcomes. The desired process outcome establishes quantifiable relationships between operating parameters and acceptable product.

Any process determined to be a critical treatment process, a final treatment process, or a special process, and which produces a waste form that must meet a requirement, or whose specified quality and conformance of waste cannot be determined readily by inspection or test before shipment, requires a Process Control Plan.

The responsible manager of the process being evaluated must determine the need for a Process Control Plan in accordance with I -M60-WPC-001, Waste Process Control. If necessary, the responsible manager will then coordinate the development of the Process Qualification Plan, performance of the process qualification, and development of the Process Control Plan. The final process outcomes are then incorporated into the operating procedures and the process capability report, and Plans filed as quality assurance records by the responsible manager.

## 8 INSPECTION

Inspections evaluate the conformance to waste acceptance and certification criteria, stated process control plans, and inspection procedures. The Waste Certification Flow Diagram in the RFETS Application to Ship Low Level Waste to the Nevada Test Site shows the inspection activities in the sequence of waste generation and transfer.

RFETS procedures establish the inspection points, define the inspector responsibilities, include standards for acceptance and rejection, and provide instructions for inspection performance.

These inspections assess package integrity, package contents conformance, and package documentation, labeling, and marking. Nonconformance to criteria is documented through 2-U76-WC-4030, Control of Waste Nonconformances. The nonconformance report (NCR) is attached to the drum or crate Waste/Residue Traveler and returned to the generator for corrective actions.

The following inspections are Performed on all LL waste

- Issue conducted at Warehouse to assess waste package integrity prior to use
- In Process performed on a sample basis at any time during waste generation prior to sealing, to ensure wastes comply with IDC designation and contain no free liquids, compressed gases, or gross levels of particulates
- Dock performed on filled and sealed packages on process building docks to assess package integrity, labeling, handling damage, and proper documentation
- Final Inspection and Loading performed just prior to loading on transport vehicles, to ensure proper marking, labeling, tie-down, blocking and bracing, loading, documentation, and package integrity

## 9 TEST CONTROLS

Tests performed to verify conformance of an item or activity to specific requirements are planned, controlled, and documented to assure consistent, repeatable, and retrievable results. Tests are performed by qualified personnel to procedures that specify test criteria and conditions for acceptance or rejection of the tested item. The tests associated with the LLW program are

- RTR
- Equipment Systems Operations Tests
- NDA
- Software Validation Tests

All wastes within the PA, and those from strip-out operations in Buildings 881, 883, and 886, receive NDA, and non-homogeneous LLW receives 100% RTR. Certain wastes that are homogenous enough to be accurately characterized through a random sample are exempt from RTR. These include pondcrete (IDC 805), saltcrete (IDC 804), roaster oxide (069), and sewage sludge (295). Through documented process controls, procedures, and in-process inspections, these exempted wastes can be verified as not containing restricted material.

Software validation testing for WEMS is performed according to the procedure WEMS Software Quality Assurance Compliance procedure, 4-F72-WEM-WP1205. Individual software custodians are responsible to perform tests, disposition results, perform corrective actions when needed, and maintain testing records. Procedure 4-U36-SMP-ADM-4013, Software Management for Nondestructive Assay Systems implements SQA for NDA systems.

Systems Operations (SO) tests are performed for newly installed waste processing equipment and coordinated by the Technical Support Services department. The SO tests validate equipment function and verify performance of equipment to selected design criteria. Systems Operations tests are developed, documented, approved, and conducted in accordance with the COEM. Safeguards measurements conducts preoperational functional tests for all NDA equipment. NDA operating software incorporates system performance tests such as background measurements and spectral resolution. Operators are instructed to measure standards at the beginning of each shift. These measurements must pass established acceptance criteria before the NDA system can be used for actual measurements.

#### ***9.1 Control of Test and Measuring Equipment***

#### ***9.2 Nondestructive Assay***

Safeguards Measurements is responsible for the control and calibration of all NDA equipment used for nuclear material accountability and waste segregation purposes. NDA equipment used for nuclear material accountability and waste segregation purposes is controlled and calibrated in accordance with 4-S58-SW-ADM-4000, NDA Calibration Program.

The Safeguards Measurements calibration program is described in the Safeguards Measurements Program Management Plan for Nondestructive Assay and is implemented by procedure 4-S58-SUT-ADM-4000, NDA Calibration Program. All NDA counters are defined as "Calibrate Before Use" equipment. The calibration of each counter is verified daily before the counter is used to make measurements.

Measurements of calibration standards are performed by NDA Services Personnel according to approved procedures. The calibration data are collected and analyzed by Safeguards Measurements.

Safeguards Measurements establishes the calibration function and modifies the equipment software to incorporate the current calibration parameters in accordance with approved Safeguards Measurements internal procedures. 1-U82-SMP-ADM-4014, Calibration of Passive/Active Neutron Systems for the PADC and the crate counter, SNUP-4010 for LOSAC, and SN11P-4009 for HEPA/LOSAC. Safeguards Measurements also determines the acceptance criteria for calibration verification measurements and incorporates these into the operating software.

NDA Services personnel must measure calibration standards each time the equipment is used. If the calibration verification measurements fail the acceptance criteria, a placard is used to show that the system is under Safeguards Measurements control until the apparent problem has been resolved. Safeguards Measurements investigates to determine the cause and correct the apparent problem. Corrective actions usually include realignment of the system.

Calibration standards for NDA counters are prepared and certified by Metrology in accordance with procedure S-C-00013, Synthetic and NDA Standards Calibration. The Metrology certifies Rocky Flats stream plutonium oxide that has been characterized using measurement systems traceable to NIST and NBL. Balances traceable to NIST are used to weigh quantities of the certified plutonium oxide that are immobilized in RTV silicone foam modules and added to standard drums containing matrix material representative of actual waste matrices. Standard matrix drums can be prepared one of two ways: 1) balances traceable to NIST are used to weigh quantities of certified plutonium oxide which are immobilized in RTV silicone foam modules and added to standards drums containing material representative of actual waste matrices, or 2) standard drums are constructed with vertical tubes inserted through matrix material. Certified Pu sources of varying activities can be placed in the tubes to cover the measurement range. All records of preparation and traceability are maintained by Metrology. Calibration records are maintained by Safeguards Measurements.

### ***9.3 Process Equipment and Radioactive Sources Calibration***

All test and measurement equipment used is controlled and calibrated in accordance with requirements specified in ASME NQA-1, Section 12, and procedure 1-197-ADM12.01, Control of Measuring & Test Equipment. Calibration of test and measuring equipment may be performed either internally, using in-house reference standards, or externally by national certifying agencies (such as NIST) or manufacturers. All reference standards have valid relationships to nationally recognized standards, for example, NIST, MIEL. If national standards do not exist, the basis for calibration is documented. All test and measuring equipment are uniquely identified.

Several Rocky Flats organizations, including Metrology, Analytical Services, and Safeguards Measurements, have responsibilities for controlling and calibrating test and measuring equipment. 1-197-ADM-12.01 establishes Metrology as responsible for approving all other calibrating organizations through an active surveillance program. In addition, Metrology is responsible for performing calibrations for a variety of physical, dimensional, chemical, and NDA measurements and for preparing and certifying standards for NDA and the Analytical Laboratories in accordance with Procedure 395000-N, ELA-00008, Metrology Laboratories Calibration of Measuring and Test Equipment, describes the recall system which establishes the traceability of all standards and test and measuring equipment under the purview of Metrology. All calibrating facilities shall have mechanisms in place for evaluating inspections or tests where out-of-tolerance instruments were used. These mechanisms shall include methods for evaluating the data obtained from the use of these instruments, and methods for retesting or correcting the data to ensure data accuracy.

As part of its surveillance program, Metrology assures that all Rocky Flats calibrating organizations comply with 1-197-ADM-12.01. All calibrating organizations must establish a control system for the equipment under their purview, which includes unique identification of test and measuring equipment.

