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Revision 3

CH2M HILL Plateau Remediation Company Environmental Quality Assurance Program Plan

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
under Contract DE-AC06-08RL14788

CH2MHILL
Plateau Remediation Company

P.O. Box 1600
Richland, Washington 99352

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Introduction

Management Plan PRC-MP-QA-599, *Quality Assurance Program*, describes the CH2M HILL Plateau Remediation Company (CHPRC) Quality Assurance (QA) Program, including the overall structure, requirements, implementation methods, and responsibilities. That plan requires that program and project plans be developed to ensure effective implementation of the QA requirements for CHPRCs environmental activities. This Environmental Quality Assurance Program Plan (EQAPP) is the management tool that documents the quality system for planning, implementing, documenting, and assessing the effectiveness of the environmental activities supporting the PRC work scope, *Hanford Federal Facility Agreement and Consent Order* (also known as the *Tri-Party Agreement* (TPA) implementation, data operations, and other environmental programs. This EQAPP includes Quality Assurance Project Plan (QAPjP) requirements for implementation of the following CHPRC's projects: the Soil & Groundwater Remediation Project (S&GRP); the 100K Project; the Deactivation and Decommissioning (D&D) Project; the Sludge Treatment Project (STP); and the Waste & Fuels Management Project (W&FMP).

Implementation of PRC-MP-QA-599 and this EQAPP satisfies the requirement in the Plateau Remediation Contract (PRC) with the U.S. Department of Energy (DOE) that CHPRC develop a Quality Assurance Program (QAP) that implements the following:

- DOE Order 414.1C Attachment 2 Contractor Requirements Document (CRD), *Quality Assurance*
- Code of Federal Regulation, Title 10, Part 830 Nuclear Safety Management, Subpart A, *Quality Assurance Requirements*
- DOE/CBFO-94-1012, DOE Carlsbad Field Office (CBFO), *Quality Assurance Program Description,* Revision 8, for WIPP-related activities
- DOE/RW-0333P, *DOE Office of Civilian Radioactive Waste Management (OCRWM), Quality Assurance Requirements and Description*, Revision 18, for activities related to disposal at Yucca Mountain.

The PRC further requires the contractor to comply with all environmental laws, regulations, DOE Orders, and procedures applicable to the work being performed under

the contract. A complete listing of these requirements is found in the PRC No. DE-AC06-08RL14788, Attachment J.2, entitled, *Requirements Sources and Implementing Documents*.

This EQAPP supports and complies with the CHPRC Quality Assurance Program PRC-MP-QA-599 and the Integrated Safety Management System/Environmental Management System (ISMS/EMS). Additional QA requirements pertaining to environmental activities include the following requirements of the TPA:

- ARTICLE XXXI QUALITY ASSURANCE
- Section 6.5 QUALITY ASSURANCE of the TPA Action Plan for Resource Conservation and Recovery Act of 1976 (RCRA) closure plans, the RCRA permit, and any other relevant plans that may be used to describe sampling and analyses at RCRA treatment, storage, and disposal (TSD) units.
- Section 7.8 QUALITY ASSURANCE of the TPA Action Plan for Remedial Investigation/Feasibility Study (RI/FS) or RCRA facility investigation/corrective measures study (RFI/CMS) work plans, or in other work plans that may be used to describe sampling and analyses at Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) past-practice units or RCRA past practice units.

A document of particular importance to all environmental sampling and analysis activities performed at Hanford is DOE/RL-96-68, *Hanford Analytical Services Quality Assurance Requirements Document (HASQARD)*. The PRC requires that all environmental sampling and analysis activities comply with the requirements of the HASQARD.

The CHPRC EQAPP establishes the environmental QA Program requirements of the CHPRC QA Program for all PRC environmental cleanup and restoration activities. This document was developed using U.S. Environmental Protection Agency (EPA) guidance documents for application to environmental management activities, EPA 240/B-01/002, *EPA Requirements for Quality Management Plans* EPA QA/R-2. The EQAPP follows the format of EPA QA/R-2 for developing environmental quality management plans, EPA QA/R-5 for developing environmental quality project plans and incorporates the QA

requirements of the CHPRC QA Program , which includes all the quality provisions of DOE Order 414.1C, Attachment 2 CRD, EM-QA-001, Rev. 0, and NQA-1-2008.

The EQAPP complies with and is written in the EPA QA/R-2 format. This EQAPP contains the following elements and corresponding requirements from EPA QA/R-2:

1. Management and Organization
2. Quality System Components
3. Personnel Qualification and Training
4. Procurement of Items and Services
5. Documents and Records
6. Computer Hardware and Software
7. Planning
8. Implementation of Work Processes
9. Assessment and Response
10. Quality Improvement.

Each element describes how the EQAPP implements the contract requirements noted above to each applicable environmental function and activity.

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Terms

ASME	American Society of Mechanical Engineers
AVS	Acquisition Verification Services
BCAA	Benton Clean Air
CBFO	Carlsbad Field Office
CEC	Central Environmental Committee
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CFR	*Code of Federal Regulations*
CHPRC	CH2M HILL Plateau Remediation Company
CMD	corrective measures design
CMI	corrective measures implementation
CMS	corrective measures study
CRD	contractor requirements document
D&D	deactivation & decommissioning
DOE	U.S. Department of Energy
DQA	data quality assessments
DQO	data quality objectives
ECO	Environmental Compliance Officer
ECOE	Environmental Center of Expertise
Ecology	Washington State Department of Ecology
EMS	Environmental Management System
EP	Environmental Protection
EP&SP	Environmental Program and Regulatory Management
EPA	U.S. Environmental Protection Agency
EQA	environmental quality assurance
EQAPP	environmental quality assurance program plan
ER&QA	environmental review and quality assurance
ESH&Q	environment, safety, health, and quality
FFTF	Fast Flux Test Facility

FSP	field sampling plan
HASQARD	hanford analytical services quality assurance requirements document
HSP	health & safety plan
IM	interim measure
IRA	interim response action
ISMS/EMS	Integrated Safety Management System/Environmental Management System
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
O&M	operation and maintenance
OCRWM	Office of Civilian Radioactive Waste Management
P/F/F	project/function/facility
PFP	Plutonium Finishing Plant
PRC	Plateau Remediation Contract
Q&PA	quality and performance assurance
QA	quality assurance
QA/QC	quality assurance/quality control
QAE	Quality Assurance Engineer
QAP	quality assurance program
QAPjP	quality assurance project plan
QAPP	quality assurance program plan
QC	quality control
RA	remedial action
RCRA	*Resource Conservation and Recovery Act of 1976*
RD	remedial design
RD/RA	remedial design/remedial action
RFA	RCRA Facility Assessment
RFI/CMS	RCRA facility investigation/corrective measures study
RI/FS	Remedial Investigation/Feasibility Study
RL	U.S. Department of Energy, Richland Operations Office
ROD	record of decision

SAP	sampling and analysis plans
S&GRP	Soil and Groundwater Remediation Project
SME	subject matter expert
SMP	software management plan
STP	Sludge Treatment Project
TPA	Tri-Party Agreement
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TSD	treatment, storage, and disposal
V&V	Verification & Validation
WAC	*Washington Administrative Code*
W&FMP	Waste & Fuels Management Project
WDOH	Washington Department of Health

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1 Management and Organization of CHPRC Environmental Quality Assurance Program and Functions

This Environmental Quality Assurance Program Plan (EQAPP) describes the quality assurance (QA) policy, requirements, roles, responsibilities, and authorities of the CH2M HILL Plateau Remediation Company (CHPRC) Environmental Quality Assurance (EQA) Program. The EQAPP provides quality requirements for the planning, implementation, and assessment of environmental functions and activities. The EQA organization provides quality assurance oversight for environmental requirements, functions, and activities. This includes but is not limited to, environmental data collection, environmental technology programs, monitoring, reporting, regulatory documentation, and other compliance activities.

The EQA organization is a direct report to Environmental Program & Strategic Planning (EP&SP) through Environmental Review and Quality Assurance (ER&QA), and reports via a matrixed relationship to the Director of Quality and Performance Assurance (Q&PA). This is consistent with the CHPRC philosophy of direct functional personnel reporting to a project and indirect functional personnel reporting to the program. EQA provides quality engineering, environmental document review and approvals, and oversight in direct support to EP&SP with independence provided by the matrix back to Q&PA. EQA also provides direct support to projects as requested, and oversight of EQAPP implementation by both project and functional personnel.

1.1 Purpose

In accordance with EPA QA/R-2, the purpose of this section is to document the overall policy, scope, applicability, and management responsibilities of the organization's quality system.

This section describes CHPRC's environmental quality assurance program structure, including Quality and Performance Assurance (Q&PA), the EQA Program and Project Quality Assurance/Quality Control activities. It identifies the basic QA requirements imposed by the PRC for environmental requirements, functions, and activities, as well as the implementation of the EQAPP.
NOTE: The CHPRC Organization Charts are available on the CHPRC website at http://prc.rl.gov/rapidweb/HR/index.cfm?PageNum=17,and include Safety, Health, Security and Quality Organization, and the Environmental Program and Regulatory Management Organization.

1.1.1 Quality and Performance Assurance (Q&PA)

The Q&PA is a component of the CHPRC Safety, Health, Security and Quality Organization, and is composed of five groups: 1) Nuclear Safety, Regulatory, and Event Reporting; 2) Issues Management; 3) Quality Systems; 4) Performance Oversight; and 5) Waste and Fuels QA. These groups provide QA support to all CHPRC projects consistent with the quality and quality improvement needs of each individual project.

1.1.1.1 CHPRC QA Policy

The CHPRC QA Program's policy is to develop, implement, and assess a QA program that complies with the requirements of DOE Order 414.1C Attachment 2 CRD, 10 CFR 830 Subpart A, DOE/CBFO-94-1012, DOE/RW-0333P, EM-QA-001, and the applicable QA requirements of the TPA. The entire CHPRC QA Policy is located in PRC-MP-QA-599, *Quality Assurance Program.*

1.1.2 Environmental Quality Assurance (EQA)

Because much of the PRC involves environmental cleanup functions and activities, the CHPRC has established a separate Environmental Quality Assurance (EQA) function. EQA is a component of the CHPRC Environmental Program and Regulatory Management (EP & RM) Organization and is matrixed

to Q&PA to provide for independence. The EQA Program is consistent with the overall Q&PA Program and operates to achieve the quality objectives for environmental functions and activities.

1.1.2.1 EQA Policy

The EQA Program is committed to achieving environmental excellence by systematically integrating environmental quality principles consistent with the environmental cleanup goals through Quality Engineering, surveillance, and assessments. The EQA policy is consistent with and supports the CHPRC Environmental Policy, which states in part:

> *"The environmental policy of the CHPRC is to be responsible stewards of the environment. The CHPRC is committed to achieving environmental excellence by systematically integrating environmental, safety, health and quality principles into the work processes as stated in PRC-POL-EP-5054. All CHPRC employees are responsible for conducting work consistent with this policy. Top management is responsible for reviewing performance against this policy."*

1.1.3 Project Quality Assurance/Quality Control (QA/QC)

In addition to the Q&PA and the EQA Programs, individual CHPRC projects have QA Engineers (QAEs) assigned to provide QA support, oversight and inspection. These projects include the CHPRC Soil and Groundwater Remediation Project (S&GRP); Deactivation and Decommissioning (D &D); Fast Flux Test Facility (FFTF) Closure Project; Waste & Fuels Management Project (W&FMP); Plutonium Finishing Plant (PFP) Closure and Balance of Site; and 100K Project and Sludge Treatment Project. Individual QA engineers provide QA oversight and review of specific project activities and functions. These QAEs report directly to the project and are matrixed back to Q&PA to provide independence and program support.

1.2 Requirements

The CHPRC environmental quality program is consistent with EPA QA/R-2, *EPA Requirements for Quality Management Plans,* Section 3.2, DOE Order 414.1C, Attachment 2, CRD, Criterion 1, *Program* and NQA-1-2008, Requirement 1, *Organization*, and complies with 10 CFR 830 Subpart A, DOE/CBFO-94-1012, DOE/RW-0333P, EM-QA-001, and the applicable QA requirements of the TPA.

1.3 Implementation

The following table (located in the CHPRC Management Plan, PRC-MP-QA-599, *Quality Assurance Program*, Attachment 2, Criterion 1, *Program*), lists the applicable procedures required to implement the program.

Criterion Number	10 CFR 830.122 Program Element	CHPRC Document Number and Title	ISMS/EMS Integration
1	Program	PRC-MP-MS-015, Requirements Management Process PRC-MP-MS-19361, CH2M Hill Plateau Remediation Company Project Execution Plan PRC-MP-MS-29238, Assurance System Description PRC-RD-EN-10484, Nondestructive Assay Management Program	Establish ES&H policy Management review Define scope of work Identify hazards, environmental impacts, and ES&H requirements Analyze hazards and environmental impacts and

Criterion Number	10 CFR 830.122 Program Element	CHPRC Document Number and Title	ISMS/EMS Integration
		PRC-PRO-SH-3468, Stop Work Responsibility PRC-PRO-EN-14616, Resolving Dissenting Technical Opinions CHPRC-00189, The CHPRC Environmental Quality Assurance Program Plan HNF-25689, Transportation and Packaging Quality Assurance Program PRC-MP-EP-40220, Environmental Programs and Regulatory Management Roles, Responsibilities, and Functions.	implement controls Perform work within controls

1.3.1 Q&PA

The CHPRC's Q&PA Program ensures the effective implementation of the CHPRC quality program.

1.3.2 EQA

EQA ensures the direct support of quality and the effective quality program implementation associated with environmental cleanup activities.

1.3.3 Project QA/QC

Project QA/QC ensures the implementation of quality within respective projects.

1.4 Responsibilities

Section 1.4 of the CHPRC Management Plan PRC-MP-QA-599, *Quality Assurance Program,* describes the detailed organizational structure and responsibilities. This section details additional specific responsibilities pertaining to the EQAPP. Detailed organizational charts are maintained and made available by the Human Resources Organization.

All employees are responsible for performing work in accordance with the requirements set forth in this EQAPP. Those employees performing oversight and verification have the authority and responsibility to identify quality problems, recommend solutions, and verify implementation of effective corrective actions.

CHPRC is committed to performing work in accordance with requirements to ensure high quality products and services meeting or exceeding the customer's needs, and fulfilling the expectations of our customer to achieve adequate protection of workers, the public, and the environment, while taking into account the work to be performed and the associated hazards.

> **NOTE:** All employees are responsible for and have the authority to stop work when they are convinced that a situation exists which places themselves, their coworker(s) or the environment in danger.

1.4.1 President and Chief Executive Officer of CHPRC

The President of CHPRC has responsibility for the quality of CHPRC activities, services, and products.

1.4.2 Vice President Environmental Program and Regulatory Management

The Vice President (VP) of EP & RM is responsible for the interpretation and implementation of environmental codes, standards, and regulations. The VP EP&SP provides qualified staff to support safe and compliant work, maintains an interface with external environmental regulators, and promotes and champions environmental compliance. The VP EP&SP has overall responsibility for the Environmental Management System (EMS). The VP EP&SP is also responsible for ensuring:

- EP & RM work is performed in accordance with the CHPRC EQA Program
- Organizational charts, functional responsibilities and levels of authority are defined and documented
- Organizational resources are made available to support an effective EQA program.

NOTE: For additional roles and responsibilities of the EP&SP VP, see PRC-MP-EP-40220, *Environmental Programs and Regulatory Management Roles, Responsibilities and Functions.*

1.4.3 Director of Environmental Review and Quality Assurance

The Director of ER&QA reports to the Vice President of EP&SP and is responsible for ensuring

- An effective EQA program is planned and documented
- Appropriate management access to EQA manager
- Appropriate resources are identified and provided.

NOTE: For additional roles and responsibilities of the Director of ER&QA see PRC-MP-EP-40220, *Environmental Programs and Regulatory Management Roles, Responsibilities and Functions.*

1.4.4 Environmental Quality Assurance Manager

The EQA Manager has responsibility for effective implementation of the EQA Program through quality engineering and assessments to ensure, assess, and evaluate the effectiveness of implementation of the CHPRC EQA Program. The EQA Manager and staff have access to the appropriate management levels in order to plan, assess, and identify improvements to the quality systems. The EQA Manager ensures the direct support of quality and the effective quality program implemtnation associated with environmental cleanup activities.

The EQA Manager is the Technical Authority for Environmental QA requirements, is a direct report to the CHPRC Director of ER&QA, is matrixed to the Director of Q&PA (to ensure independence), and is responsible for:

- Ensuring implementation of this EQAPP
- Approving environmental documents (or Delegate), specifically
  - Data Quality Objectives (DQOs)
  - Sampling Analysis Plans (SAPs)
  - Quality Assurance Project Plans (QAPjPs)
  - Other Documents, as requested
- Coordinating Environmental QA Program activities
- Conducting programmatic independent assessments and surveillances, and reporting quality issues to management

- Ensuring the EQA staff have no direct involvement or responsibility for the work being assessed
- Interfacing with other CHPRC QA organization personnel for coordination and support of environmental activities
- Interfacing with DOE QA, legal, projects, and other regulatory agencies concerning environmental QA programs and issues.

1.4.5 Director of Environmental Protection

The Director of Environmental Protection (EP) is responsible for implementing environmental policies and procedures that meet applicable environmental laws, regulations, and DOE Orders. The Director of EP has the responsibility and authority for ensuring that the Environmental Management System (EMS) is established, implemented, and maintained.

EQA works closely with EP to ensure the attainment of quality and compliance with environmental regulatory requirements. The EQA/EP Responsibilities Table in Appendix A of this document details the differentiation of these responsibilities.

> **NOTE**: For additional roles and responsibilities of the Director of Environmental Protection, along with other EP&SP roles and responsibilities, see PRC-MP-EP-40220, *Environmental Programs and Regulatory Management Roles, Responsibilities and Functions.*

1.4.6 Project Responsibilities

1.4.6.1 Project Management

Project management is responsible for developing, maintaining, and implementing project/facility-specific procedures to implement EQAPP requirements, and for interfacing with the EQA organization on matters pertaining to EQA.

1.4.6.2 Project QAE

Project QAEs are responsible for integrating quality into the project documents and for performing project specific surveillances to ensure the attainment of quality for environmental activities. The Project QAE will provide quality engineering support for project documentation including, but not limited to, Data Quality Objectives (DQOs), Sampling and Analysis Plans (SAPs), and Quality Assurance Project Plans (QAPjPs) for appropriate quality requirement implementation. Project QAEs are responsible for maintaining their QAE qualification with regard to environmental activities.

1.4.7 EQA Responsibilities

EQA implements the CHPRC EQA Program by providing Quality Engineering support and QA oversight of environmental activities undertaken by the CHPRC. Quality Engineering support activities include consultations with project engineers and staff personnel to ensure quality requirements are built-in during the planning stages of CHPRC environmental documents, activities, and projects. EQA activities include assessments and surveillance to ensure that quality requirements have been met.

EQA is responsible for providing oversight of the EMS.

NOTE: The ISMS/EMS is a management system that provides a formal, organized process whereby people plan, perform, assess, and improve the safe conduct of work efficiently and in a manner that ensures protection of workers, the public, and the environment.

The ISMS/EMS encompasses the requirements of the Contractors Requirement Document (CRD) for DOE O 450.1A to implement an EMS. The CHPRC ISMS/EMS emphasizes a desire for zero illnesses,

injuries, environmental impacts, errors, or omissions in the performance of the PRC scope of work. This philosophy applies to all aspects of work and may be applied to worker's daily lives beyond the workplace. PRC-MP-MS-003, *Integrated Safety Management System/Environmental Management System Description,* describes how environment, safety, health, and quality (ESH&Q) are integrated into the work planning and execution for the PRC scope of work.

A crosswalk between EMS/ISO 14001/ISMS and this EQAPP is located on the EQA website.

1.5 Environmental Clean-up Documentation

Appendix B identifies typical environmental cleanup documentation as defined in the TPA Action Plan, which may be required for CERCLA, RCRA or Facility D&D. These processes are shown relative to the corresponding functions: Investigation, Alternative Analysis, Decision, Implementation of Decision, and Project Closeout. This chart also distinguishes that these elements are conducted under the appropriate QA program.

2 Quality System Components

2.1 Purpose

The purpose of the Quality System Components requirement from EPA QA/R-2 is to document how an organization manages its quality system and defines the primary responsibilities for managing and implementing each component of the system.

This EQAPP is a component of the CHPRC QA Program and was developed using EPA QA/R-2, EPA Requirements for Quality Management Plans (The CHPRC QA Program is described in PRC-MP-QA-599 *Quality Assurance Program* (QAP) and is comprised of the QAP, QA Program Plans, and QA Project Plans). This EQAPP is the implementing document of the QAP for all PRC activities involving environmental requirements, functions, and activities. Such activities include, but are not limited to: environmental data collection; environmental technology programs; environmental monitoring and reporting; risk assessments; and preparation of all other environmental documents.

Procedures and processes used to implement this EQAPP are common to the overall CHPRC QA management system. Activities that affect quality—including management assessments, training, project planning and execution, and data assessments—are performed in accordance with approved procedures appropriate to those activities.

All environmental activities employ the graded approach and will vary according to the nature of the activities and the intended use of the resulting information or data. The graded approach is described in PRC-PRO-QA-259, *Graded Approach*.

Each CHPRC organization conducting environmental activities is responsible for compliance with this EQAPP. See Section 1.4, Responsibilities.

This EQAPP shall be reviewed annually from its initial issue date and updated as necessary. Review of other quality system documentation is performed in accordance with approved procedures.

2.2 Requirements

CHPRC complies with the requirements of EPA QA/R-2, *EPA Requirements for Quality Management Plans,* Section 3.3, DOE Order 414.1C, Attachment 2, CRD, Criterion 1-*Program* and NQA-1 Requirement *2-Quality Assurance Program.*

2.3 Implementation

The following table (located in the CHPRC Management Plan PRC-MP-QA-599, *Quality Assurance Program*, Attachment 2, Criterion 1, *Program,*) lists the applicable procedures required to implement the program.

Criterion Number	10 CFR 830.122 Program Element	CHPRC Document Number and Title	ISMS/EMS Integration
1	Program	PRC-MP-MS-015, Requirements Management Process PRC-MP-MS-19361, CH2M Hill Plateau Remediation Company Project Execution Plan PRC-MP-MS-29238, Assurance System Description PRC-RD-EN-10484, Nondestructive Assay Management Program	Establish ES&H policy Management review Define scope of work Identify hazards, environmental impacts, and ES&H requirements Analyze hazards and

Criterion Number	10 CFR 830.122 Program Element	CHPRC Document Number and Title	ISMS/EMS Integration
		PRC-PRO-SH-3468, Stop Work Responsibility PRC-PRO-EN-14616, Resolving Dissenting Technical Opinions CHPRC-00189, The CHPRC Environmental Quality Assurance Program Plan HNF-25689, Transportation and Packaging Quality Assurance Program PRC-MP-EP-40220, Environmental Programs and Regulatory Management Roles, Responsibilities, and Functions.	environmental impacts and implement controls Perform work within controls

2.3.1 Implementation Tools:

The CHPRC also uses the following tools for implementing the requirements of the QA system:

- Quality System Audits/Assessments/Surveillances
- Training Plans
- Quality Assurance Project Plans(QAPjP)/Sampling and Analysis Plans (SAP)
- Data Verification and Validation (V&V)
- Data Quality Assessments

NOTE: These tools are applicable to all PRC functions and activities and are applied by Q&PA, EQA, and the Project QA/QC Engineers as appropriate.

3 Personnel Qualification and Training

3.1 Purpose

In accordance with EPA QA/R-2, the purpose of this section is to document the procedures for ensuring that all personnel performing work for an organization have the necessary skills to effectively accomplish their work.

The training and qualification program provides for the development and maintenance of proficiency commensurate with the scope, complexity, and nature of each job performance activity. PRC-MP-TQ-011, *CHPRC Qualification and Training Plan*, describes how training is accomplished at the Hanford Site and identifies the processes by which the CHPRC will maintain a qualified and trained work force. Numerous procedures exist regarding personnel training and qualification at the Hanford Site. Those procedures implement the training program. (See 3.3, *Implementation.*)

3.2 Requirements

CHPRC complies with the requirements of EPA QA/R-2, *EPA Requirements for Quality Management Plans,* Section 3.4, DOE Order 414.1C, Attachment 2, CRD Criterion 2, *Personnel Training and Qualification* and NQA-1-2008, Requirement 2, *Quality Assurance Program.*

3.3 Implementation

The following table (located in the CHPRC Management Plan, PRC-MP-QA-599, *Quality Assurance Program*, Attachment 2, Criterion 2, *Personnel Training and Qualification,*) lists the applicable procedures required to implement these requirements.

Criterion Number	10 CFR 830.122 Program Element	CHPRC Document Number and Title	ISMS/EMS Integration
2	Personnel Training and Qualification	PRC-MP-TQ-011, CHPRC Qualification and Training Plan PRC-MP-TQ-33263, Safeguards Training Program Description PRC-RD-TQ-11061, Training Requirements PRC-PRO-TQ-164, Integrated Training Electronic Matrix PRC-PRO-TP-166, Transportation Safety Training PRC-PRO-TQ-175, Training Program Descriptions PRC-PRO-QA-263, Qualification and Certification of Inspection and Test Personnel (Endorsed) PRC-PRO-TQ-459, Environmental Training PRC-PRO-QA-9662, Independent Assessment Process PRC-PRO-EN-20051, Engineering Selection, Qualification, and Training PRC-PRO-PM-21486, Project Management Personnel Selection, Qualification, and Professional Development PRC-PRO-OP-21712, Required Reading PRC-PRO-TQ-26025, Developing Training Programs	Identify hazards and environmental impacts and ES&H requirements Analyze hazards and environmental impacts and implement controls Perform work within controls Provide feedback and continuous improvement

PRC-POL-TQ-11337, *Employee Training*, identifies CHPRC's commitment to a trained work force by stating: "Training programs shall be maintained and enhanced as needed, that provide employees with the training to meet the Integrated Environmental, Safety and Health Management System (ISMS) guiding principle of: Competence Commensurate with Responsibility."

All CHPRC employees are required to receive training appropriate to their specific job assignments and responsibilities, in accordance with PRC-RD-TQ-11061, *Training Requirements*.

All CHPRC employees directly involved in environmental functions and activities shall complete all environmental training requirements per PRC-PRO-TQ-459, *Environmental Training*. Such individuals include, but are not limited to, Environmental Compliance Officers, all Environmental Protection and Regulatory Management exempt personnel, Environmental Quality Assurance Program Quality Assurance Engineers, and project specific Quality Assurance Engineers.

CHPRC employees participating in EMS audits shall be qualified in accordance with Appendix J of this EQAPP.

Management shall ensure and document that personnel have the appropriate qualifications, including training, knowledge, skills, certifications, accreditations, and/or licenses prior to assigning them to perform work. The proficiency of personnel shall be maintained and the need for new training identified based on changing requirements.

In addition to the above training, all QA Engineers are required to complete the EQA Quality Assurance Engineer 2 (QAE2) Supplemental Training Program.

4 Procurement of Items and Services

4.1 Purpose

To be in compliance with EPA QA/R-2, this section documents the procedures for purchased items and services that directly affect the quality of environmental programs.

The Design/Technical Authority is to ensure the review and approval of the procurement documents (and any changes to these documents), and to verify that the procurement documents are accurate, complete in accordance with approved procedures, and describe the following:

- The item or service to be procured
- The associated technical and quality requirements
- The quality system elements to be imposed on the supplier
- How the supplier's conformance to the requirements will be verified.

The Design/Technical Authority reviews and approves all applicable responses to solicitations to ensure compliance to technical and quality requirements.

Procured items and services are to be of acceptable quality, demonstrated by the review of objective evidence of quality for applicable items and services furnished by suppliers and subcontractors, source selection, source inspections, supplier audits, and examination of deliverables.

4.2 Requirements

CHPRC complies with the requirements of EPA QA/R-2, *EPA Requirements for Quality Management Plans,* Section 3.5, DOE Order 414.1C, Attachment 2, CRD Criterion 7, *Procurement* and NQA-1-2008, Requirement 4, *Procurement Document Control,* and Requirement 7, *Control of Purchased Items and Services.*

4.3 Implementation

The following table, located in the CHPRC Management Plan, PRC-MP-QA-599, *Quality Assurance Program*, Attachment 2, Criterion 7, *Procurement,* lists the applicable procedures required to implement these requirements:

Criterion Number	10 CFR 830.122 Program Element	CHPRC Document Number and Title	ISMS/EMS Integration
7	Procurement	PRC-RD-AC-10320, PHMC Acquisition System Requirements PRC-PRO-AC-123, Requesting Materials and Services PRC-PRO-AC-186, Statements of Work PRC-PRO-QA-268, Control of Purchased/Acquired Items and Services (Endorsed) PRC-PRO-QA-301, Control of Suspect/Counterfeit and Defective Items PRC-PRO-AC-335, Use and Control of Purchasing Card PRC-PRO-QA-3144, Supplier Quality Assurance Program Evaluation	Identify hazards, environmental impacts and ES&H requirements Define scope of work Provide feedback and continuous improvement

Criterion Number	10 CFR 830.122 Program Element	CHPRC Document Number and Title	ISMS/EMS Integration
		PRC-PRO-40213, Subcontractor Oversight	

4.3.1 Requests for Material or Services

Requests for material or services are made in accordance with procedures defined in PRC-PRO-AC-123, *Requesting Materials and Services.* This procedure is written specifically for end-users and requestors of materials and services to ensure that identified processes, reviews, and approvals are obtained prior to procurement.

4.4 Supplier Evaluation

PRC-PRO-QA-9662, *Independent Assessments,* and PRC-PRO-QA-3144, *Supplier Quality Assurance Program Evaluation,* define the requirements and processes for evaluating suppliers' QA programs, including their implementation of procedures prior to the supplier being placed on the Evaluated Suppliers List.

4.5 Acquisition Verification Services

The Fluor Hanford Acquisition Verification Services (AVS) performs supplier evaluations and receipt inspection on behalf of CHPRC for designated procured items as appropriate.

NOTE: Quality Classes are defined in PRC-PRO-QA-259, *Graded Approach.*

5 Documents and Records

5.1 Purpose

The purpose of the Documents and Records section is to document appropriate controls for quality-related documents and records determined to be important to the mission of the organization.