All calibrating organizations must also use approved procedures for performing calibrations of test and measuring equipment. Those instruments that are calibrated on site shall be calibrated in an environmentally controlled area and the environmental data recorded and maintained, for example, temperature, humidity, and dust concentrations. Reference standards must either be certified by the Metrology Laboratories or be obtained from a nationally recognized source. Calibrating organizations must establish calibration frequencies and a mechanism for ensuring that only calibrated equipment is used for this project.

#### **9.4 Real-Time Radiography**

A verification of the RTR video system performance is performed at the beginning and end of each work shift or whenever the system is started up to RTR waste drums. A test pattern is used on the camera and observed on the video screen to verify the quality.

Imaging system controls are adjusted to obtain the desired screen contrast levels and line pair resolution as defined by the Real-Time Radiography procedures.

### **10 MARKING, HANDLING, STORAGE AND TRANSFER**

The following are the primary procedures control the marking, handling, storage, labeling, staging, transfer, and preparation for shipment of waste packages in order to prevent damage or loss, to minimize deterioration, and to assure safety of operations:

- 1-PRO-079-WGI-001, Waste Characterization, Generation, and Packaging
- 1-Q11-WO-1221, Controls for the Movement of Waste Containers
- 4-D99-WO-1100, Solid Radioactive Waste Packaging
- 1-80-WO-1102-WRT, Waste/Residue Traveler Instructions

Waste generators, inspectors, custodians, field technicians, and certification officials verify and document compliance to these procedures from the initial point of generation of LLW to final disposal.

Marking and labeling requirements for off site shipment are defined in the Traffic Management department's T-300 series procedures.

#### **10.1 Hazardous Liquid Waste Transfer and Storage**

Storage for liquid hazardous wastes is conducted to requirements in 6 CCR 1007-3 Sections 262, 264, and 265. Requirements and procedures governing liquid waste transfer operations are defined in document 1-10000-HWR, Hazardous Waste Requirements Manual.

#### **10.2 Storage**

LLWs (including LLMWS) are stored in designated areas at Rocky Flats Mixed LLW is stored in RCRA interim status or permitted storage areas

LL Wastes scheduled for offsite shipment are processed through the appropriate staging area

Dock inspection, RTR verification, document review, and storage are conducted in accordance with established procedures, drawings, and specifications

### ***10.3 Waste Transfer***

The Traffic Management department coordinates the offsite shipment of LLW to the disposal site AU LLW shipments are made in accordance with applicable DOT, EPA, state, and local hazardous waste regulations, as well as disposal site requirements Procedures for waste transfer are specified in the Rocky Flats Transportation Safety Manuals and associated Traffic Management procedures

## **11 INSPECTION, TEST AND OPERATING STATUS**

The status of certification activities is maintained from the point of waste generation through the final shipment inspection Required certification activities are identified and described in WC and other procedures and referred to in the corresponding WO procedures

### ***11.1 Inspections and Tests***

Inspection points in the waste stream verify the performance of required activities Passage of a waste package through an inspection point is verified by the inspector signing and/or stamping the Waste/Residue Traveler Waste items found non-conforming must be tagged with a yellow Waste Nonconformance Status Tag (RF-47841) and physically segregated from conforming waste items whenever possible

### ***11.2 Nondestructive Assay for Radioactive Material Content***

Measurement control procedures and the controlling software of each NDA counter system ensure proper operating status of the NDA counter

Assay and Storage personnel must measure a working standard daily before using the counter for actual assays If the daily working standard measurement does not pass acceptance criteria encoded in the controlling software, the system shuts down and instructs the operator to contact Safeguards Measurements Placards are placed on NDA systems to indicate the systems are under Safeguards Measurements control and are not available for use Safeguards Measurements provides written and verbal notification to NDA Services when the systems are ready for use

In addition, NDA operators must measure calibration standards on a weekly basis. These measurements must also pass acceptance criteria or operators are instructed to contact Safeguards Measurements for corrective action.

The weekly calibration standard measurements are documented on the NDA System Measurement Control Review Form and also on control charts by Safeguards Measurements.

Safeguards Measurements also compiles the measurement control data, performs a statistical evaluation of the data, and summarizes the results in a monthly measurement control report which are kept on file.

### **11.3 Processing**

The progress and control of waste packages through the waste stream is maintained by forms, labels, and markings which require the performance of specific tasks to ensure compliance of each waste package to the WAC.

The performance of identified activities is documented by the generator or responsible party affixing their signature at the appropriate location on the documentation. The serialization of each waste package and use of these numbers on all documentation ensures traceability through the system.

The inspection status of waste is clearly marked on the forms, labels, and markings attached to waste packages.

## **12 CONTROL OF NONCONFORMING ITEMS**

Procedure 2-U76-WC-4030, Control of Waste Nonconformances, addresses the system to control waste nonconformances. Non-conforming waste packages are identified by affixing the waste nonconformance status tag to the waste package showing the package ID number and the unacceptable condition. The waste package is then segregated from the processing stream until corrective action is completed, documented, and verified.

Packages not meeting certification requirements may be returned to the waste generating organization for corrective action. Return of the rejected waste package to its originating organization is dependent upon area storage capacity, 90 day storage limitations, and radiation and chemical protective equipment requirements. Waste generators receiving the returned non-conforming waste package disposition the NCR by describing the corrective action to be taken, using the space provided on the NCR. Independent verification of the corrective action is performed prior to closure.

## **13 CORRECTIVE ACTIONS**

Conditions adverse to waste acceptability are identified promptly through inspections, tests, surveillances, and audits and corrected as soon as practical.

Cause analysis is performed when significant concerns are identified. Significance is determined by the Performance Oversight group or the Waste Certification Official and is defined as a nonconformance that will preclude acceptance of waste by the disposal site or an unacceptable trend of process or building nonconformances.

Significant adverse trends must be evaluated for root cause and actions taken to address root cause in order to preclude recurrence. Significant adverse conditions may result in, issuance of a stop work order by the Waste Certification Official.

Corrective actions originated are initiated, documented, and tracked in accordance with 1-MAN-012-SCARM, Site Corrective Action Requirements Manual. Stop work orders are issued according to procedure 1-50000-ADM-15 02, Stop Work Action. Deficiencies resulting in Stop Work Actions must be corrected prior to resuming waste processing. Significant concerns are reported to all levels of involved Rocky Flats management, and follow-up is conducted to verify that collective actions are implemented.

Special cases or circumstances may exist in which a variance to approved and established procedures or requirements may be justified or desirable for effective and efficient waste management. In such circumstances a variance request may be initiated and submitted to Radioactive & Regulatory Waste Programs for review. The variance request must include a description of the specific requirements for which the variance is being requested and a justification for the variance.

At a minimum, the variance request must be approved by Radioactive & Regulatory Waste Programs (RRWP) and the Waste Certification Official (WCO). Upon review, RRWP and the WCO will evaluate the validity of the variance and determine which, if any, organizations need to provide approval.

In addition, if a variance compromises compliance with an offsite receiving facility's, (such as a disposal site's) waste acceptance criteria, then it must be approved by the receiving facility prior to offsite shipment of the affected packages.

The purpose of an approved variance is to provide up-front authorization to deviate from established procedural requirements on a case-by-case basis, thereby obviating the need for an NCR where one would otherwise be initiated. Approved variances must be included with the affected Waste/Residue Traveler. Variances are quality records.

Radioactive & Regulatory Waste Programs will assign a unique sequential number to all variances, maintain a log, and keep a master file of all approved variances.

#### **14. QUALITY ASSURANCE RECORDS**

QA records are maintained in order to furnish documented evidence that wastes are generated, packaged, inspected, assayed, analyzed, tested, and shipped according to the applicable requirements.