The preparation, review, approval, issue, use, and revision of documents that specify quality requirements or prescribe activities affecting quality shall be controlled to ensure that correct documents are being used. Records shall be specified, prepared, reviewed, approved, and maintained. Specific record specification and retention requirements are documented in the CHPRC implementing procedures.

5.2 Requirements

5.2.1 EPA/DOE/NQA-1

CHPRC complies with the requirements of EPA QA/R-2, *EPA Requirements for Quality Management Plans,* Section 3.6, DOE Order 414.1C, Attachment 2, CRD Criterion 4, *Documents and Records,* and NQA-l-2008, Requirement 2, *Quality Assurance Program*, and Requirement 6, *Document Control*, and Requirement17, *Quality Assurance Records*, and the requirements of PRC-MP-QA-599.

In addition to the requirements noted above, all environmental documents identified in Section 9.0 of the TPA Action Plan, entitled *Documentation and Records*, must comply with the requirements of the TPA Action Plan.

5.2.2 Other Requirements

Any other environmental documents including, but not limited to, the Hanford Site Annual Groundwater Monitoring Report, Effluent Treatment Facility and Treated Effluent Treatment Facility reports, National Emissions Standards for Hazardous Air Pollutants (NESHAP) air monitoring reports, and a National Pollutant Discharge Elimination System (NPDES) permit must comply with the requirements of PRC-RD-EP-15332 *Environmental Protection Requirements,* PRC-PRO-EP-15334 *Effluent and Environmental Monitoring for Radionuclide Air Emissions,* and PRC-PRO-EP-15335, *Environmental Permitting and Documentation Preparation,* as applicable.

5.3 Implementation

The following table located in the CHPRC Management Plan, PRC-MP-QA-599, *Quality Assurance Program*, Section 4, *Documents and Records,* lists the applicable procedures required to implement these requirements:

Criterion Number	10 CFR 830.122 Program Element	CHPRC Document Number and Title	ISMS/EMS Integration
4	Documents and Records	PRC-RD-IRM-210, Records Management Program PRC-RD-IRM-8310, Document Control Program PRC-PRO-MS-589, Project Hanford Management System Documents PRC-PRO-PM-8039, Document Control PRC-PRO-IRM-9679, Control of Administrative Plans, Reports, Studies, and Description Documents	Perform work within controls Identify hazards and environmental impacts, and ES&H requirements Analyze hazards, environmental impacts and implement controls

Criterion Number	10 CFR 830.122 Program Element	CHPRC Document Number and Title	ISMS/EMS Integration
		PRC-PRO-IRM-10588, Records Management Processes PRC-PRO-IRM-32281, Electronic Records PRC-PRO-IRM-211, Administrative Record File and Public Information Repositories	

PRC-PRO-IRM-10588, *Records Management Process,* defines the records program, maintenance, use, control, and disposition requirements, and describes this process.

TPA Action Plan, Section 9.0 contains a listing of documents which may be generated to implement environmental cleanup work activities and includes a description of the processes required to generate, review, and approve these documents. These documents are categorized as either Primary or Secondary and include:

5.3.1 Primary Documents

- Remedial Investigation/Feasibility Study (RI/FS) Work Plan
- Remedial Investigation (RI) Phase II Report
- Feasibility Study (FS) Phases I and II Report
- FS Phase II Report
- Pre-closure Work Plan
- Proposed Plan
- Remedial Design (RD) Report
- Remedial action (RA) work plan
- Remedial design and remedial action (RD/RA) work plan
- Operation and maintenance (O&M) plan
- Closure plan
- Part B permit application (for operation and/or post-closure)
- RCRA facility assessment (RFA) report
- RCRA facility investigation (RFI) report (final)
- Corrective measures study (CMS) report (preliminary and final)
- Corrective measures implementation (CMI) work plan
- Corrective measures design (CMD) report
- Interim response action (IRA) proposal

- Interim measure (IM) proposal
- Waste/Material Stream Project Management (Work) Plans (further addressed in TPA Action Plan Section 11.5)
- Other work plans (as specified in TPA Action Plan Section 11.6)
- Other documents as specified elsewhere in the TPA.

Figures 9-1 and 9-2 of Section 9.0 of the TPA Action Plan illustrate the preparation, review, and comment process for Primary Documents and the RCRA Part B Permit Application, and Closure/Postclosure Plan Process Flowchart, respectively.

5.3.2 Secondary Documents

- Hanford Operable Units Report (Currently titled "Preliminary Operable Units Designation Project")
- RI Phase I report
- RFI report (preliminary)
- Hanford Site waste management units report
- Sampling and data results
- Treatability investigation work plan (except per Section 7.3.6 selected treatability investigation work plans can be established as primary documents by the lead regulatory agency)
- Treatability investigation evaluation report
- Supporting studies and analyses
- Other related documents, plans, and reports not considered as primary

Figure 9-3 of Section 9.0 of the TPA Action Plan illustrates the preparation, review, and comment process for Secondary Documents.

The EQAPP requires that all Secondary Documents conform to the process identified in Section 9.0 of the TPA Action Plan.

5.3.3 TPA Administrative Record

The EQAPP incorporates the TPA Section 9.4 Administrative Record requirement that all environmental documents listed in Table 9-3 of Section 9.4 of the TPA Action Plan be included in the TPA Administrative Record. PRC-PRO-IRM-211, *Administrative Record File and Public Information Repositories*, is the implementing CHPRC procedure for this requirement. These documents include:

- RI/FS work plan
- RI Phase I report
- Feasibility study Phase I and II report
- Feasibility study Phase III report
- Proposed Plan
- Abatement proposal
- Interim response action proposal

- Documentation of preliminary assessment/site investigation
- Treatability study work plan and characterization plan
- Agency for Toxic Substances and Disease Registry (ATSDR) health assessment
- Preliminary natural resource survey (by natural resource trustee)
- Procedures as specified in work plans
- Supplemental work plan
- Health assessment
- Work plan change notice
- Sample data results
- Closure Plan
- Permit application (Part A and Part B)
- Draft permit (or permit modification) or notice of intent to deny
- Statement of basis or fact sheet, including all resources to documentation
- RFA report
- RFI/CMS work plan
- RFI report (preliminary and final)
- CMS report (preliminary and final)
- Interim measures proposals
- Procedures as specified in work plans
- Work plan change notice
- Sample data results
- Memoranda on policy decision
- Guidance documents
- Supporting technical literature
- Record of Decision
- Responsiveness summary
- Letters of approval
- Action memoranda
- Waiver requests and regulatory agency responses
- Final determination pursuant to dispute resolution
- Hanford Federal Facility Agreement and Consent Order including Action Plan
- Administrative orders
- Consent decrees
- Affidavits
- Correspondence to or from the Tribe
- Tribal comments
- Responses to Tribal comments
- Community relations plan
- Correspondence to or from the public
- Public notices

- Public comments
- Public meeting minutes
- Public hearing transcripts
- Responses to public comments
- Fact sheets (public information bulletins).

In addition, for those documents designated as Primary Documents, the Administrative Record must also include:

- All drafts submitted to the regulatory agencies for review and/or approval
- Any documents submitted by the non lead regulatory agency to the lead regulatory agency for inclusion in the Administrative Record
- Written comments from the lead regulatory agency to DOE (to include Notice of Deficiency on a Permit Application)
- DOE written responses to comments received from the lead regulatory agency
- Final document and any subsequent revisions
- Drafts which are submitted for public comment
- For public comments, the public comments and lead regulatory agency responses (if no comments are received, a letter from the lead regulatory agency shall be included documenting that fact).

For those documents designated as Secondary Documents, the Administrative Record must also include:

- Final documents and any subsequent revisions
- Any documents submitted by the non-lead regulatory agency to the lead regulatory agency for inclusion in the Administrative Record
- Written comments from the lead regulatory agency to DOE, if provided
- DOE written responses to comments received from the lead regulatory agency.

Project managers for each of the Tri-Parties determine which additional documents should be included in the Administrative Record as per Section 9.4 pp. 9-13 of the TPA Action Plan. Such documents may include:

- Validated sampling and analysis results
- Supporting technical studies and analyses
- Inspection reports and follow-up responses.

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6 Computer Hardware and Software

6.1 Purpose

The purpose of this section is to document how the organization will ensure that computer hardware and software satisfies the organization's requirements.

This section pertains to computer hardware and software processes used to support the acquisition, control, development, testing, installation, operation, maintenance, and retirement of computer hardware and software as applicable to design, construction, operation, modification, repair, and maintenance of the environmental program.

6.1.1 Hardware

Computer hardware used to maintain, index, store, or access records shall be maintained and controlled to ensure accountability, reproducibility, and protection from loss.

6.1.2 Software

A Software Management Plan (SMP) is required to be written, in accordance with PRC-PRO-IRM-309, *Controlled Software Management*, to further define specific requirements, procedures, or methods for a particular software application or organization. The Software Management Plan (SMP) describes the quality planning required before the development, acquisition, or major modification of a software application and defines specific requirements, procedures, or methods for a particular software application or organization. The SMP provides the confidence that the software conforms to established requirements.

The software management methodology involves the application of a systematic, disciplined, quantifiable approach at each stage of the software lifecycle. The method starts with defining conceptual models of a software application or system and using these models as the basis for system specification and design. In addition, the method establishes standards for planning the work; developing design, code, test and user documentation; verifying the completion of each lifecycle stage; and controlling changes to the baseline configuration.

Software Subject Matter Experts (SMEs) are expected to be the project/function/facility's (P/F/F) expert about software management. SMEs should have cognizance of all software applications in use within the organization. Software owners are responsible for:

- Control of individual software applications
- Completion of software documentation
- Management and training of authorized users
- Assessing and documenting the impact of changes to the user requirements on the performance of the hardware and software
- Ensuring the documents and records accurately reflect the completed work.

Computer software shall include, but is not limited to, design, data handling, data analysis, modeling of environmental processes and conditions, operations, process control of environmental technology systems (including automated data acquisition and laboratory instrumentation), and data bases containing environmental data (EPA QA/R-2).

6.2 Requirements

CHPRC complies with the requirements of EPA QA/R-2, *EPA Requirements for Quality Management Plans,* Section 3.7, DOE Order 414.1C, Attachment 2, CRD, Section 5, *Work Processes,* and NQA-1-2008, Requirement 3, *Design,* and Subpart 2.7, *Quality Assurance Requirements for Computer Software for Nuclear Facility Applications.*

6.3 Implementation

The following table located in PRC-MP-QA-599, *Quality Assurance Program,* Attachment 2, Criterion 5, *Work Processes* lists the applicable procedures required to implement these requirements:

Criterion Number	10 CFR 830.122 Program Element	CHPRC Document Number and Title	ISMS/EMS Integration
5	Work Processes	PRC-RD-TP-7900, Transportation and Packaging Program Requirements PRC-RD-IRM-10768, Computer Software Requirements PRC-RD-MN-10859, Maintenance Management PRC-RD-PM-14988, Project Management Requirements PRC-RD-EP-15332, Environmental Protection Requirements PRC-RD-PC-17913, Work Breakdown Structure and Coding Requirements PRC-PRO-NS-062, Unreviewed Safety Question Process PRC-PRO-QA-297, Inspection, Test and Operating Status (Endorsed) PRC-PRO-QA-298, Nonconforming Items PRC-PRO-QA-301, Control of Suspect/Counterfeit and Defective Items PRC-PRO-IRM-309, Computer Software Management PRC-PRO-QA-5432, Hold Point Application in Technical Work Documents PRC-PRO-NS-8366, Facility Hazard Categorization PRC-PRO-QA-8635, Review and Approval of Technical Documents PRC-PRO-WKM-12115, Work Management PRC-PRO-CN-14990, Construction Management PRC-PRO-EP-15333, Environmental Protection Processes PRC-PRO-TP-15438, Unreviewed Safety Question Process for Transportation HNF-PRO-33415, Structures, Systems, Components Cleaning/Cleanliness and Foreign Material Exclusion (Endorsed)	Identify hazards, environmental impacts and ES&H requirements Analyze hazards, environmental impacts and implement controls Perform work within controls Provide feedback and continuous improvement Define scope of work

CHPRC personnel employ software with appropriate hardware to collect, manage, manipulate, and record environmental information and data. The purposes for these activities include preparation and issuance of environmental reports and permit information required by the TPA, and modeling using environmental data to evaluate various risk scenarios and identify potential risk management alternatives.

The collecting, managing, manipulating and recording of environmental information and data and the application of the data generated by these activities must also comply with the requirements of PRC-PRO-IRM-309, *Computer Software Management,* which describes the procedure for software management, development, acquisition, testing, installation, operation, and retirement.

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7 Planning

7.1 Purpose

The purpose of the planning section is to document how individual data operations will be planned within the organization to ensure that the data or information collected are of the needed and expected quality for their desired use.

Planning for environmental activities involves a systematic approach to ensure that all data or information collected is of the needed and expected quality for the desired use. The systematic planning process includes:

- The identification and involvement of all customers and suppliers
- A description of the project goal, objectives, questions, and issues to be addressed
- The identification of project schedule, resources, milestones, and any applicable requirements
- The identification of the type and quantity of data needed, and how the data will be used to support the projects objectives
- The specification of performance criteria for measuring quality
- The specification of needed QA and QC activities to assess the quality performance criteria
- A description of how, when, and where the data will be analyzed, evaluated, and assessed against its intended use and the quality performance criteria.

There are different variations to systematic planning, tailored to specific application areas. The Triad Approach, developed by EPA's Technology Innovation Program, combines systematic planning with more recent technology advancements such as techniques that allow for results of early sampling to inform the direction of future sampling. The Triad refers to three primary components, systematic planning, dynamic work strategies, and real-time measurement systems. The goal of the Triad approach is to manage decision uncertainty. It is the DQO process that is the most commonly-used application of systematic planning.

7.2 Requirements

CHPRC complies with the requirements of EPA QA/R-2, *EPA Requirements for Quality Management Plans*, Section 3.8, Planning, DOE Order 414.1C, Attachment 2, CRD, Criterion 6, *Work Processes* and NQA-1-2008, Requirement 2, *Quality Assurance Program*, and PRC-MP-QA-599, *Quality Assurance Program*.