Record storage, preservation, retention schedules, and safekeeping are governed by DOE Order 1324 2, Records Disposition, and FPNM 10 I - 1 1 4, National Archives and Records Service General Record Schedules

Requirements based on these documents are contained in 1-77000-RM-001, Records Management Guidance for Records Sources

Paper records pertaining to the LLWW are defined by type and are only considered valid records if they are signed and dated by authorized personnel from the applicable organizations and maintained by the applicable organizations noted below

<u>QA Record</u>	<u>Responsible Organization</u>
1 Waste/Residue Traveler	Waste Certification Official
2 WSRIC Building Books	Waste Identification and Documentation (Master)
3 Personnel Records for Required Classroom, OJT Training, and Qualification	Job Development
4 Personnel Records for DOT Hazardous Materials Transportation Training	Job Development and Traffic Management
5 Waste Package Inspection Results	Waste Certification Official
6 Waste Package Receiving Acceptance Records (QIDS, Purchase Orders, sample inspections and tests)	Receiving and Inspection
7 RTR Results	Waste Certification Official and NDT
8 NDA Radionuclide Counter Calibration Records and Software Records	Safeguards Measurements
9 Bills of Lading and the Uniform Hazardous Waste Manifests	Traffic Management
10 Portable Radiometric Measuring Equipment Calibration Records	Radiation Instrumentation
11 Process Equipment Design Drawings	Technical Support Services
12 Waste Characterization Data (Process Knowledge Interview Sheets)	Waste Inventory & Documentation

---

13 Waste Characterization Data (Analytical Results)	Waste Inventory & Documentation
14 Purchase Requisitions and Procurement Documents	Procurement Support
15 Vendor Qualification Reports	Procurement Support and Approved Vendor Listing
16 Process Equipment and packaging design review and validation records	Technical Support Services
17 Radioactive Sources Calibration Data Sheets	Metrology
18 Process Measuring and Test Equipment Calibration Data Sheets	Metrology
19 Audit Records	Performance Oversight
20 Software Quality Assurance Compliance Records	Applicable Custodian
21 CARS, DRs, and Reports from Surveillances, Self Assessments, and other Reviews	Plant Action Tracking System
22 Rocky Flats application to ship LLW	Radioactive & Regulatory Waste Programs
23 NRWOL and Supporting Characterization Documents Documentation	Waste Inventory and
24 Waste Generator Instructions	Customer Service Organization

#### **15 INDEPENDENT ASSESSMENTS**

The Performance Oversight group of Kaiser-Hill conducts independent audits of the LLAV program at Rocky Flats to ensure compliance to contractual and DOE requirements. An audit of the LLW Management Plan is scheduled annually. The RMRS QA group performs assessments and surveillances to determine the status of compliance. Audits and assessments are conducted according to audit group procedures.

#### **16 SOFTWARE QUALITY ASSURANCE (SOA)**

Several software systems are related to waste management operations and are controlled during development, use, and maintenance to ensure that the software performs reliably and to expectations.

The responsibility for ensuring software quality assurance rests with the individual department that maintains the software

Specific activities and responsibilities for complying with these requirements are detailed in each individual department's SQA Compliance Procedure

The Compliance procedures are required to contain sections that address software and hardware descriptions, design control, change control, verification, validation, use control, and program documentation

The following software systems support the LLW Management program

The Waste and Environmental Management System (WEMS) is a multi-user software package that operates on the unclassified VAX cluster. This system tracks all waste types (TRU/IRU Mixed, LLW/LLW Mixed, and Hazardous) from "cradle-to-grave" and is the responsibility of the Waste Inventory and Documentation (WID) group. The WEMS software tracks individual waste packages during the waste generation, packing, storage, and shipping process and is used to prepare load lists to waste disposal sites. WIID is responsible for maintaining the WEMS Software Quality Assurance Compliance procedure, 4-F72-WEM-WPT1205, for the WEMS

The software used to control NDA systems is accessed by multiple users and is carefully controlled and maintained by Safeguards Measurements. Access is built into the software. Executable codes are distributed to various computers controlling these NDA systems at Rocky Flats. This software package is both automated and interactive and controls the process by which packages are assayed

NDA controlling software prompts the user for pertinent information such as operator identification number, package number, or IDC. Upon final assay of the packages, the software automatically calculates and prints out such information as the date of assay, net and gross weight, IDC, radionuclide assay results, and LLW/TRU designation

The Safeguards Measurements organization's controlled software quality assurance procedure is 4-U36-SMP-ADM-4013, Software Management for Nondestructive Assay Systems for all NDA software packages at Rocky Flats

## 17 QUALITY IMPROVEMENT

Waste Management activities embrace a wide range of Quality Improvement concepts: process characterization and qualification, root cause analysis, corrective action verification, nonconformance reporting, program assessments, and use of measurable performance indicators. The requirements in Section 4.9, Control of Processes, outlines the process control planning, characterization, and qualification requirements that apply to all waste treatment activities

## 18. SURVEILLANCE

---

Surveillance of the LLW management program is conducted to provide an additional mechanism to identify and prioritize corrective actions

Surveillance topics are requested by management in order to obtain more information about suspected deficiencies, to verify program implementation, or to confirm completion of corrective actions for previously identified deficiencies

Surveillance of LLW management activities is performed by the Integrated QA Audits & Assessments group

QA surveillance's of waste management activities are also performed by the QA group within the RMRS ESH&Q department

Operations and functional managers are required to provide surveillance personnel free access to documents, work areas, workers, and supervision during surveillance activities

The surveillance results are reported to involved management, and the surveillance activity is conducted according to approved procedures

## **Appendix 3**

### **ER and Decommissioning Program QA Supplement**

## DESIGN CONTROL AND CONTROL OF SCIENTIFIC INVESTIGATIONS

### 1 0 PURPOSE

This section describes the requirements and methods by which RMRS investigations, analyses, and report preparation are controlled and verified by the RMRS Departments for all environmental, deactivation and decommissioning projects

These controls include requirements for the establishment of data quality objectives, sampling procedures, data reduction, validation, and reporting, internal quality control checks, data assessment, data validation criteria, peer review, and design records

### 2 0 APPLICABILITY

These requirements are applicable primarily to scientific investigations, which include field sampling, sample and data handling, and analysis and interpretation, as required under the Rocky Flats Cleanup Agreement and referenced guidance documents This section is applicable to personnel performing work activities that affect the data quality required for those activities

Designed, engineered, or constructed plant facilities are addressed in the requirements of this QAPD, RFCA and the RFETS Facilities Engineering and Project Management Manual, used to satisfy DOE Order 6430 1A

### 3 0 REQUIREMENTS

#### 3 1 Data Quality Objectives

Data quality objectives (DQOs) quantitatively and qualitatively describe the uncertainty that a decision maker is willing to accept in results derived from analytical data This uncertainty is used to specify the quality of the measurement data required, usually in terms of precision, accuracy, representativeness, comparability, and completeness (PARCC) parameters The establishment of DQOs assists in all aspects of investigations, including determining methods for sampling, sample preparation, and selection of appropriate analytical methods

The process for establishing project/site specific DQOs is described in EPA QA/G-4, Guidance for the Data Quality Objectives Process and NUREG 1575, Multi-Agency Radiation Survey and Site Investigation Manual

DQOs must be established prior to the initiation of Investigative activities The project/site specific data users, use(s) of data, data objectives, sampling methods, and appropriate analytical levels will be established in individual sampling and analysis plans The project/site specific analytical methods and PARCC parameters will be summarized in work planning documents such as workplans, field implementation, survey and sampling plans that are developed for each project These DQOs include field instrument precision and accuracy as well as objectives for field QC measures such as acceptable variance in field duplicate, trip and rinsate samples and other specific field tests