7.3 Implementation

The following table located in the CHPRC Management Plan PRC-MP-QA-599, *Quality Assurance Program*, Attachment 2, Criterion 5, *Work Processes*, lists the applicable procedures required to implement these requirements:

Criterion Number	10 CFR 830.122 Program Element	CHPRC Document Number and Title	ISMS/EMS Integration
5	Work Processes	PRC-RD-TP-7900, Transportation and Packaging Program Requirements PRC-RD-IRM-10768, Computer Software Requirements PRC-RD-MN-10859, Maintenance Management PRC-RD-PM-14988, Project Management Requirements PRC-RD-EP-15332, Environmental Protection Requirements PRC-RD-PC-17913, Work Breakdown Structure and Coding Requirements PRC-PRO-NS-062, Unreviewed Safety Question Process PRC-PRO-QA-297, Inspection, Test and Operating Status (Endorsed) PRC-PRO-QA-298, Nonconforming Items PRC-PRO-QA-301, Control of Suspect/Counterfeit and Defective Items PRC-PRO-IRM-309, Computer Software Management PRC-PRO-QA-5432, Hold Point Application in Technical Work Documents PRC-PRO-NS-8366, Facility Hazard Categorization PRC-PRO-QA-8635, Review and Approval of Technical Documents PRC-PRO-WKM-12115, Work Management PRC-PRO-CN-14990, Construction Management PRC-PRO-EP-15333, Environmental Protection Processes PRC-PRO-TP-15438, Unreviewed Safety Question Process for Transportation HNF-PRO-33415, Structures, Systems, Components Cleaning/Cleanliness and Foreign Material Exclusion (Endorsed)	Identify hazards, environmental impacts and ES&H requirements Analyze hazards, environmental impacts and implement controls Perform work within controls Provide feedback and continuous improvement Define scope of work

7.3.1 RCRA Activities

For RCRA permitting activities, all projects identified as operating under Interim Status requirements shall follow the planning process identified in PRC-RD-EP-15332 Section 2.19. For those activities identified as Final Status actions, the requirements of PRC-RD-EP-15332 Section 2.20 shall be applied. RCRA closure activities shall be conducted following the requirements listed in PRC-RD-EP-15332 Section 2.46.

7.3.2 CERCLA Activities

CERCLA activities shall follow the planning process contained in PRC-PRO-EP-25415, *CERCLA Response Actions,* as referenced in PRC-RD-EP-15332 Section 2.50 and PRC-PRO-EP-15333

Section 5.50. For CERCLA Removal Actions, the planning process identified in PRC-PRO-EP-25415 Sections 5.1 through 5.9 shall be employed. All CERCLA Remedial Actions shall be planned and conducted following the requirements listed in PRC-PRO-EP-25415, Sections 5.10 through 5.20.

7.3.3 Major Decision Elements

The major decision elements for RCRA actions, and CERCLA and RCRA past-practice actions, are identified in Section 6.0, Treatment, Storage, and Disposal Unit (TSD) Process, and Section 7.0, Past Practices Processes, of the TPA Action Plan, respectively. These elements contain provisions designed to ensure collection of quality information and data and include application of 1) the EPA Data Quality Objectives process as defined in the EPA Guidance Document, "Guidance for the Data Quality Objectives Process," EPA/600/R-96/055 (QA/G-4) 2006 as revised; and 2) application of EPA's Requirement Document, "Requirements for Quality Assurance Project Plans," EP N240/B-01/003 (EPA QA/R-5) 2006 as revised.

7.3.4 Significant Activities

All significant activities that impact decision making actions require the application of the DQO process as described in the EPA Guidance Document (QA/G-4). After a DQO document is developed a Quality Assurance Project Plan must then be developed by applying the EPA Requirements Document (EPA QA/R-5). Together, these documents collectively employ a graded and logical approach to systematic planning of environmental cleanup activities to all PRC cleanup activities. The elements contained in the EPA guidance documents are designed to ensure collection and analysis of quality data.

Adherence to the process and elements listed in these documents is mandatory and incorporates by reference the QA requirements of Sections 6.5 and 7.8 of the TPA Action Plan.

7.3.5 DQO Process

The major elements of the DQO Process include the following:

1. State the Problem
2. Identify the Decision
3. Identify Inputs to the Decision
4. Define the Study Boundaries
5. Develop a Decision Rule
6. Specify Limits on Decision Errors
1. Optimize the Design of Obtaining Data.

Each project must adhere to this process, as defined in the QA/G-4 Guidance Document, in order to ensure that quality data are obtained to successfully complete the project. Adherence to the guidance will ensure that information needed as crucial input to the QAPjP and Field Sampling Plan (FSP) has been properly obtained.

7.3.6 Quality Assurance Project Plan Development

Once the DQO process has been completed, an FSP QAPjP shall then be developed from the DQO process. Together, with a Health and Safety Plan (HSP), these documents comprise a SAP. The principal elements of the FSP include: 1) Sampling Process Design; 2) Sampling Methods; 3) Sample Handling and Chain of Custody; 4) Analytical Methods; 5) Calibration; and 6) Quality Control.

Although no specific EPA guidance document exists for FSP's, reference to the above elements is found in EPA QA/R-5 for the preparation of a QAPjP. The principal components of the QAPjP, as identified in

EPA QA/R-5, are: 1) QA Project Plan Requirements; 2) QAPjP Elements; 3) Crosswalks to QA; and 4) Documents including crosswalk between the DQO Process and the QAPjP.

It is the intent of this EQAPP to require that all projects follow and employ both the substantive and procedural elements of the above listed EPA guidance documents.

7.3.7 NESHAPS/Radioactive Air Emissions

EQA provides QA Program oversight to ensure the monitoring and reporting of radioactive air emissions activities are in accordance with: EPA 40 CFR 61, Washington Department of Health (WDOH) *Washington Administrative Code* (WAC) 246-247, and DOE Order 450.1A. This oversight includes but is not limited to surveillances and the review and approval of applicable documents including NESHAPs QAPPs, QAPjPs, and programmatic assessments. EQA is independent of the work being conducted and these assessments constitute an independent external assessment.

The activities specific to radioactive air emissions measurements include:

- Collection of laboratory analyses performed to detect the presence of radioactive materials on particulate filter media, charcoal cartridge filters, silver-zeolite cartridges, sodium hydroxide media, and silica gel or Drierite cartridges
- Compilation of laboratory analyses with measured stack flow data or maximum stack flow rates to derive releases of radioactivity and average concentrations of radioactivity in sampled emissions
- Calculation of quantities of radionuclides released and average concentrations for a calendar year, for a specific discharge point or a specific area on the Hanford Site
- Validation of acquired data
- Preparation, review, and release of the annual reports.

EQA is responsible for:

- Scheduling and conducting surveillances/assessments of air emissions activities
- Reviewing documents to assure data quality and QA objectives are met
- Verifying resolution of nonconforming items
- Reviewing sample analysis performance at laboratories
- Approving QAPPs and QAPjPs.

7.3.8 NPDES Discharges

The requirements of the Clean Water Act Section 301 regarding discharges to the Columbia River are met through compliance with the water discharge permitting system. The NPDES permit program implements the Clean Water Act's prohibition on unauthorized discharges to the navigable waters of the United States. NPDES Permits allow the discharge of specific pollutants from specific outfalls at specified concentrations for a certain period of time.

EQA provides oversight to ensure that monitoring and recording of water discharges complies with the requirements and conditions of the NPDES Permit No. WA-002591-7, which authorizes discharges from outfalls 001, 003, and 004 to the Columbia River.

Additionally, EQA provides oversight to ensure compliance with the provisions of the NPDES Storm Water Multi-Sector Permit No. WAR10B90(F), which authorizes storm water discharges to the Columbia River via outfall 004 (also known as the 1908-K outfall).

Oversight responsibilities include ensuring the maintenance of project- and operations-specific documentation necessary to show compliance with NPDES discharge requirements and applicable permit terms and conditions.

7.3.9 Facility Decommissioning Process: Deactivation & Decommissioning (D&D) Sites

The facility decommissioning process implements the approach DOE uses to take a facility from operational status to final disposition or closure at the Hanford Site. The facility decommissioning process is described in Section 8 of the Tri-Party Agreement Action Plan and applies to facilities and structures.

The decommissioning process as applied to facilities consists of three distinct phases after facility shutdown is complete: 1) transition; 2) surveillance and maintenance; and 3) disposition. During the transition phase, facility processes include stabilization, deactivation, and decontamination. After the facility has completed the transition phase, it enters a surveillance and maintenance phase until final disposition can be accomplished. Final disposition usually involves dismantlement, deactivation or demolition. It could also involve other alternatives such as partial demolition and barrier placement. The final disposition is described and authorized in a decision document such as an Action Memorandum, Record of Decision (ROD) or other agreed-upon document based on a graded approach with the regulatory agencies.

7.4 Environmental Project Modeling

7.4.1 Planning for Modeling

Planning for modeling projects ensures that a model is scientifically sound, robust, and defensible and is just as important as planning traditional environmental measurements for data collection projects. To ensure proper planning of PRC environmental modeling activities, the EQA Program shall invoke the use of the EPA's guidance document for environmental modeling, *EPA Guidance for Quality Assurance Project Plans for Modeling*, EPA QA/G-5M. This document is the companion document to the EPA Requirements Document for Quality Assurance Project Plans, EPA QA/R-5, noted above in Section 7.3.6.

7.4.2 Collection of Quality Data

Collection of Quality Data is critical to the success of any modeling effort. Therefore, to ensure that quality data are obtained to provide input data to a model, all PRC environmental modeling activities must employ the data quality objectives process. The quality system planning approach invokes the data quality objectives process of QA/G-4 to provide quality information and data for input to proper model development as required by QA/G-5M.

7.4.3 The Modeling Development

The modeling development and application process shall contain the following elements:

- Modeling Needs and Requirements Analysis
- Model Development
- Model Application.

All Modeling activities shall contain the following elements:

- Project Management
- Measurement and Data Acquisition

- Assessment and Oversight
- Data Validation and Usability.

7.4.4 Model Quality Objectives (MQOs)

Systematic planning and quality objectives should be applied to modeling projects. Modeling Quality objectives (MQOs) should be established based on the study objectives, intended use of the output, and the type of modeling to be performed.

A graded approach is used to apply a level of planning rigor, quality assurance and uncertainty assessment commensurate with the nature of the work being performed and the intended use of the model output data. As a result, an acceptable plan for some modeling studies may require a qualitative discussion of the process and its objectives, while others may require extensive documentation to adequately describe their complexity.

QA and uncertainty assessments are two aspects in modeling studies that are very closely linked. Based on the perception of acceptable uncertainty, manager and modeler must consider several factors that can be broadly characterized as a tradeoff between risk in model results due to uncertainty, versus the uncertainty and risk in the management decision. Several factors must be considered, including the type of modeling needed; data needed to support the modeling effort; and the assessment of modeling accuracy, costs, and schedule. However, it is the type of modeling, as well as the intended use of the modeling results, that dictates the type of uncertainty and sensitivity analyses to be performed. QA controls and uncertainty analysis broth provide assurance that the modeling results are "correct". Hence, these aspects play critical roles in establishing MQOs that ensure meaningful model results for decision-making.

7.5 Environmental Calculations

Performing calculations is necessary in the process of environmental engineering to ensure systems maintaining compliance parameters of environmental regulations meet the requirements of those regulations as documented in the code of federal regulations, and that cleanup actions are evaluated appropriately for risk to human health and the environment.

8 Work Processes

8.1 Purpose

EPA QA/R-5 states the purpose of this section is to document how work processes will be implemented within the organization to ensure that data or information collected are of the needed and expected quality for their desire use.

Work is performed in accordance with established technical standards and administrative controls using approved instructions or procedures. Items are identified and controlled to ensure their desired use. Items are maintained to prevent damage, loss, or deterioration. Equipment used for process monitoring, data collection, and analyses is calibrated and maintained as appropriate. Individuals meet the quality requirements, self-check their own performance, and recommend improvements in the quality of work products and processes.

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

8.2 Requirements

CHPRC work processes involving environmental functions and activities shall be consistent with the quality assurance requirements found in EPA QA/R-2, *EPA Requirements for Quality Management Plans*, Section 3.9, *Implementation of Work Processes,* DOE Order 414.1C Attachment 2, CRD, Criteria 5, *Work Processes,* and the following Requirements of NQA-1-2008:

- Requirement 3, *Design Control*
- Requirement 4, *Procurement Document Control*
- Requirement 6, *Document Control*
- Requirement 7, *Control of Purchased Items and Services*
- Requirement 8, *Identification and Control of Items*
- Requirement 9, *Control of Special Processes*
- Requirement 10, *Inspection*
- Requirement 11, *Test Control*
- Requirement 12, *Control of Measuring and Test Equipment*
- Requirement 13, *Handling, Storage and Shipping*
- Requirement 14, *Inspection, Test and Operating Status*
- Requirement 15, *Control of Nonconforming Items*
- Requirement 16, *Corrective Action*
- Requirement 17, *Quality Assurance Records*

- Requirement 18, *Audits.*

Sampling activities and laboratory analysis are conducted in accordance with the QA and QC requirements specified in DOE/RL-96-68, *Hanford Analytical Services Quality Assurance Requirements Document (HASQARD),* or EPA/SW-846, *Test Methods for Evaluating Solid Waste*, Physical/Chemical Methods, or other approved methods.

8.3 Implementation

The following table located in PRC-MP-QA-599, *Quality Assurance Program*, Attachment 2, Section 5, *Work Processes*, Section 6, *Design, and Section 8.0, Inspection and Acceptance Testing* list the applicable procedures required to implement these requirements:

Criterion Number	10 CFR 830.122 Program Element	CHPRC Document Number and Title	ISMS/EMS Integration
5	Work Processes	PRC-RD-TP-7900, Transportation and Packaging Program Requirements PRC-RD-IRM-10768, Computer Software Requirements PRC-RD-MN-10859, Maintenance Management PRC-RD-PM-14988, Project Management Requirements PRC-RD-EP-15332, Environmental Protection Requirements PRC-RD-PC-17913, Work Breakdown Structure and Coding Requirements PRC-PRO-NS-062, Unreviewed Safety Question Process PRC-PRO-QA-297, Inspection, Test and Operating Status (Endorsed) PRC-PRO-QA-298, Nonconforming Items PRC-PRO-QA-301, Control of Suspect/Counterfeit and Defective Items PRC-PRO-IRM-309, Computer Software Management PRC-PRO-QA-5432, Hold Point Application in Technical Work Documents PRC-PRO-NS-8366, Facility Hazard Categorization PRC-PRO-QA-8635, Review and Approval of Technical Documents PRC-PRO-WKM-12115, Work Management PRC-PRO-CN-14990, Construction Management PRC-PRO-EP-15333, Environmental Protection Processes PRC-PRO-TP-15438, Unreviewed Safety Question Process for Transportation HNF-PRO-33415, Structures, Systems, Components Cleaning/Cleanliness and Foreign Material Exclusion (Endorsed)	Identify hazards, environmental impacts and ES&H requirements Analyze hazards, environmental impacts and implement controls Perform work within controls Provide feedback and continuous improvement Define scope of work
6	Design	PRC-RD-EN-1819, PHMC Engineering Requirements PRC-PRO-NS-062, Unreviewed Safety Question	Identify hazards, environmental impacts

Criterion Number	10 CFR 830.122 Program Element	CHPRC Document Number and Title	ISMS/EMS Integration
		Process PRC-PRO-QA-301, Control of Suspect/Counterfeit and Defective Items PRC-PRO-EN-440, Engineering Document Change PRC-PRO-NS-700, Safety Basis Development PRC-PRO-EN-2001, Facility Modification Package Process PRC-PRO-EN-8016, Design Change Notice Process PRC-PRO-EN-8258, Functional Design Criteria PRC-PRO-NS-8317, Safety Basis Implementation and Maintenance PRC-PRO-EN-8336, Design Verification	and ES&H requirements Analyze hazards, environmental impacts and implement controls Perform work within controls Provide feedback and continuous improvement Define scope of work
8	Inspection and Acceptance Testing	PRC-PRO-QA-283, Control of Inspections (Endorsed) PRC-PRO-EN-286, Testing of Equipment and Systems PRC-PRO-QA-297, Inspection, Test, and Operating Status (Endorsed) PRC-PRO-MN-490, Calibration Management Program PRC-PRO-QA-1607, Visual Weld Inspection (Endorsed)	Analyze hazards, environmental impacts and ES&H requirements Provide feedback and continuous improvement Perform work within controls

Laboratory QA/QC includes a comprehensive program that includes the use of matrix spikes, duplicates, matrix spike duplicates, laboratory control samples, surrogates, tracers, and blanks. Appendix C contains a complete description of these QC samples including sampling methods, handling and custody, information on their holding times, field and laboratory QC elements, acceptance criteria, etc.