### 3 2 Sampling Procedures

The SOPS, which together with this QAPD comprise the SAP for the RMRS ER and D&D Programs, outline specific procedures for ER and D&D activities

The workplanning documents for each ER and D&D project will be reviewed and approved by the RMRS Quality Assurance organization and DOE/ regulators as specified by RFCA As part of this review and concurrence process, the Sampling Plan portion of the work controlling documents will be reviewed to ensure that the proposed sampling activities are planned to be conducted according to approved SOPs and instructions Where site or activity specific variations to SOPs are needed to effectively conduct sampling, formal document modifications will be prepared For unique or one-time sampling activities, the SOPs will be modified and controlled or the SAP will include the additional requirements and steps to accurately reflect the methodology to be used

New procedures, if needed, may be submitted and/or recommended in the work planing documents on an individual basis All requests for new or revised SOPs must be submitted to the RMRS Quality Assurance Organization The RMRS Project Manager, or his designee, shall obtain the required approvals, including EPA/CDPHE as required by RFCA

In order to assure that approved sampling procedures are being adhered to during field sampling activities, quality verification field surveillances will be conducted as described in Section 6 9 and 6 10, Assessment The RMRS QA organization will develop a surveillance schedule based on the field activity schedule presented in the workplanning documents The specific tasks and frequency of field surveillances shall be documented in accordance with the requirements of this QAPD Examples of tasks and frequency of surveillances to be addressed would be approximately 10 percent of the boreholes and well installations on a project, and approximately 5 percent of the samples for each type of sample collected

### 3 3 Analytical Procedures

Laboratory analytical requirements for the RFETS are defined by the K-H Analytical Services Division These requirements are generally consistent with those specified in SOWs used in the U S EPA's Contract Laboratory Program (CLP) These SOWs are used for analysis of parameters where CLP methods are available K-H Analytical Services Division (ASD) is responsible for developing and implementing the requirements for subcontracted services as identified in the ASD General Requirements (GRs) procedures The method for particular analysis must be used such that the required detection limits (or minimum detectable activity) that are specified in the K-H GRs are achieved

### 3 4 Data Reduction, Validation, and Reporting

Analytical data results will be submitted to the RMRS Project Manager by KH ASD These data will include results from field surveys and laboratories Analytical results shall be independently validated by KH ASD and the results will be submitted to the RMRS project manager The responsible project manager will review DQOs specified in the SAPs to determine if existing analytical and validation guidelines address validation needs

If validation guidelines do not address DQO needs, the existing guidelines will be revised or new guidelines will be developed. The percentage of sample delivery groups to be validated will be determined by the responsible project manager with a minimum of 25% being validated. Special needs may require 100% validation and will be specified in the SAPs. All validation will be conducted through the K-H ASD.

#### 3.4.1 Data Reduction

Data reduction functions are divided into field and laboratory reduction activities. Each of these activities are summarized below.

##### *Field Data Reduction*

Field measurements, data, and observations shall be recorded in project log books, on field data forms, or on similar permanent records. Entries shall be recorded directly and legibly in indelible ink in field logbooks or on field forms with all entries signed and dated, or as specified in SOPs (note for some field measurements, this may not be appropriate, [i.e., seismic logs, strip charts], accepted standard methods specific to these activities will be used). If entries must be changed, the change shall not obscure the original entry. The reason for the change shall be stated and the correction and explanation shall be signed and dated or otherwise appropriately identified at the time the correction is made. Field data records will be organized into standard formats whenever possible and retained in the QA records system. All RMRS SOPs shall specify the field data and sampling records that will be generated as a result of implementing the procedure. Generic examples of the types of field operations and sampling records specified in the RMRS SOPs include but are not limited, to

- Field data sheets and field logs
- Data processing and storage records
- Sample identification and chain-of-custody (C-0-C) records
- Document control, inventory, and filing records
- QA/QC records
- Health and safety records

The combined data records should be sufficiently detailed to provide a complete and accurate history of data gathering and results.

##### *Laboratory Data Reduction*

Laboratory data shall be recorded or acquired during analysis and then prepared for review through computerized or manual algorithms to produce a raw data set (note the GRs specify the use of ASCII format). Raw data shall be verified in accordance with ASD requirements.

#### 3.4.2 Validation

Validation activities consist of reviewing and verifying field and laboratory data and evaluating data quality. The field and laboratory validation activities are described below. Data validation will be performed in accordance with the ASD SOW for validation.

### *Field Data Validation*

Validation of field technical data will be performed on two different levels. First, data shall be validated by periodic surveillances at the time of field collection by following RMRS SOPs for data collection. Secondly, data shall be validated by the K-H ASD or subcontractors.

Replicates of field measurements will be taken periodically by the field sampling crews to ensure the validity of technical data from field instruments. Random checks of sampling and field conditions (e.g., weather, wind, temperature, etc.) shall be made by RMRS QA personnel. Whenever possible, in-house peer review will also be incorporated into the data validation process in order to maximize consistency among field personnel. K-H ASD subcontractors will validate data prior to inclusion into the RMRS soil and water database.

### *Laboratory Data Validation*

Laboratory data shall be reviewed and validated by the K-H ASD laboratory validation subcontractor. Results of data review and validation activities are documented in an electronic deliverable to K-H ASD and uploaded into the K-H analytical database where it is captured by the RMRS soil and water database for retrieval and use.

Analytical data generated for RMRS ER and D&D activities are assigned data usability qualifiers. Data usability qualifiers are assigned as a result of the data validation process and are consistent with EPA data usability qualifiers.

- V Valid (usable for all purposes)
- A Acceptable with qualifications (usable for most purposes)
- R Rejected (unusable for most purposes)

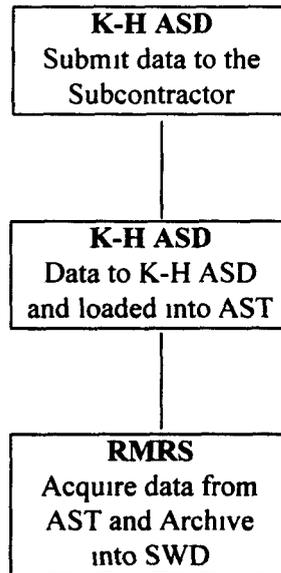
All data generated in conjunction with RFCA specified activities are subject to verification and validation, or as agreed to between DOE/CDPHE/EPA. Data review and validation criteria (e.g., holding times, instrument calibration requirements, detection limits, and QC sample analysis) are referenced in the K-H General Requirements (GRs). Other data review and validation criteria will be specified in the SAPs/QAPs and supporting SOPS.

### 3.4.3 Reporting

Sample analysis reporting turnaround times are presented in the K-H ASD GRs. The reporting frequencies have been established for ER and D&D routine analyses. Reporting times for some analyses may be accelerated.

K-H ASD and the validation subcontractor receive analytical data packages that are prepared by the laboratories as soon as they are available. The validation subcontractor validates the data and submits the validated data to K-H ASD per the GRs.

Figure 1



3 5 Field Sampling Quality Control Procedures

The field duplicate, the trip blanks, and the equipment rinsate blanks, where appropriate, will be sent with the samples from the field to the analytical laboratories. Other QC techniques may be employed with geotechnical or geophysical data where replicates or blanks are not practical. Table 3-2 shows general guidelines used for the collection frequency of QC samples.

Table 1  
 QC Sample Collection Frequency

<u>Activity</u>	<u>Frequency</u>
Field Duplicate	1 in 20
Field Blanks	As specified in the SAP
Trip Blank	As specified in the SAP
Equipment Rinsate Blank	As specified in the SAP
Other QC Activities	As specified in the SAP

3 5 1 Field Duplicate

Field duplicate samples are collected and analyzed to provide an indication of overall sampling and analytical precision. Field duplicates are collected following the same sampling procedures used to obtain the regular sample. In fact, a field duplicate is typically obtained when a sample from one location is split into two.

equal portions, with each portion going to the laboratory in a separate container. Exceptions to splitting samples to obtain a duplicate apply to duplicates for volatiles and for atmospheric and air quality (e.g., particulate) samples. Duplicate samples of volatiles will be collected independently to reduce the possibility of volatilization in the sample. For atmospheric and air quality samples, a field duplicate is obtained by a complete separate sample taken from a separate, co-located sampler and collected at the same time and/or over the same time period.