Inspection and testing of specified items, services, and processes shall be conducted using established acceptance and performance criteria. Equipment used for inspections and tests shall be calibrated and maintained. Calibration of the analytical equipment (gas chromatograph, spectrophotometer, pH meter, and other analytical equipment) is performed in accordance with PRC-PRO-MN-490, *Calibration Management Program*, as well as the manufacturer's procedures for calibration.

Environmental Technology QA requirements are discussed in Section 4.1.3 of the Project Specific Quality Assurance Requirements (PSQAR) Deactivation & Decommissioning (D & D) Appendix D.

NOTE: The EQA Website, contains the following checklists:

- QAPjP Review
- QAPP Review
- DQO Review
- Data Quality Assessments (DQA) Review
- Verification and Validation (V & V) Review.

Application of the checklist and inclusion of all the elements contained therein is required of all CHPRC personnel conducting environmental modeling activities.

9 Assessment and Response

9.1 Purpose

The purpose of the Assessment and Response section is to document how the organization will determine the suitability and effectiveness of the implemented quality system and the quality performance of the environmental programs to which the quality system applies.

EQA develops and maintains an environmental compliance audit and review program which documents how the organization determines the suitability and effectiveness of the implemented quality system and the quality performance of the environmental programs to which it applies. The adequacy of the quality system is assessed at least annually.

9.2 Requirements

9.2.1 Management Assessments

Management Assessment processes applicable to all CHPRC employees shall be conducted in accordance with EPA QA/R-2, *EPA Requirements for Quality Management Plans*, Section 3.10, *Assessment and Response*, DOE Order 414.1C Attachment 2, CRD, Criteria 9, *Management Assessment,* and NQA-1, Requirement 2, *Quality Assurance Program.*

9.2.2 Independent Assessments

Independent Assessments shall conform to the requirements of EPA QA/R-2, *EPA Requirements for Quality Management Plans*, Section 3.10, *Assessment and Response*, DOE Order 414.1C, Criterion 10, *Assessment/Independent Assessment* and NQA-1-2008, Requirement 18, *Audits.*

9.2.3 Audit and Review Program

DOE Order 450.1A, *Environmental Protection Program,* establishes the EMS requirements and requires that each DOE Site implement an environmental compliance audit and review program. EQA developed and shall maintain this required audit/assessment process of the EMS which is located in Appendix J, *CHPRC EMS Assessment Process,* of this EQAPP. EQA is responsible for developing and implementing this process.

9.3 Implementation

The following table located in PRC-MP-QA-599, *Quality Assurance Program,* Attachment 2, Criterion 9, Management Assessment, and Criterion 10, *Independent Assessment*, lists the applicable procedures required to implement these requirements:

Criterion Number	10 CFR 830.122 Program Element	CHPRC Document Number and Title	ISMS/EMS Integration
9	Management Assessment	PRC-POL-QA-21255, Integrated Assessment Policy PRC-PRO-QA-246, Management Assessment	Provide feedback and continuous improvement Management review
10	Independent Assessment	PRC-PRO-OP-055, Startup Readiness PRC-PRO-QA-9662, Independent Assessment Process PRC-PRO-QA-9769, Surveillance Process	Provide feedback and continuous improvement Management review Perform work within controls

Assessments shall be conducted in accordance with the process described in PRC-PRO-QA-246, *Management Assessment*, and will focus on compliance with documented requirements and procedures.

10 Quality Improvement

10.1 Purpose

In accordance with EPA QA/R-2, this section documents how the organization will improve the organization's quality system. The quality of PRC environmental activities is the responsibility of each CHPRC employee involved in any activity that impacts the environment on the Hanford Site. Such activities include, but are not limited to, environmental sampling and analysis and waste remediation. EQA is responsible for monitoring and assessing all CHPRC environmental quality improvement efforts on the Hanford Site.

10.2 Requirements

The CHPRC shall comply with the quality improvement requirements of DOE Order 414.1C, Attachment 2, CRD, Criterion 3, *Quality Improvement* and NQA-1-2008, Requirement 15, *Control of Nonconforming Items,* Requirement 16, *Corrective Action,* and Requirement 18, *Audits.*

10.3 Implementation

The following table located in PRC-MP-QA-599, *Quality Assurance Program*, Attachment 2, Criterion 3, *Quality Improvement*, lists the applicable procedures required to implement these requirements:

Criterion Number	10 CFR 830.122 Program Element	CHPRC Document Number and Title	ISMS/EMS Integration
3	Quality Improvement	PRC-PRO-QA-052, Issues Management PRC-PRO-NS-058, Event/Near Miss Investigation and Critique Process PRC-PRO-EM-060, Reporting Occurrences and Processing Operations Information PRC-PRO-MS-067, Lessons Learned/Operating Experience Program PRC-PRO-QA-298, Nonconforming Items PRC-PRO-QA-246, Management Assessment PRC-PRO-NS-2243, Identification, Reporting, and Tracking of Nuclear Safety and Worker Safety and Health Requirement Non-compliances & PAAA/Worker Safety and Health Enforcement Activities PRC-PRO-QA-24741, Performance Analysis Process PRC-PRO-QA-4294, Performance Indicator Process	Provide feedback and continuous improvement Management review

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11 References

PRC-RD-EN-10484, *Nondestructive Assay Management Program.*

PRC-RD-MN-10859, *Maintenance Management.*

PRC-RD-WLD-23775, *Administrative Control of Welding.*

PRC-PRO-NS-2243, *Identification, Reporting, and Tracking of Nuclear Safety and Worker Safety and Health Requirement Noncompliance's & PAAA/Worker Safety and Health Enforcement Activities*

HNF-11724, *Fluor Hanford Safety Management Programs.*

PRC-PRO-OP -055, *Startup Readiness.*

HNF-PRO-263, *Qualification and Certification of Inspection and Test Personnel.*

HNF-PRO-283, *Control of Inspections.*

HNF-PRO-297, *Inspection, Test, and Operating Status.*

PRC-PRO-EN-440, *Engineering Document Change.*

HNF-PRO-1607, *Visual Weld Inspection.*

PRC-PRO-EN-2001, *Facility Modification Package Process.*

PRC-PRO—EN-8016, *Design Change Notice Process.*

PRC-PRO-MN-19304, *Periodic Maintenance Process.*

WMP-100, Policies, Section 4.6, "*WFMP Integrated Environment, Safety, and Health Management Roles, Responsibilities, and Functions.*"

WMP-200, Procedures, Section 1.1, "Administrative Procedure Control Process."

WMP-200, Procedures, Section 1.18, "Technical Procedure Process."

WMP-200, Procedures, Section 3.12, *"Chain of Custody for Environmental Media and Waste Samples."*

10 CFR 830 Title 10 Nuclear Safety Management, Subpart A, Quality Assurance Requirements.

American Society of Mechanical Engineers (ASME) NQA-1 2000 Edition, Quality Assurance Requirements for Nuclear Facility Applications.

D&D-20197, *Deactivation and Decontamination Project Execution Plan*

D&D-28194, *Conduct of Deactivation and Decommissioning Operations*

DE-AC06-08RL14788, Plateau Remediation Contract (PRC)

DOE Order 414.1C Attachment 2 CRD, *"Quality Assurance."*

DOE/RL-96-68, *Hanford Analytical Services Quality Assurance Requirements Document* (HASQARD), U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RW-0333P, *Quality Assurance Requirements and Description, Revision 18, DOE Office of Civilian Radioactive Waste Management (OCRWM)*

DOE/WIPP-02-3214, *Remote-Handled TRU Waste Characterization and Program Implementation Plan.*

DOE-STD 1027-92, Change Notice 1, "*Hazard Categorization and Accident Analysis.*"

DOE-STD 3009-94, Change Notices 1 through 3, "*Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses.*"

EPA QA/G-11, "Guidance on Quality Assurance for Environmental Technology Design."

HNF-34082, *MOU Between Sludge Treatment Project and K-Basin Closure Project.*

HNF-EP-0538-11, *Near-Facility Environmental Monitoring Quality Assurance Project Plan.*

PRC-MP-MS-003, *Integrated Environment, Safety, and Health Management System (ISMS).*

PRC-MP-EP-40220, *Environmental Programs and Regulatory Management Roles, Responsibilities, and Functions.*

HNF-SD-GN-TI-502, *Project Hanford Nuclear Facilities List And Authorization Basis Information.*

HNF-SP-1145, *Radiation Protection Program.*

KBC-23617, *KBC Project - Project Execution Plan.*

KBC-26842, *Plan for Implementing Waste Management Requirements for the K Basins Interim Remedial Action.*

KBC-30811, *Sludge Treatment Project, Project Execution Plan.*

Letter, 07-KBC/CDL-011, *MOU for the KBC Project Reorganization Effective 8/27/2007*

PRC-MP-QA-599, *Quality Assurance Program.*

PRC-POL-TQ-11337, *Employee Training.*

PRC-PRO-AC-123, *Requesting Materials and Services.*

PRC-PRO-EP-15333, *Environmental Protection Processes.*

PRC-PRO-EP-15334, *Effluent and Environmental Monitoring for Radionuclide Air Emissions.*

PRC-PRO-EP-15335, *Environmental Permitting and Documentation Preparation.*

PRC-PRO-IRM-211, *Administrative Record File and Public Information Repositories.*

PRC-PRO-IRM-309, *Computer Software Management.*

PRC-PRO-IRM-10588, *Records Management Processes.*

PRC-PRO-QA-052, *Issues Management.*

PRC-PRO-QA-259, *Graded Approach.*

PRC-PRO-QA-268, *Control of Purchased/Acquired Items and Services.*

PRC-PRO-QA-301, *Control of Suspect/Counterfeit and Defective Items.*

PRC-PRO-QA-3144, *Supplier Quality Assurance Program Evaluation.*

PRC-PRO-QA-9662, *Independent Assessments.*

PRC-PRO-TQ-459, *Environmental Training.*

PRC-RD-EN-10484, *Nondestructive Assay Management Program.*

PRC-RD-EP-15332, *Environmental Protection Requirements.*

PRC-RD-IRM-210, *Records Management Program.*

PRC-RD-IRM-8310, *Document Control Program.*

PRC-RD-MN-10859, *Maintenance Management.*

PRC-RD-TQ-11061, *Training Requirements.*

PRC-RD-WLD-23775, *Administrative Control of Welding.*

SNF-7465, SNF, *Construction Project - Project Execution Plan.*

Title 10 CFR Part 71, 2001, *Packaging and Transportation of Radioactive Materials.*

Title 10 CFR Part Part 72, 2001, *Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High Level Radioactive Waste.*

Title 10 CFR Part Part 830 Subpart A, *Quality Assurance Requirements.*

Washington Administrative Code, 246-247, "*Radioactive Air Emissions.*"

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Appendix A

EQA/EP Responsibilities Table

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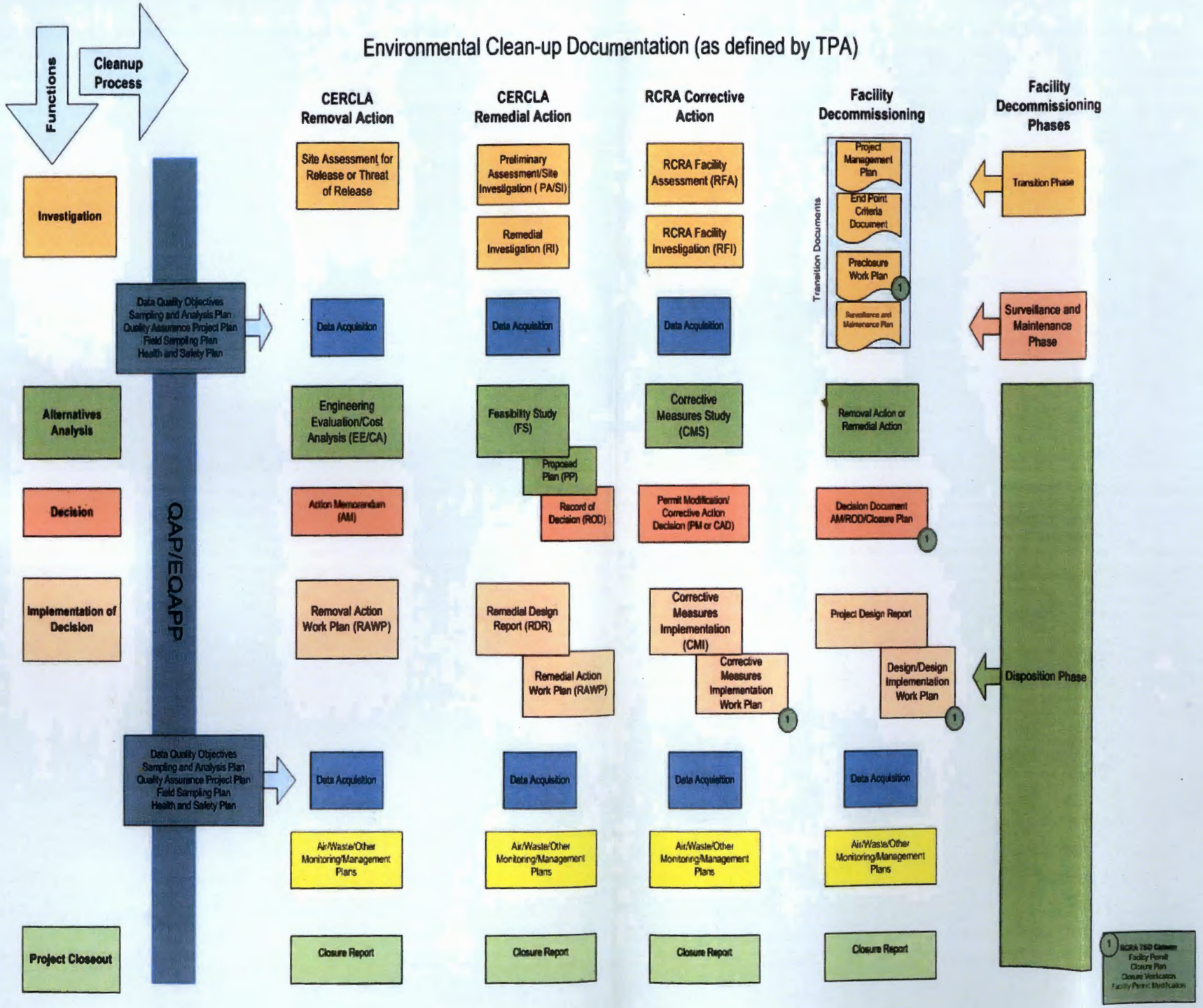
EQA/EP Responsibilities Table

Environmental Quality Assurance (EQA)	Environmental Protection (EP)
Develops, maintains, and ensures implementation of the CHPRC EQA Program.	Implements environmental policies and procedures that meet applicable environmental laws, regulations, and DOE Orders.
EQA provides programmatic quality assurance of environmental requirements, functions, and activities for PFP Closure Project, 100K Project, Fast Flux Test Facility Closure Project, Soil & Groundwater Remediation Project, Deactivation & Decommissioning, Waste & Fuels Management Project, and the Sludge Treatment Project. This includes but is not limited to environmental data collection, environmental technology programs, monitoring, reporting, regulatory documentation, and other compliance activities. EQA shall develop and maintain the environmental compliance audit and review program as required by the EMS.	EP is a functional organization that also has responsibility for supporting and ensuring achievement of company-wide and site-wide environmental compliance program milestones and establishes implements and maintains the EMS.
EQA will ensure the level of QA/QC for the collection, preservation, transportation, and analysis of each sample required for implementation of the TPA.	EP manages the Air, Water, NEPA/SEPA, CERCLA, and RCRA implementation programs including permit preparation, integration, configuration control, management, and the programs TS A/PCBs.
EQA performs document reviews, assessments and surveillances to support the goals and objectives of CHPRC and serves as the Interpretative Authority for EQA documents and requirements.	EP manages EP through requirements and procedures (PRC-PRO-EP-15333 *Environmental Protection Processes)*.
EQA interfaces with the Projects/Facilities through implementation of approved QAPPs and QAPjPs.	EP participates in DOE interaction with the EPA, Washington State Department of Ecology (Ecology), WDOH, and Benton Clean Air Agency (BCAA).

Environmental Quality Assurance (EQA)	Environmental Protection (EP)
The EQA Manager is a direct report to the CHPRC Environmental Review and QA Director and is responsible for: • Interpretative Authority for Environmental QA requirements • Ensuring implementation of the EQAPP • Coordinating Environmental QA and quality control (QC) activities within CHPRC • Conducting independent assessments and surveillances, and reporting quality issues to management • Recommending to the Vice President of EP&SP, managers of environmental activities, and/or the CHPRC Manager Environmental Review and QA that a stop work order is to be issued when significant requirements are not being met • Ensuring the EQA staff have no direct involvement or responsibility for the work being assessed • Interfacing with other CHPRC QA organization personnel for coordination and support of environmental activities • Interfacing with DOE QA, legal, and projects concerning EQA programs and issues **NOTE:** For additional Roles and Responsibilities of EQA and EP see PRC-MP-EP-40220, *Environmental Programs and Regulatory Management Roles, Responsibilities, and Functions.*	The Director of EP: • Serves as the Functional Director for EP • Sets environmental policy • Ensures that the EMS is established, implemented and maintained. • Provides assistance to the projects by resolving cross-cutting environmental issues and resource needs • Leads the CHPRC environmental compliance program and ensures milestones for this program are met • Ensures the quality of EP products, services, and programs per PRC-MP-QA-599, Quality Assurance Program Description • Chairs the Environmental Center of Expertise (ECOE) • Serves as CHPRC representative on the multi-contractor Central Environmental Committee (CEC) • Supplies Environmental Compliance Officers (ECOs) to CHPRC projects • Provides SMEs • Provides resources to Projects to develop and/or guide the development of RCRA and CERCLA documents • Provides the environmental Interpretive Authority • Ensures new and revised regulatory requirements are evaluated and provided to projects • Provides a single point of contact for regulator inspections
	ECOs coordinate and ensure the implementation of EP policies and processes within the projects and facilities. The ECOs provide input and solutions to their assigned project for a variety of technical problems involving environmental issues, concerns and other matters. The ECOs work with the EP SMEs and staff, and as necessary, CHPRC legal counsel to determine the appropriate regulatory approach.


Environmental Clean-up Documentation (as defined by TPA)
Functions
Cleanup Process
CERCLA Removal Action
CERCLA Remedial Action
RCRA Corrective Action
Facility Decommissioning
Facility Decommissioning Phases
Investigation
Alternatives Analysis
Decision
Implementation of Decision
Project Closeout
QAP/EQAPP
Site Assessment for Release or Threat of Release
Preliminary Assessment/Site Investigation (PA/SI)
Remedial Investigation (RI)
RCRA Facility Assessment (RFA)
RCRA Facility Investigation (RFI)
Project Management Plan
End Point Criteria Document
Preclosure Work Plan
Surveillance and Maintenance Plan
Transition Documents
Transition Phase
Surveillance and Maintenance Phase
Data Quality Objectives
Sampling and Analysis Plan
Quality Assurance Project Plan
Field Sampling Plan
Health and Safety Plan
Data Acquisition
Engineering Evaluation/Cost Analysis (EE/CA)
Feasibility Study (FS)
Proposed Plan (PP)
Record of Decision (ROD)
Corrective Measures Study (CMS)
Removal Action or Remedial Action
Action Memorandum (AM)
Permit Modification/ Corrective Action Decision (PM or CAD)
Decision Document AM/ROD/Closure Plan
Removal Action Work Plan (RAWP)
Remedial Design Report (RDR)
Remedial Action Work Plan (RAWP)
Corrective Measures Implementation (CMI)
Corrective Measures Implementation Work Plan
Project Design Report
Design/Design Implementation Work Plan
Disposition Phase
Air/Waste/Other Monitoring/Management Plans
Closure Report

Appendix C

Soil & Groundwater Remediation

Quality Assurance Project Plan

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Background

The primary goals of the project are to prevent groundwater degradation, remediate groundwater, monitor groundwater and remediate waste sites. Cleanup is designed to return groundwater and waste sites to beneficial use, where possible, or at least prevent further degradation.

Project/Task Description

The Soil and Groundwater Remediation Project (S&GRP) is focused on the following four objectives:

- Shrink the Contaminated Area - Reduce the contaminated surface area to eliminate the threat to groundwater through removal actions on soil contamination waste sites under the purview of CHPRC
- Reduce Recharge - Reduce the transport of contaminants to groundwater from water released onto the soil.
- Remediate Groundwater - Complete remedial actions at pump-and-treat sites.
- Monitor Groundwater - Determine the groundwater monitoring needs for long-term stewardship of the Central Plateau, evaluate new technologies that may be more effective, and decommission existing groundwater monitoring wells that are no longer functional or useful.

The S&GRP produces a variety of products in conjunction with the activities listed above. Examples of these are: CERCLA and RCRA regulatory documents; descriptions of work for drilling and well decommissioning campaigns; statements of work; data quality objective (DQO) reports; data quality assessments; work plans; sampling and analysis plans; well summary reports; test plans; remediation reports; design media for remediation facilities; quarterly and annual groundwater monitoring reports; and annual summary reports for treatment systems.

Activities conducted by S&GRP include groundwater pump and treat system design, construction, operation, maintenance; well drilling/DPTs supporting groundwater remediation and waste site characterization; test pit excavation; coordination of geophysical data acquisition; sampling; aquifer testing; field screening/analysis; coordination of laboratory services; and data management.

C1. Program

The overall quality assurance program requirements for the S&GRP are governed by PRC-MP-QA-599, *Quality Assurance Program* and the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) Sections 6.5 and 7.8.

CHPRC implements Quality Assurance requirements based upon a graded approach. The graded approach for environmental activities that involve generating, acquiring or using environmental data is based on the intended use of the data, the analytical protocol selected, and on parameters of accuracy, precision, comparability, completeness, and representativeness. Additional grading criteria are available in Attachment C-4 of this plan.

The CHPRC Environmental Quality Assurance Program Plan (CHPRC-00189) encompasses all environmental activity performed by CHPRC. This S&GRP Quality Assurance Project Plan (QAPjP) is subordinate to the CHPRC Environmental QAPP.

Specific CHPRC and S&GRP implementing procedures are listed in Attachment C-3. Soil & Groundwater Remediation Project implementing procedures may be accessed on the S&GRP Procedure Manual web page.

The environmental regulations require the development of Remedial Investigation and Feasibility Study (RI/FS) work plans for CERCLA operable units as well as RCRA Facility Investigation/Corrective Measures Study (RFI/CMS) work plans for RCRA past practice units. These work plans always include a Sampling and Analysis Plan (SAP) or equivalent document, which in turn contains a Quality Assurance Project Plan (QAPjP). Previously issued unit specific QAPjPs were not developed under a single QA program and as a result exhibit some variation and outdated citations. Unit specific QAPjPs shall comply with format and content requirements of EPA QA/R-5. This document describes how S&GRP accomplishes work in support of those unit specific QAPjPs. This QAPjP addresses the general quality assurance elements applied across S&GRP waste sites and groundwater remediation activities.

This QAPjP defines the processes used by the S&GRP to produce quality data and assure operations are fully compliant with all applicable quality affecting requirements. This plan provides additional quality assurance (QA) requirements for the S&GRP such as quality objectives, methods, operational approaches, and goals for performing the work scope. This plan also explains how project goals are achieved and supplements the quality management system provided in PRC-MP-QA-599.

Table 1 describes the relationship between various sections of this QAPjP and *EPA Requirements for Quality Assurance Project Plans*, EPA QA/R-5.

Table C1.

EPA QA/R-5 Criteria	Title	QAPjP Section
Project Management	Project/Task Organization	C1
	Problem Definition and Background	Background
	Project Task Description	Background
	Quality Objectives and Criteria	C5.1, Att C.2.2
	Special Training/Certification	C2, AttC-1-2, Att C-2-1
	Documents and Records	C4, Att C-1-4.1, Att C-2-4, Att C-2-12
Data Generation and Acquisition	Sample Process Design	C5, Att C-1-3.2
	Sampling Methods	C5.3, Att C-1-3.2
	Sample Handling and Custody	C5.4, Att C-1-4.1, Att C-2-6-
	Analytical Methods	C5.5 att C-2-8
	Quality Control	C3, C5, Att C-2-10
	Instrument/Equipment Testing, Inspection and Maintenance	C8, Att C-2-14
	Instrument/Equipment Calibration and Frequency	C8, Att C-2-7, att C-2-11.4

Table C1.

EPA QA/R-5 Criteria	Title	QAPjP Section
	Inspection and Acceptance of supplies and consumables	C7, Att C-2-18
	Non Direct Measurement	C5.1, Att C-2-3
	Data Management	C 4, C5.6 Att C-2-9
Assessment and Oversight	Assessment and Response Actions	C3, C9, C10
	Reports to Management	C3. C9
Data Validation and Usability	Data Review, Verification and Validation	C5.6, att C-1-5, Att C-2-11.0
	Verification and Validation Methods	C5.6, Att C-2-9
	Reconciliation with User Requirements	C5.2, C5.7

The policy of CHPRC and S&GRP management is to direct activities in a manner that is cost effective and ensures the results meet or exceed the customer's expectations. The achievement of quality will require the total commitment of all S&GRP employees to PRC-RD-LEG-10348, *Legal and Ethical Conduct*. The quality management system described in this plan fosters compliance with approved standards, plans, and procedures. Those standards, plans, and procedures incorporate expectations for safety and environmentally protective work within controls to support the principles and functions of the Integrated Environment, Safety, and Health Management System (ISMS). All S&GRP personnel have the authority to stop work when serious quality, safety or health conditions exist. PRC-PRO-SH-3468 states that all employees are given the responsibility and authority to stop work when they are convinced that a situation exists which places themselves, their coworker(s), or the environment in danger.

This plan will be reviewed and updated as necessary when added work scope elements require additional QA considerations.

HNF-30052 *Soil and Groundwater Remediation Project, Project Execution Plan,* defines the S&GRP organization, roles, responsibilities, and interfaces required to facilitate groundwater protection and remediation. This plan provides overall direction for quality management for S&GRP. Quality Assurance personnel support all levels of S&GRP management while maintaining sufficient organizational freedom and authority to both perform their duties and remain functionally independent from organizations responsible for performing the work. See Figure C-1.

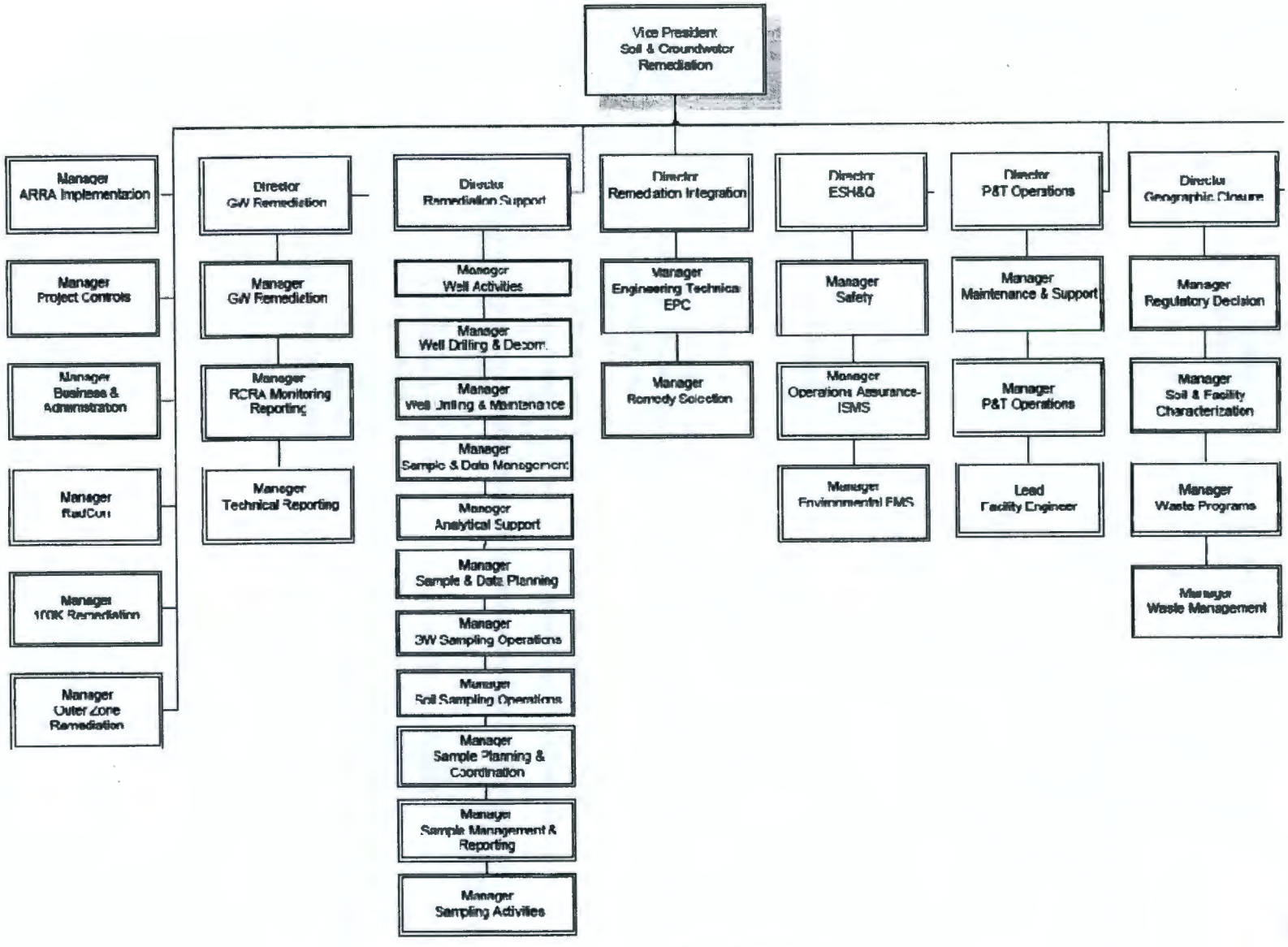

Figure C1.