### 3.5.2 Equipment Rinsate Blank

Equipment blanks shall be prepared for manual and small automated sampling equipment used to collect samples. Equipment rinsate blanks shall be collected once per every 20 samples or once per day, whichever is more frequent. If disposable or dedicated equipment is used, then equipment blanks will not be collected. The procedure for collecting rinsate blanks consists of pouring volatile-free ASTM Type 11 reagent water into/through/over a decontaminated piece of sampling equipment (such as a bailer) and then dispensing it into prepared sample bottles. Sample bottles will be randomly selected from the supply of prepared sample bottles, selecting a sample container appropriate for each type of analysis for which environmental samples are being collected. Analyses of equipment rinsates are used to assess the efficiency of implementation of equipment decontamination SOPs. Unless specified otherwise in the SAP, equipment rinsate blanks shall be obtained where sample collection requires the use of sampling equipment.

### 3.5.3 Field Blanks

Field blanks consist of volatile-free ASTM Type II reagent water that are prepared in the field in the same manner as regular samples. The blanks serve to identify contamination that is potentially associated with sample collection, preparation, and transportation. Field blanks for groundwater and surface water sampling are prepared by carrying an unused, sealed bottle of volatile-free ASTM Type II reagent water into the field and preparing a sample bottle for the reagent water following the same preparation procedures that are applicable to a regular sample, including filtering and adding preservatives, as appropriate. The field blank sample is then transported to the lab for analysis with the regular samples. The field blanks are then analyzed in the laboratory as if they were regular samples. The typical frequency for preparation of field blanks is once per every 20 samples. However, the need for field blanks and their frequency will be determined on a site or activity specific basis. Therefore, the use and frequency of field blanks will be specified in the SAPs/QAPs.

Field blanks for atmospheric data (e.g., new particulate filters) are taken to the field and handled, prepared, and transported for analysis (e.g., drying and weighing of filters) in the same manner as regular sample media. The blanks are not exposed to atmospheric conditions.

The use of field blanks for soil and sediment sampling at the RFETS is not appropriate because of the lack of commercially available blank soils and solid materials that adequately reflect the various soil types encountered. Developing blank soil types within the RFETS region is not practical due to the subjectivity of characterizing background soil conditions and the variability of soil types.

### 3 5 4 Trip Blanks

Trip blanks consist of volatile-free ASTM Type R reagent water samples that are prepared in the laboratory. Trip blanks serve to assess contamination of sample containers during storage and transport and of samples during preparation for analysis at the laboratory. Trip blanks for groundwater and surface water samples are prepared at the laboratory prior to the sampling trip by pouring volatile-free ASTM Type II reagent water into prepared (i.e., preservative added where appropriate) bottles. These sample bottles will be randomly selected from the supply of prepared sample bottles. The sample bottles will be filled with an appropriate amount of water for the analysis required. These trip blanks will be shipped to the sampling site with the regular sample bottles, and then transported back for analysis with the samples collected during the sampling event. The trip blanks will remain unopened throughout the sampling event. The trip blanks will be prepared and analyzed at the laboratory as if they were regular samples. Trip blanks will be utilized in place of field blanks for volatile samples only, unless rinsate and/or field blanks indicate possible contamination, then trip blanks will be prepared for other analytes. As with field blanks, the frequency of trip blank use is typically once per every 20 samples. However, the need for and frequency of trip blanks will be determined on a site or activity specific basis. Therefore, the use of trip blanks and the frequency will be as specified in the SAPs/QAPs.

### 3 5 2 Laboratory Quality Control Procedures

Laboratory QC procedures are used to provide measures of internal consistency of analytical and storage procedures. Specific QC procedures and QC criteria are in place for organic, inorganic, water quality parameter, and radiochemical analyses. The laboratory QC procedures and samples used are described in detail in the analytical methods cited and in the K-H ASD GRs.

### 3 6 Data Assessment

RMRS project personnel are responsible for evaluating analytical data from K-H subcontract laboratories. In addition, the RMRS QA personnel may assist the project personnel in determining data usability and acceptance.

#### 3 6 1 Calculations

Calculations shall be performed according to approved procedures. To ensure defensibility of the records, calculations shall be legible and in logical progression so that the steps and the reasoning behind the calculations can be understood. For calculations performed using a programmable calculator or computer, a sample calculation will be included in the permanent files together with a program listing and printout of input data. The calculated results also shall be placed in the QA records system files. A calculation or series of calculations shall contain the following, as a minimum:

- Task number, date performed, and signature of person who performed the calculation
- Purpose for calculation
- Assumptions made or inherent in calculation

- Reference (including page, where applicable) for each piece of input data (e g , standard notebook, telephone memorandum, technical paper)
- Method used for calculations
- Results (underlined)

Calculations shall be reviewed by an independent engineer or scientist of professional level equal to or higher than that of the originator After completing the check, the reviewer shall sign his or her name and the date immediately below that of the originator on the calculations Both the originator and reviewer are responsible for the completeness and accuracy of the calculations and must initial any corrections or changes This process certifies that the methodology or computer program is as expected

### 3 6 2 Data Assessments

Field and laboratory data are assessed by reviewing field and laboratory data reports and identifying anomalous data Any anomalous data will be flagged by K-H ASD as invalid Analytical data will be assessed in two ways (1) validity and (2) usability Data validity and usability are closely related and may be assessed as

- V Valid, usable for all purposes
- A Acceptable with qualifications, usable for most purposes
- R Rejected, unusable for most purposes

The quality, validity, and appropriate use of environmental measurement data collected for this project will be determined prior to use by the Data Users

### 3 7 Data Validation and Usability Classification

The acceptance and review criteria for validation standards are specified by K-H ASD and in the applicable GRs

The following three levels of data usability are utilized for the ER and D&D Programs at the RFETS

- a Data is usable for all purposes if all of the following criteria are met
  - Data quality is classified as valid
  - All data quality objectives are achieved
  - All specific agreements and/or regulatory requirements are met
- b Data is considered usable for some purposes if any of the following conditions occur
  - Data quality is classified as valid or acceptable with qualifications (rejected data may be usable for some very limited purposes such as screening)
  - Not all data quality objectives are achieved
  - Not all specific program requirements are not met

c Data may be unusable if any or all of the following conditions are met

- Data quality is classified as rejected
- Data quality objectives are not achieved
- Specific program requirements not met

### 3 8 Peer Reviews

When ER activities involve state-of-the art or untried technologies, peer reviews of data, reports, conceptual designs, etc shall be performed. A peer review team will be appointed by the appropriate project manager(s). The peer review team shall consist of independent qualified experts. The review and approval of the team members' credentials, including verification of education and experience, shall be documented by the appropriate project manager. Peer reviews shall be documented and prepared by the project manager. During the peer review, all review comments shall be documented, as well as the resolution of all comments. Dissenting opinions which cannot be resolved shall also be clearly indicated.

The original document, submitted for peer review comments, and resultant changes to the documents shall be included in the document package and forwarded to the QA records management system.

### 3 9 Design Records

Design documentation for scientific investigations, analyses, and report preparation, including the design bases, input documents, references, design decision documentation, including but not limited to memoranda, analyses, drawings, specifications, as-built drawings and records, other design output documents, evidence of design verification/evaluation, qualification records of reviewers, and documents confirming interface control, with approved changes thereto, shall be considered QA Records and controlled in accordance with Section 6 4 of this QAPD.

## Software Quality Assurance

### 1 0 PURPOSE

This section defines the requirements and methods for the control and documentation of computer software utilized for ER and D&D Program activities

### 2 0 APPLICABILITY

This section applies to computer software used by the ER and D&D Departments or subcontractors to produce or manipulate data that is reported to state or federal regulatory agencies. Specific details for the implementation of the requirements contained in this section are contained in ER and D&D Department software control procedures. The extent to which these requirements apply is related to the nature, complexity, and importance of the software application.

### 3 0 REQUIREMENTS

Computer software will be developed, controlled, and maintained to reduce the likelihood of defects entering executable codes during development, modification, and operation, and to ensure that the end product satisfies the requirements of its intended application. Software shall be verified, validated, and documented consistent with the nature, complexity, and its intended application.

#### 3 1 Software Development

Software development shall be accomplished in a traceable, planned, and orderly manner. The number of phases and relative emphasis placed on each phase of software development will depend on the nature and complexity of the software. Software development may be performed in an iterative or sequential manner.

##### 3 1 1 Requirements

During this phase, the requirements that the software must satisfy that pertain to functionality, performance, design constraints, attributes, and external interfaces shall be specified, documented, and reviewed. These requirements shall define the response of the software to input data, and shall provide the detail and information necessary to design the software. The requirements shall be approved by the appropriate level of management as described in written procedures.

##### 3 1 2 Design

During this phase, a software design based on the requirements will be developed, documented, reviewed, and approved. The design shall specify the overall structure (control and data flow), and the reduction of the overall structure into physical solutions (algorithms, equations, control logic, and data structures).

### 3 1 3 Implementation

During this phase, the design shall be translated into a programming language, and the implemented software shall be analyzed to identify and correct errors. Implementation phase software verification activities shall consist of the examination of source code listings to assure adherence to internal coding standards and conventions.

### 3 1 4 Testing

During this phase, the design as implemented in code shall be exercised by executing the test cases. Failure to successfully execute the test cases shall be reviewed to determine if modifications of the requirements, design, implementation, or test plans and test cases are required. The code shall not be used until the cause is found.

Testing phase activities shall consist of the validation of the code to assure adherence to the requirements, and to assure that the software produces correct results for the test cases. To evaluate technical adequacy, the software test case results can be compared to results from alternative methods, such as

- Analysis without computer assistance
- Other validated computer programs
- Experiments and tests
- Standard problems with known solutions
- Confirmed published data and correlations

### 3 1 5 Installation and Checkout

During this phase, the software becomes part of a system incorporating applicable software components, hardware, and data. The process of integrating the software with applicable components may consist of installing hardware, installing the program, and verifying that all components have been included. Installation and checkout phase software verification and validation activities shall consist of

- (a) The execution of tests for installation and integration, and
- (b) The documentation of the approval of the software for operational use

### 3 2 Commercial Software

Where commercial "off-the-shelf" software is used, including codes available in the public domain, it shall be placed under the configuration controls required by this section prior to use. Available documentation from the software supplier shall be obtained in order to evaluate the software's adequacy. Examples of this type of software include mathematical/numerical data reduction software, models, data management software, computer language compilers, etc. Source code is generally not available and controls are limited to unique version identification and user-related manuals for such software. Documented validation is required to demonstrate that the software performs its stated capabilities and functions.

### 3 3 Acquired Software

“Acquired Software” is non-commercial software acquired from organizations outside the ER and D&D Departments. Software which has not been developed or originated by the RMRS and is not commercially available, requires documented validation to demonstrate that the software performs its stated capabilities and functions. ER and D&D Departments or subcontractor personnel shall test the software in accordance with written test plans to validate the software. The specific form of the test plan is up to the tester but must identify the software options to be tested, the data to be used as input, the expected results, and the acceptance criteria.

### 3 4 Software Verification and Model Validation

The results of software verification and model validation activities shall be documented. Software verification and model validation shall be performed by individuals other than those who designed the software.

Software verification activities shall

- (a) Ensure that the software adequately and correctly performs all intended functions, and
- (b) Ensure that the software does not perform any unintended function that either by itself or in combination with other functions can degrade the entire system.

Software verification and validation activities shall be planned and performed for each system configuration which may impact the software.

Software verification shall be performed during the software development to ensure that the products of a given cycle phase fulfill the requirements of the previous phase or phases.

### 3 4 2 Software Validation

Computer models shall be validated. Model validation activities shall be performed to demonstrate that models, as embodied in computer software, are correct representations of the process or system for which they are intended. Model validation demonstrations are commonly achieved by comparing data produced by the model with data taken from the real world process or system. The latter data might be laboratory experimental data, field experimental data, raw field observations, or in situ testing data. Specific sets of data used in the validation process shall be identified and justification shall be made for their use.

When data are not available from the sources mentioned above, alternative approaches used shall be documented. Alternative approaches may include peer review and comparisons with the results of similar analysis performed with other validated models and verified software. The results of model validation shall be documented as QA Records.

### 3 5 Software Configuration Control

#### 3 5 1 Configuration Identification

A configuration baseline shall be defined at the completion of the software development. Approved changes created subsequent to a baseline shall be added to the baseline. A baseline shall define the most recent approved software configuration.

#### 3 5 2 Configuration Change Control

Changes to software shall be formally documented. This documentation shall contain a description of the change, the rationale for the change, and the identification of affected baselines. The change shall be formally evaluated and approved by the organization responsible for the original design, unless an alternate organization has been given the authority to approve the changes. Only authorized changes shall be made to software baselines.

### 3 6 Software Documentation

Software documentation shall be maintained as a QA record as discussed in Section 6 4 of this QAPD. Such documentation shall include:

- Software requirements
- Software design documentation
- Software change documentation
- Description of mathematical models and numerical methods
- Software verification documents
- Model validation documentation
- Software configuration management documentation
- User's instructions or manual

### 3 7 Software Application Control

Application control (the control of how an application is run) shall be implemented for software runs performed to generate or process data to develop conclusions that are to be reported to regulatory agencies. The requirements for software application control will be contained in written procedures which will be developed by the end function responsible for performing the analysis prior to the application's use. The purpose is to assure that configuration managed software is applied under the conditions specified in verification and validation documents.

### 3 8 Software Security

Access to computer software and computer-based data shall be controlled to prevent possible accidental or malicious misuse, modification, or disclosure.

### 3 9 Software Deficiencies

Deficiencies in software shall be documented on the NCR and dispositioned in accordance with Sections 6 8 and 6 9 of this QAPD Software users will be notified of deficiencies found in software so they may determine any impact on previously reported results or conclusions

### 3 10 Quality Assurance Records

The documentation requirements identified in this section and referenced ER and D&D Department software control procedures constitute QA Records and shall be maintained in accordance with the requirements identified in Section 6 4 of this QAPD

The project specific QAPs shall specify the applicable QA Records to be maintained in accordance with the requirements identified in Section 6 4 of this QAPD

## **Measuring and Test Equipment**

## 1 0 PURPOSE

This section establishes the requirements and the methods for the control of Measuring and Test Equipment used in ER and D&D activities. The controls for analytical laboratory equipment are determined by K-H ASD.

## 2 0 APPLICABILITY

The requirements are applicable to the RMRS ER and D&D programs and subcontractors who perform work at the RFETS and whose activities involve the use of measuring and test equipment.

## 3 0 REQUIREMENTS

### 3 1 Selection

An all-inclusive system is used for the calibration and maintenance of M&TE and measurement standards. The system provides for such items to be of proper type, range, accuracy, and tolerances to accomplish the function of determining conformance to specified requirements. M&TE and measurement standards are calibrated and utilized in an environment controlled to the extent necessary to assure continued measurements of required accuracy, giving due consideration to temperature, humidity, vibration, cleanliness, and other controlled factors.