Organization

Remediation Integration

The Remediation Integration Organization is responsible for providing cross cutting services in support of the remediation of structures, soils and groundwater sites under the management of CHPRC. The services provided are as follows:

Operable Unit (OU) Zone Integration

The OU Zone Integration organization provides centralized management, planning, development and oversight of regulatory decision documents.

Specific responsibilities include the development and implementation of an integrated, resource-loaded schedule that is approved by CHPRC including the resolution of technical, scope, schedule, and budget issues, as necessary, to maintain favorable performance. The OU Zone Integration organization integrates with outside and other CHPRC projects to establish expectations and effectively implement assigned scope, ensure that regulatory documentation and activities are consistent with the CHPRC strategy, and ensure that the product deliverables meet customer's expectations. Ultimately, the OU Zone Integration organization acts as single point of contact for all matters dealing with scope, schedule, budget, and technical issues associated with assigned OU/Zone cleanup decisions.

Remedy Selection

The Remedy Selection Organization is responsible for the planning, management, development and delivery of the regulatory documentation necessary to implement remedial actions under CERCLA and RCRA for CHPRC. The organization is responsible for coordinating with the DOE, EPA, Ecology, and other stakeholders to develop remedy documentation that is compliant with regulatory requirements and considers stakeholder expectations for quality and consistency in content and format. The range includes CERCLA Remedial and Removal Action documents, such as Work Plans, Remedial Investigation Reports, Feasibility Studies, Proposed Plans, and Records of Decisions. The range also includes RCRA documents such as Closure Plans.

Engineering, EPC

Engineering Technical EPC is responsible for technology identification and evaluation, design engineering services, and procurement support for S&GRP. This includes canvassing of commercial and other DOE site practices, creation of conceptual and definitive designs, and evaluation review/approval of sub-contractor provided designs in compliance with Hanford Site Engineering Procedures. It is also responsible for implementation of the Deep Vadose Zone Treatability Test.

Waste Site Remediation

Organization provides centralized management, planning, development, oversight and implementation of waste site remedial action in accordance with regulatory decision documents. Management of Waste Site Remediation is assigned by Geographic Zone (e.g. 100K, Outer Zone, etc.).

Health & Safety

Occupational Health and Safety (OS&H) provides services to the project that include Industrial Safety, Industrial Hygiene, and Chemical Management oversight. OS&H is responsible for assuring the project follows safe work practices in accordance with State and Federal safety and health regulations by analyzing hazards and prescribing controls for work performed by the project including subcontractors and construction forces.

RadCon

Radiological Control is responsible for implementation of radiological control and protection requirements. They are responsible to:

- Implement radiological control and protection requirements.
- Evaluate and prescribe appropriate radiological protection equipment for S&GRP work activities.
- Conduct hazard screening as part of the work planning process to identify radiological hazards and establish necessary controls.
- Verify radiological conditions of the work area are consistent with work planning assumptions prior to entry into the work area or commencement of the radiological work activity.

Environmental Manager/ECO

Provides support to field activities to ensure environmental protection requirements are implemented. Provides guidance on implementation of regulations, and provide support to preparation and review of evaluation, decision, and implementing documents.

Remediation Support Organization

The Remediation Support Organization is responsible for the development, management and execution of well installation and maintenance, sample collection, data management and waste management activities within S&GRP. The organization provides the necessary trained and qualified resources required to plan and implement characterization activities from the development of planning documents through field execution and managing the resultant data. The specific responsibilities are defined below.

Well Activities

The Well Activities organization serves as the central site resource responsible for the installation and maintenance of groundwater wells and drilling activities on the Hanford site. The organization is responsible for identifying, developing and maintaining the necessary contract and CHPRC resource base to support the safe, efficient installation of wells and characterization borings. Primary responsibilities include:

- Planning, coordinating, and implementing well drilling and decommissioning for Hanford Site wells according to project specific requirements. This includes drilling wells to Washington State standards and preparing all required submittals and notifications required by State law. It also includes providing well related information for site databases. Decommissioning includes identifying all wells that are surplus to monitoring needs or represent a pathway for contaminate migration to groundwater and sealing the well to Washington state standards.
- Provide maintenance and modification of existing wells, installation and removal of pumps, and cleaning and remediation of wells for optimal usage. Also includes updating of site `databases when changes to well configuration occur.
- Operate the Modular Storage Units that were established for purgewater management under a CERCLA non-time critical removal action, i.e., the *Investigation-Derived Waste Purgewater Management Action Memorandum* (DOE/RL-2009-39), and the *Investigation Derived Waste Purgewater Management Work Plan* (DOE/RL-2009-80). The Modular Storage Units will be operated in accordance with the regulatory standards for miscellaneous units to ensure purgewater management is protective of human health and the environment. Routine operation of the Modular

Storage Units includes inspections, freeboard measurement, maintenance, leak detection riser water level measurements, purgewater truck transfers, and inter-tank transfers. Upon completion of service, the Modular Storage Units will be disassembled and dispositioned in a manner that minimizes the need for further maintenance; is protective; and returns the land to the appearance and use of surrounding land areas to the degree possible given the nature of the activity. Design, operation, and closure standards for the removal action are addressed in detail in Appendix A of the action memo.

Waste Management

The waste management organization serves as the central resource responsible for the characterization, management, shipment and disposal of wastes generated during S&GRP operations. Primary responsibilities include:

- Characterizing all waste to determine the appropriate treatment and/or disposal criteria. This includes profile development, review of analytical sampling information, process knowledge, etc.
- Managing all waste generated in the field as well as recycled waste.
- Ensuring all waste has a designated disposal/treatment path.
- Providing waste management guidance/expertise (packaging/labeling, treatment/disposal options, compatibility, etc.) to the S&GRP.
- Coordinating with the waste shipping subcontractor to ensure all waste is shipped to an appropriate TSD and/or off-site.

Sampling Activities

The Sampling Activities organization is responsible for the collection of groundwater, soil, vapor and other miscellaneous media samples, processing the samples as necessary and shipping the samples for analysis. Primary responsibilities include:

- Collection of representative samples through the use of quality procedures and training.
- Serve as the subject matter experts for sampling activities within the CHPRC.
- Maintain a diverse inventory of sampling equipment, vehicles and trained personnel to support current and projected sampling activities.
- Operate an equipment cleaning facility to EPA standards.

Sample Management and Reporting (SMR)

The SMR organization provides centralized management, planning, development and oversight of sampling and analytical activities within the S&GRP. Primary responsibilities include:

- Assuring proper project planning for data quality through development and review of Data Quality Objective (DQO) reports and Sampling and Analysis Plans (SAPs).
- Serving as the primary interface between project data users and on-site and off-site analytical laboratories to ensure required laboratory performance levels.
- Assuring the quality of field and analytical data through implementation of multiple quality control measures.

- Assuring the integrity and traceability of data through implementation of proper and appropriate sample and data management processes.
- Evaluate and document quarterly and annual laboratory performance data.

Geographical Closure

Remedial Action work is performed as sub-projects within the Soil and Groundwater Remediation Project. It includes planning, field work and closure necessary to implement the appropriate regulator approved remedy on a waste site by waste site basis. The site characteristics vary widely and may consist of hazardous, radioactive, and mixed waste sites.

The remedies generally consist one or more of the following actions:

- Removal of the waste, treatment and shipping for disposal (Remove-Treat-Dispose, or RTD)
- Installation of an engineered barrier or cap
- Verification and installation (as needed) of a minimum soil cover on sites that will naturally attenuate within an allowable time period. This method is known as Maintain Existing Soil Cover (MESC) or Natural Attenuation with Institutional Controls (NAIC)
- Perform sampling to confirm no further action is required. This method is known as Confirmatory Sampling/No Action (CSNA)

Remedial Action Project Execution Strategy (RA-00035) discusses the processes for planning and execution, priorities, and responsibilities of the leadership team involved in Remedial Action work performed by CHPRC and their subcontractors. RA-00035 establishes the bases for work planning and execution to ensure consistency of performance within CHPRC.

100K Remediation Action and Outer Zone

Both of these organizations are responsible for soil site remediation at Hanford. Remedial action work is performed as sub-projects within the Soil and Groundwater Remediation Project. It includes planning, field work and closure necessary to implement the appropriate regulator approved remedy on a waste site by waste site basis. The site characteristics vary widely and may consist of hazardous, radioactive, and mixed waste sites.
The remedies generally consist one or more of the following actions:

- Removal of the waste, treatment and shipping for disposal (Remove-Treat-Dispose, or RTD)
- Installation of an engineered barrier or cap
- Verification and installation (as needed) of a minimum soil cover on sites that will naturally attenuate within an allowable time period. This method is known as Maintain Existing Soil Cover (MESC) or Natural Attenuation with Institutional Controls (NAIC)
- Perform sampling to confirm no further action is required. This method is known as Confirmatory Sampling/No Action (CSNA)

Operations & Maintenance

This organization is responsible for the operation and maintenance (O&M) of existing and future pump and treat (P&T) facilities as well as the soil vapor extraction units, Modutank ™ , warehousing, shop and other such facilities. The O&M organization is divided into three groups; Operations, Engineering, and Maintenance & Support. The Operations group is responsible for the day to day operations of facilities and includes Field Work Supervisors; operations specialists; NCOs for plant operations; bargaining unit procurement of materials and supplies for P&Ts; warehousing operations; teamster support for S&GWR, and carpenter support. The Engineering group is responsible for engineering matters associated with the day to day operation of facilities and includes facility engineers and design authorities for each of the P&Ts including chemical, mechanical, instrumentation, and electrical support. The Engineering group receives support from the S&GRP Engineering Design Group for larger or major plant upgrades. The Maintenance and Support group, including maintenance specialists, is responsible for the development of work packages and other necessary documents for the implementation of facility repairs and maintenance which mostly includes providing bargaining unit labor for electrical, instrumentation, and pipefitter support. Support and other bargaining unit support is requested from the site wide pool when necessary for short term work.

Operations Assurance

The Operations Assurance organization is responsible for a variety of CHPRC functional support activities including; personnel training and qualification, project level technical & administrative procedures, quality assurance & control, conduct of operations, issues management, self-assessments & Safety Analysis Center.

The training function is responsible to ensure project personnel have the skills and knowledge to safely and effectively perform their work and to meet applicable regulatory requirements. The training consists of a mixture of initial and continuing training activities. The S&GRP training programs are developed using a systematic manner and is provided using a mixture of training settings and techniques.

The training function is responsible to ensure all project level administrative and technical procedures are controlled in accordance with CHPRC level requirements.

The quality assurance function is responsible to for implementation of applicable company level quality assurance program requirements including specific environmental and laboratory requirements. The quality assurance group performs their oversight with an appropriate level of independence of the project activities being reviewed.

The Operations Assurance group is responsible in accordance with applicable requirements to ensure successful project implementation of company level required programs including; Conduct of Operations, issues management, project self-assessment and interface with the Safety Analysis Center. The Operations Assurance organization provides routine project level interface with these company level functional organizations.

Groundwater Remediation

Management of the various groups as well as facilitation of work across the S&GRP and EPC to support remedy implementation and continued operation of existing facilities for groundwater remedies in the 100, 200, and 300 areas. Support integration of the river corridor remedies across multiple contractors for groundwater and vadose zone contamination.

Groundwater Operable Unit

Groundwater Operable Unit group is responsible for remedial actions that have been implemented or are in the process of being implemented including pump and treat facilities, well fields, ISRM barrier, and other related facilities associated with 100-HR-3, 100-KR-4, 300-FF-5, 100-FR-3, 100-NR-2, 100-BC-5, and ZP-1. Support personnel for the group includes project engineers and technical support. The group interacts with EPC Construction on the implementation of new facilities as well as major facility modifications. Group responsibilities include CAM for the projects, participation in regulatory meetings, support the integration of groundwater and vadose contamination remedies, and general coordination with the various S&GRP groups to coordinate and facilitate remedy implementation and continued facility operations.

RCRA Monitoring and Reporting

RCRA Reporting/ Monitoring is responsible for groundwater monitoring, technical and statistical evaluations, and reporting for RCRA TSD/WMA sites, Atomic Energy Act areas of interest or waste sites, and one permitted solid waste landfill facility. RCRA Monitoring and Reporting ensures that sampling and reporting of groundwater monitoring data meets State of Washington and Federal regulatory requirements and DOE Orders, and prepares and implements monitoring plans in accordance with specific regulatory requirements as well as GIS mapping and cartography support for S&GRP. Members of the group also support evaluation of groundwater data for some CERCLA Groundwater Operable Units including review and assessment of data from the well trips and supporting analysis.

Technical/Reporting

Technical/Reporting is responsible for groundwater monitoring, technical evaluations, and reporting for CERCLA groundwater operable units (OU), pump-and-treat systems, and other remedial technologies implemented in accordance with project, DOE, regulatory requirements. Technical/Reporting develops and maintains project specific databases for pump-and-treat operations. The group includes the technical leads for the various operable units as well as risk assessment, modeling, maintenance of project specific databases, hydrologic testing, and aquifer tube and ISRM support.

The S&GRP QA Engineers report to the Manager of S&GRP Operations Assurance.

The achievement of quality in all activities is the responsibility of each employee. The S&GRP QA Engineers help to ensure quality products by:

- Reviewing documents to ensure data quality and quality assurance objectives are succinctly described.
- Preparing quality assurance inspection plans (QAIP).
- Performing assessments and surveillances to ensure quality objectives are adequately achieved.
- Verifying resolution of any nonconformance (may also be performed by the supporting Plateau Projects QA Quality Control Inspector).
- Interfacing with analytical laboratories, PNNL, WCH and WRPS.
- Initiating revisions to this QAPjP as appropriate.

Mission Support Alliance (MSA) Acquisition Verification Services (AVS) performs supplier evaluations and receipt inspection for designated procured items as appropriate by Quality Level.

Field Sampling shall comply with the requirements in DOE/RL-96-68, *Hanford Analytical Services Quality Assurance Requirements Document* (HASQARD), Volumes 1 and 2. Field Screening shall comply with the requirements in DOE/RL-96-68, *Hanford Analytical Services Quality Assurance Requirements Document* (HASQARD), Volume 3.

C2. Personnel Training and Qualification

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

A combination of general and job specific safety and operational training is provided to prepare employees to operate and maintain S&GRP activities in a safe, effective, efficient, and environmentally sound manner. PRC-PRO-TQ-459, *Environmental Training*, WMP-200, Section 5.1, "Training and Qualification Program," and PRC-RD-TQ-11061, *Training Requirements,* all form the basis for the training provided to personnel assigned or matrixed to the S&GRP. A training coordinator is assigned to assure that S&GRP personnel receive the required training and maintain their qualification.

State regulations require that drillers hold a valid State of Washington drillers license per WAC 173-162. Certified journeyman electricians with qualifications meeting WAC 296-401B-455 subcategory 03A are required for electrical connections on pumps in resource protection wells. These requirements are passed on to drilling contractors.