The application requirements of the M&TE and measurement standards determine the selection of the type of M&TE to be used. M&TE to be used for the determination of each major measurement parameter shall be selected such that the accuracy and precision of the M&TE meets or exceeds the accuracy and precision requirements for the parameter being measured.

### 3 2 Identification

M&TE is uniquely identified both on the specific item and in accompanying records. This is accomplished by physically marking the equipment with the unique identifier status tag, color code, and/or calibration sticker that includes the M&TE unique identifier, calibration, and calibration due date. The identifier is recorded on the data sheet, log book page, etc., along with the data recorded when using the item. This will be supplied by the Site Metrology services for traceability.

### 3 3 Calibration

M&TE is calibrated, adjusted, and maintained at prescribed intervals or, prior to use, against certified equipment having known valid and traceable relationships to nationally recognized standards such as National Institute of Standards and Technology (NIST). When nationally recognized standards exist, the basis for calibration is documented.

Measurements standards used in the calibration system are supported by certificates, reports, or data sheets attesting to the description or identification of the item, the calibration source, date

calibration, calibration assigned value, statement of uncertainty, and environmental or other conditions under which the calibration results were obtained

The standardization/calibration of in situ monitoring equipment and field test probes and kits will be completed according to manufacturer's specifications and at frequencies specified in SAPs or for field M&TE. Also, photoionization detectors (PIDs), flame ionization detectors (FIDs), and gas chromatographs (GCs) will be used for field gas sampling. The calibration, use, and maintenance of the PIDs, FIDs, and GCs depends on the specific type of instrument being used and, therefore, will be done according to the manufacturers instructions.

A calibration log shall be maintained for field instruments and all calibrations shall be documented in the log sheet. Calibration stickers may also be used to indicate calibration status. M&TE calibration documentation includes the following information as a minimum:

- Unique identification of the M&TE (e.g., serial # 12345)
- Description of the item (e.g., Digital Multimeter, model #xyz)
- Frequency of Calibration (e.g., every year)
- Date of last calibration
- Date of next calibration
- Traceability information (e.g., Traceability to NIST voltage standard ser # 295123, Traceable to ASTM standard methodology for Sulfur Dioxide spike samples ASTM-6543-1976)
- Calibration procedure (e.g., SOP#CP-999Z-Rev 1, Fluke Multimeter Calibration Procedure for model 999X dated 7/4/90)
- Preventative Maintenance Schedule (e.g., and major preventative maintenance may be concurrent with calibration schedule)

### 3.4 Calibration Procedures

Written procedures are utilized for the calibration of all M&TE and measurement standards. The calibration procedures for M&TE required for the implementation of an SOP are described in the "Procedures" section of that particular procedure. Since the use of M&TE is SOP-specific, the calibration procedures are described within the SOP rather than in this QAPD. Calibration procedures described in the SOPs specify the measurement standards and equipment to be used, the required parameter, range, and accuracy of the measurement standard, and the acceptable tolerance of each instrument characteristic being calibrated. At a minimum each calibration procedure includes the following:

- reference EPA-approved or other validated, standard method
- specific acceptance criteria for all calibration measurements
- description of non-standard or modified methods and references to support these methods
- description of calibration frequency
- list of any critical spare parts that may be required for calibration purposes

### 3.5 Preventative Maintenance Procedures and Schedules

Preventative maintenance for M&TE is implemented according to manufacturers instructions, or according to specific requirements stated within the "Procedures" section of a particular SOP

The Site Metrology tracking system is utilized to provide a maintenance schedule of M&TE and measurement standards to assure timely maintenance, thereby precluding use of an instrument beyond its maintenance due date. Prior to use of M&TE, personnel verify that the maintenance due date has not expired. If the maintenance due date has expired, the item shall be tagged and segregated if possible, and a Non-conformance report prepared.

### 3.6 Nonconformances

If any M&TE or measurement standard is found to be significantly out-of-tolerance during the calibration process, the calibration system shall provide for the notification to the respective user and the QA organization of the out-of-tolerance condition with associated measurement data so that the appropriate action can be taken.

### 3.7 Handling and Storage

Proper protection, handling, storage, and environmental conditions is maintained for M&TE. The effects of environmental or other factors of an item's uncertainty is considered when calibration specifications are established and appropriate protection measures taken. Limitations on the handling, use, and storage of items is defined in the applicable calibration test, and item-specified M&TE implementing procedures.

### 3.8 Commercial Devices

Calibration and control measures are not required, for example, with rulers, tape measures, levels, and other such devices, when normal commercial equipment provides adequate accuracy.

### 3.9 Quality Assurance Records

Documents generated as a result of control, use, or calibration of M&TE are considered to be QA Records, and are maintained in accordance with Section 6.4 of this QAPD. Records documenting the schedules and procedures to maintain accuracy of M&TE and measurement standards include individual calibration records or other means of control for each item. Such records shall provide a description or identification of the item, calibration interval, date calibrated, identification of the calibration source, calibration procedure used, calibration results, and calibration actions taken. In addition, the individual record of any item whose accuracy must be reported via a calibration certificate or report shall state the certificate or report number.

## **Appendix 4**

### **QA Program Implementing Documents**

**Appendix 4, QA Program Implementing Documents**

*(This is not an all inclusive listing Document Control or the QE serving your organization should be contacted for additional information and controls related to specific work scopes )*

Quality Requirements	Site Specific Implementing Documents	RMRS Specific Implementing Documents
<p><b>Management</b>                      Criterion 1 - Program</p>	<ul style="list-style-type: none"> <li>• Site Quality Assurance Manual,</li> <li>• Site Quality Assurance Program Procedures Manual,</li> <li>• RFETS K-H Team QA 10 CFR 830 120 Site Implementation Plan,</li> <li>• RFETS K-H Team Quality Assurance DOE Order 5700 6C Implementation Plan,</li> <li>• 1-D41-HWRM-22, Interaction with Environmental Regulatory Agencies and Enforcement Inspectors, and</li> <li>• specific program manuals, plans and controls for transportation, laboratory services, radiological engineering, health and safety, radiological control, etc</li> </ul>	<ul style="list-style-type: none"> <li>• RMRS QAPD (This Document),</li> <li>• RMRS QA Policy,</li> <li>• 95-QAPJP-0050RFETS WIPP Transuranic Waste Characterization Program QAPJP,</li> <li>• RMRS Quality Assurance Program Documentation Binder,</li> <li>• 94-RWP/EWQA-0014, Low Level Waste Management Plan, and</li> <li>• Environmental Restoration QAPJP</li> </ul>
<p><b>Management</b>                      Criterion 2- Personnel Training and Qualification</p>	<ul style="list-style-type: none"> <li>• Training User's Manual (TUM), and</li> <li>• 3-21000-ADM-02 02, Personnel Qualification</li> </ul>	<ul style="list-style-type: none"> <li>• Various building specific Training Implementation Matrices,</li> <li>• RMRS-97-040, RMRS Training Manual,</li> <li>• RMRS-QA-02 01, Qualification and Certification of Quality Assurance Personnel,</li> </ul> <p>Specific implementation details for building, programs, and projects are found in</p> <ul style="list-style-type: none"> <li>• Training Implementation Plans (TIPs),</li> <li>• INSTR 003, Instruction for Tracking/Scheduling Training and Qualifications and Retention of Records for Training,</li> <li>• INSTR 004, Development, Use and Control of List of Qualified Individuals (LOQI),</li> <li>• INSTR 005, Identifying Training and Qualification Requirements</li> <li>• INSTR 006, Development and Use of Qualification Documents (QDs),</li> <li>• INSTR 007, Development and Use of Training Implementation Plans (TIPs),</li> <li>• INSTR 011, Design/Development of Training Materials,</li> <li>• INSTR 013, Operating Organization Requirements for Controlling Training Programs,</li> <li>• OPS-DIR-007, List of Qualified Individuals, and</li> <li>• OPS-DIR-009, Building Indoctrination</li> </ul>

Quality Requirements	Site Specific Implementing Documents	RMRS Specific Implementing Documents
<p><b>Management</b>                      Criterion 3 - Quality Improvement</p>	<ul style="list-style-type: none"> <li>• 1-MAN-012-SCARM, Site Corrective Action Requirements Manual,</li> <li>• 1-A65-ADM-15.01, Control of Nonconforming Items,</li> <li>• 2-U76-WC-4030, Control of Waste Nonconformances,</li> <li>• 1-MAN-017-LLGI-RM, Site Lessons Learned/Generic Implications Requirements Manual,</li> <li>• 1-MAN-022-PAAAPROG, Price-Anderson Amendments Act Program Manual,</li> <li>• 1-11000-ADM-16 03, Cause Analysis,</li> <li>• 1-V10-ADM-1 5 02, Stop Work Action,</li> <li>• 1-D97-ADM-16 01, Occurrence Reporting Process,</li> <li>• 1-E93-ADM-16 18, Performance Indication and Trend Analysis,</li> <li>• 1-Q05-ADM-02 26, Standards Identification, Assessment, and Noncompliance Process, and</li> <li>• 1-MAN-013-SIOM, Site Integrated Oversight Manual</li> </ul>	<ul style="list-style-type: none"> <li>• RMRS-QA-03 01, Corrective Action,</li> <li>• RMRS-QA-10 02, Conduct of Surveillance,</li> <li>• OPS-INSTR 015, Management Self-Assessments,</li> <li>• Quality Assurance Improvement Plan-FY98,</li> <li>• WIPP-007, TRU Waste Characterization Project Conditions Adverse to Quality Trending and Analysis, and</li> <li>• RMRS-QA-03 02, Continuous Improvement (Draft - Due in May 1998)</li> </ul>
<p><b>Management</b>                      Criterion 4 - Documents and Records</p>	<ul style="list-style-type: none"> <li>• 1-11000-ADM-003, Correspondence Control Program, (to be superseded by</li> <li>• 1-L43-IMS-001, (same title),</li> <li>• 1-MAN-013-SIOM, Site Documents Requirements Manual, and</li> <li>1-V41-RM-001, Records Management Guidance for Records Sources</li> </ul>	<ul style="list-style-type: none"> <li>• DC-06 01, Document Control Program, •</li> <li>OPS-DIR-004, Procedures and Document Control,</li> <li>• RM-06 02, Records Identification, Generation, and Transfer,</li> <li>• RM-06 04, Administrative Record Document Identification and Transmittal, and</li> <li>• RM-06 03, Records Receipt, Processing, Retrieval, and Disposition of RMRS Document and Records</li> </ul>
<p><b>Performance</b>                      Criterion 5 - Work Processes</p>	<ul style="list-style-type: none"> <li>• The Master Activity List (MAL), Site</li> <li>• 1- MAN-013-SDRM, Site Documents Requirements Manual,</li> <li>• Conduct of Engineering Manual,</li> <li>• 1-MAN-016-ISM, Integrated Safety Management System Manual,</li> <li>• 1-D55-ADM-02 37, Activity Control Envelope Development,</li> <li>• 1-H24-ADM-10 01, Startup and Restart of Nuclear Facilities,</li> <li>• 1-R97-F&amp;A-MCS-001, Management Control System</li> <li>• 1-40-ADM-MCS-1002, Work Package Development &amp; Documentation,</li> </ul>	<ul style="list-style-type: none"> <li>• RMRS-QA-05 01, Preparation and Control of RMRS Documents,</li> <li>• RMRS-96-0065, Safety and Health Program,</li> <li>• OPS-DIR-001, Safety and Environmental Stewardship,</li> <li>• OPS-DIR-002, Authorization Basis,</li> <li>• OPS-DIR-005, Operations Review Committee Charter,</li> <li>• OPS-DIR-006, Safety Requirements for Work Involving Penetration of Walls, Floors, Ceilings, and Concrete, Asphalt or Masonry Pads,</li> </ul>

Quality Requirements	Site Specific Implementing Documents	RMRS Specific Implementing Documents
	<ul style="list-style-type: none"> <li>• 1-40-ADM-MCS-1003, Work Breakdown Structure/Baseline Change Control,</li> <li>• 1-40-ADM-MCS-1004, Work Authorization &amp; Suspension,</li> <li>• Integrated Work Control Program Manual,</li> <li>• Nuclear Safety Manual,</li> <li>• 1-83000-WELD-001, Welding Program Plan,</li> <li>• Conduct of Operations Manual, and • Radiological Control Manual</li> </ul>	<ul style="list-style-type: none"> <li>• 95-ENG-WELD-0052, RMRS Welding Plan,</li> <li>• OPS-INSTR 002, EWP Implementation Instruction,</li> <li>• INSTR 012, Radiological Deficiency Report Administration,</li> <li>• OPS-DIR-008, ALARA Committee Charter,</li> <li>• RMRS-QA-05 02, QA Review of RMRS Documents, and</li> <li>• WIPP-009, RCRA Characterization of TRU Waste to be Disposed of at WIPP</li> </ul>
<b>Performance</b> Criterion 6 - Design Control	<ul style="list-style-type: none"> <li>• Conduct of Engineering Manual,</li> <li>• Configuration Change Control Program Manual,</li> <li>• Integrated Work Control Program Manual,</li> <li>• 1-MAN-004-CSMM, Computer Software Management Manual,</li> <li>• Nuclear Safety Manual,</li> <li>• 1-V51-COEM-DES-210, Design Process Requirements,</li> <li>• Nuclear Materials Safeguards Manual,</li> <li>• 1-C10-NSM-04 03, Safety Evaluation Screen,</li> <li>• 1-C11-NSM-04 05, Unreviewed Safety Question Determination, and</li> <li>• 1-52000-ADM-02 01, ORC Requirements</li> </ul>	RMRS subscribes to the existing Site infrastructure for controlling design activities
<b>Performance</b> Criterion 7 - Procurement	<ul style="list-style-type: none"> <li>• Procurement System Volume I and Volume II, and</li> <li>• 1-W36-APR-111, Acquisition Procedure for Requisitioning Commodities and Services</li> <li>• 3-PRO-T21-CCP-CCP, Purchasing Card Procedure</li> </ul>	RMRS subscribes to the existing Site system exclusively for the procurement of items and services
<b>Performance</b> Criterion 8 - Inspection and Acceptance Testing	<ul style="list-style-type: none"> <li>• Conduct of Engineering Manual,</li> <li>• Integrated Work Control Program,</li> <li>• 1-PRO-072-001, Inspection and Acceptance Testing Process,</li> <li>• 1-V51-COEM-DES-210, Design Process Requirements, and</li> <li>• 1-197-ADM-12 01, Control of Measuring and Test Equipment</li> </ul>	RMRS subscribes to the existing Site infrastructure for Inspection and Acceptance Testing and for instrument calibration, except as described in Section 6 8 2
<b>Assessment</b> Criterion 9 - Management Assessment	<ul style="list-style-type: none"> <li>• 1-MAN-O13-SIOM, Site Integrated Oversight Manual</li> </ul>	<ul style="list-style-type: none"> <li>• RMRS-QA-09 01, Management Assessments</li> </ul>

<b>Quality Requirements</b>	<b>Site Specific Implementing Documents</b>	<b>RMRS Specific Implementing Documents</b>
<i>Assessment</i> Criterion 10 - Independent Assessment	<ul style="list-style-type: none"><li>• 1-MAN-O13-SIOM, Site Integrated Oversight Manual</li></ul>	<ul style="list-style-type: none"><li>• RMRS-QA-10 01, Independent Assessments</li></ul>