Sampling personnel are required to have training in Department of Transportation (DOT) hazardous material general awareness, and hazardous material driver's training as directed by management.

C3. Quality Improvement

Corrective actions identified from CHPRC assessments will be processed in accordance with PRC-PRO-QA-052 Issues *Management*. Nonconformances identified by CHPRC will be processed in accordance with PRC-PRO-QA-298, *Nonconforming Items*. Subcontractor nonconformances will be processed in accordance with contract documents and subcontractor QA Program requirements.

Problems with well construction, sample collection, sample custody or data acquisition that affect the quality of data or impair the ability to acquire data due to failure to meet contract requirements, or failure to follow procedure shall be documented in accordance with PRC-PRO-QA-298, *Nonconforming Items*, PRC-PRO-QA-9769, *Surveillance Process*, or the condition report as described in PRC-PRO-QA-052, *Issues Management*, as appropriate. Problems within the scope of the SMR Sample and Data Management group related to sampling, analytical support, and data validation support processes that affect the quality of data are documented, evaluated, and dispositioned in accordance with GRP-EE-01-2.7, "*Sample Issue Resolution*," and GRP-EE-01-2.10, "*Sample Management and Reporting – Request for Data Review*," as applicable.

Quality Assurance surveillance reports are provided to project management for action or information depending on the results of the surveillance. Surveillance reports and assessments are processed in accordance with PRC-PRO-QA-052, *Issues Management*.

C3.1 Field Quality Control

Field quality control evaluations are routinely performed as part of the sampling quality control program. Field QC samples include field duplicates, split samples, and three types of field blanks. The three types of field blanks are full trip, field transfer, and equipment blanks. Field blanks are typically prepared using

high purity reagent water. Silica sand should be used, instead of reagent water, when required by the SAP. Typical types of field QC are described below:

1) Full Trip Blanks (FTB) – also known as Trip Blanks (TB) or Daily's - Prepared by the sampling team prior to traveling to the sampling site. The preserved bottle set is either for volatile organic analysis (VOA) only or identical to the set that will be collected in the field. It is filled with high purity reagent water (or dead water from well 699-S11-E12AP for low-level tritium FTBs[1]). The bottles are sealed and transported, unopened, to the field in the same storage containers used for samples collected that day. Collected FTBs are analyzed for the same constituents as the samples. FTBs are used to evaluate potential contamination of the samples due to the sample bottles, preservative, handling, storage and transportation.

2) Field Transfer Blanks (FXR) – also known as Field Blank (FB) - Preserved VOA sample bottles are filled at the sample collection site with high purity reagent water that has been transported to the field. After collection, FXR bottles are sealed and placed in the same storage containers with the samples from the associated sampling event. FXR samples are analyzed for volatile organic compounds (VOC) only. FXRs are used to evaluate potential contamination caused by conditions in the field.

3) Equipment Blanks (EB) – also known as Equipment Rinsates – High purity reagent water[2] is passed through the pump or put in contact with the sampling surfaces of the equipment to collect blank samples identical to the sample set that will be collected. The EB bottles are placed in the same storage containers with the samples from the associated sampling event. EB samples are analyzed for the same constituents as the samples from the associated sampling event. EBs are used to evaluate the effectiveness of the cleaning process to ensure samples are not cross-contaminated from previous sampling events.

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[1] Because of the low detection levels achieved in the low level tritium analysis, special low level tritium water must be used. This low level tritium water, known as "dead water," is collected yearly, or as needed, from well 699-S11-E12AP or other approved source.

[2] Alternative matrices may be used as appropriate, for example: vapor sampling equipment.

4) Field Duplicates (DUP) – also known as Replicates - Two samples that are collected as close as possible to the same time and same location and are intended to be identical. Volatile organic analysis soil duplicates are sampled as collocated samples, as described below. Field duplicates for soil are collected and homogenized before dividing into two separate samples in the field. Field duplicates are stored and transported together and are analyzed for the same constituents. The field duplicates are used to determine precision for both sampling and laboratory measurements.

   a. Collocated samples are two samples collected as close as possible to the same time and location which are not homogenized. This sampling protocol is used where homogenizing samples for split or duplicate samples would impact the quality of the data. S&GRP refers to collocated samples as duplicates or splits.

5) Field Split Samples (SPLIT) – Two samples that are collected as close as possible to the same time and same location and are intended to be identical. Volatile organic analysis soil splits are sampled as collocated samples, as described above. Field split samples are stored in separate containers and analyzed by different laboratories for similar analytes. Split samples are inter-laboratory comparison samples which are used to evaluate comparability between laboratories.

Using several types of field QC samples monitors the adequacy of the sampling system and the integrity of samples from field collection through laboratory analysis. Field QC and their typical frequencies are listed in Table 3-1. Sampling and Analysis Plans (SAP) and groundwater monitoring plans address project specific field QC frequency, if applicable. Typical acceptance criteria for field QC are shown in Table 3-2. Sampling and Analysis Plans (SAP) and groundwater monitoring plans address project specific field QC acceptance criteria, if applicable.

Table C3-1. Quality Control Samples

Sample Type	Primary Characteristics Evaluated	Frequency
Field QC		
Full Trip Blank (FTB)	Contamination from containers or transportation	1 per 20 well trips
Field Transfer Blank (FXR)	Contamination from sampling site	1 each day VOCs sampled (wells or boreholes)
Equipment Blank (EB)	Contamination from non-dedicated equipment	As needed[(a) (b)]
Replicate/Duplicate Samples (DUP)	Reproducibility/Sampling Precision	1 in 20 sampling events (well trips or soil samples[(c)])
Field Split Samples (SPLIT)	Inter-laboratory comparability	As Needed
Laboratory QC		
Method Blanks	Laboratory Contamination	1 per batch
Lab Duplicates	Laboratory Reproducibility and Precision	(d)
Matrix Spikes	Matrix Effect/Laboratory Accuracy	(d)
Matrix Spike Duplicates	Laboratory Reproducibility, Accuracy, and Precision	(d)
Surrogates	Recovery/Yield	(d)
Tracers	Recovery/Yield	(d)
Laboratory Control Samples	Laboratory Accuracy	1 per batch

Table C3-1. Quality Control Samples

Sample Type	Primary Characteristics Evaluated	Frequency
Laboratory Performance Evaluation		
Performance Evaluation Programs[c]	Laboratory Accuracy	Annual
Double-Blind Standards	Laboratory Accuracy	Quarterly[d]
Audit/Assessment	Overall Laboratory Performance and Operations	Annually[e] or Every 3 Years[f]

(a) For portable Grundfos pumps, equipment blanks are collected one per ten well trips. Whenever a new type of non-dedicated equipment is used, an equipment blank shall be collected every time sampling occurs until it can be shown that less frequent collection of equipment blanks is adequate to monitor the decontamination procedure for the non-dedicated equipment.

(b) Vendor provided borehole equipment is considered dedicated equipment and EBs are not typically performed.

(c) Soil grab samples are exempted from duplicate sampling.

(d) As defined in the laboratory contract or QA plan and/or analysis procedures.

(e) Nationally recognized program, such as DOE Mixed Analyte Performance Evaluation Program or Environmental Resource Associates.

(f) Water matrix double-blind standards are submitted quarterly. Soil matrix double-blind standards are submitted by request of Analytical Services.

(g) DOE QSAS requires annual audit of commercial laboratories.

(h) HASQARD does not define a frequency for assessment of on-site laboratories. Three year evaluated supplier list requirement is typically applied.

QA = Quality assurance.

QC = Quality control.

VOC = Volatile organic compound.

The results of field and laboratory QC sample are evaluated according to criteria defined in Table 3-2. Laboratory performance is evaluated according to criteria defined in Tables 3-4 and 3-5.

Table C3-2. Field and Laboratory QC Elements and Acceptance Criteria

Analyte(a)	QC Element	Acceptance Criteria		Corrective Action
		Water	Soil	
General Chemical Parameters				
Alkalinity Chemical Oxygen Demand Conductivity Oil and Grease pH Total Dissolved Solids	MB(b)	< MDL	< MDL	Flagged with "C"
	LCS	80-120% recovery[c]	70-130% recovery[c]	Data reviewed[d]
	DUP	≤ 20% RPD[c]	≤30% RPD[c]	Data reviewed[d]
	MS[e]	75-125% recovery[c]	75-125% recovery[c]	Flagged with "N"
	EB, FTB	< 2X MDL	< 2X MDL	Flagged with "Q"
	Field Duplicate	≤20% RPD[f]	≤30% RPD[f]	Flagged with "Q"
Total Organic Carbon Total Organic Halides				
Ammonia and Anions				
Ammonia Anions by IC cyanide	MB	< MDL	< MDL	Flagged with "C"
	LCS	80-120% recovery[c]	70-130% recovery[c]	Data reviewed[d]
	DUP	≤ 20% RPD[c]	≤30% RPD[c]	Data reviewed[d]
	MS	75-125% recovery[c]	75-125% recovery[c]	Flagged with "N"
	EB, FTB	< 2X MDL	< 2X MDL	Flagged with "Q"
	Field Duplicate	≤ 20% RPD[f]	≤30% RPD[f]	Flagged with "Q"
Metals				
ICP Metals ICP/MS Metals	MB	< CRDL	< CRDL	Flagged with "C"
	LCS	80-120% recovery[c]	70-130% recovery[c]	Data reviewed[d]
	MS MSD	75-125% recovery[c] ≤ 20% RPD[c]	75-125% recovery[c] ≤30% RPD[c]	Flagged with "N" Data reviewed[d]
	EB, FTB	< 2X MDL	< 2X MDL	Flagged with "Q"
	Field Duplicate	≤ 20% RPD[f]	≤30% RPD[f]	Flagged with "Q"
Volatile Organic Compounds				
Volatiles by GC/MS Total Petroleum Hydrocarbons by GC	MB	< MDL		Flagged with "B"
	LCS	Statistically derived[g]		Data reviewed
	MS	Statistically derived[g]		Flagged with "N"

Table C3-2. Field and Laboratory QC Elements and Acceptance Criteria

Analyte(a)	QC Element	Acceptance Criteria		Corrective Action
		Water	Soil	
	MSD	Statistically derived[g]		Data reviewed[d]
	SUR	Statistically derived[g]		Data reviewed[d]
	EB, FTB, FXR	< 2X MDL[h]		Flagged with "Q"
	Field Duplicate	≤20% RPD / ≤30% RPD[f]		Flagged with "Q"
Semivolatile Organic Compounds				
Herbicides by GC PCBs by GC Pesticides by GC Phenols by GC Semivolatiles by GC/MS	MB	< 2X MDL		Flagged with "B"
	LCS	Statistically derived[g]		Data reviewed[d]
	MS	Statistically derived[g]		Flagged with "N"
	MSD	Statistically derived[g]		Data reviewed[d]
	SUR	Statistically derived[g]		Data reviewed[d]
	EB, FTB	< 2X MDL[h]		Flagged with "Q"
	Field Duplicate	≤20% RPD /≤ 30% RPD[f]		Flagged with "Q"
Radiological Parameters				
Gamma Scan Gross Alpha Gross Beta Iodine-129 Plutonium (isotopic) Strontium-89/90 Technetium-99 Tritium Tritium (low-level) Uranium (isotopic) Uranium (total)	MB	< 2X MDA		Flagged with "B"
	LCS	70-130% recovery		Data reviewed[c]
	DUP	≤20% RPD / ≤ 30% RPD		Data reviewed[c]
	MS[i]	60-140% recovery		Flagged with "N"
	EB, FTB	< 2X MDA		Flagged with "Q"
	Field Duplicate	≤ 20% RPD / ≤ 30% RPD[e]		Flagged with "Q"
	Tracer	20-105%		Data reviewed[c]

(a) Specific analytes and method for determination are available from the Sample Data and Reporting organization.

(b) Does not apply to pH.

(c) Laboratory-determined, statistically derived control limits may also be used. Such limits are reported with the data.

(d) After review, corrective actions are determined on a case-by-case basis. Corrective actions may include a laboratory recheck or flagging the data as suspect (Y flag) or rejected (R flag).

(e) Applies to total organic carbon and total organic halides only.

(f) Applies only in cases where one or both results are greater than 5X the detection limit.

(g) Determined by the laboratory based on historical data. Control limits are reported with the data.

(h) For common laboratory contaminants such as acetone, methylene chloride, 2-butanone, toluene, and phthalate esters, the acceptance criteria is < 5X MDL.

(i) Applies only to technetium-99 and total uranium analyses.

Data Flags:

Table C3-2. Field and Laboratory QC Elements and Acceptance Criteria

Analyte(a)	QC Element	Acceptance Criteria		Corrective Action
		Water	Soil	

B. C = Possible laboratory contamination (analyte was detected in the associated method blank).
N = result may be biased (associated matrix spike result was outside the acceptance limits).
Q = problem with associated field QC sample (blank and/or duplicate results were out of limits).
DUP = Laboratory matrix duplicate.
EB = Equipment blank.
FTB = Full trip blank.
FXR = Field transfer blank.
GC = Gas chromatography.
ICP = Inductively coupled plasma.
ICP/MS = Inductively coupled plasma-mass spectrometry.
LCS = Laboratory control sample.
MB = Method blank.
MDA = Minimum detectable activity.
MDL = Method detection limit.
MS = Matrix spike.
MSD = Matrix spike duplicate.
PCBs = Polychlorinated biphenyls.
RPD = Relative percent difference.
SUR = Surrogate.

Laboratory Quality Control

Internal quality assurance and quality control programs are maintained by laboratories utilized by the S&GRP. Laboratory quality assurance includes a comprehensive quality control program, which includes the use of matrix spikes (MS), matrix duplicates (DUP), matrix spike duplicates (MSD), laboratory control samples (LCS), surrogates (SUR), tracers, and method blanks (MB). These samples are recommended in the guidance documents and are required by the U.S. Environmental Protection Agency (EPA) protocol. Laboratory QC and their typical frequencies are listed in Table 3-1. Acceptance criteria are shown in Table 3-2. Sampling and Analysis Plans (SAP) and groundwater monitoring plans address project specific laboratory QC frequency and acceptance criteria, if applicable.

1) Matrix Duplicates (DUP) – An intra-laboratory replicate sample that is used to evaluate the precision of a method in a given sample matrix.

2) Matrix Spike (MS) – An aliquot of a sample spiked with a known concentration of target analyte(s). The MS is used to assess the bias of a method in a given sample matrix. Spiking occurs prior to sample preparation and analysis.

3) Matrix Spike Duplicate (MSD) – A replicate spiked aliquot of a sample that is subjected to the entire sample preparation and analytical process. MSD results are used to determine the bias and precision of a method in a given sample matrix.

4) Laboratory Control Sample (LCS) – A control matrix (e.g., reagent water) spiked with analytes representative of the target analytes or a certified reference material that is used to evaluate laboratory accuracy.

5) Method Blank (MB) – An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in the sample processing. The method blank is carried through the complete sample preparations and analytical procedure. The method blank is used to quantify contamination resulting from the analytical process.

6) Surrogates (SUR) – A compound added to all samples in the analysis batch (field samples and QC samples) prior to preparation. The surrogate is typically similar in chemical composition to the analyte being determined, yet not normally encountered in most samples. Surrogates are expected to respond to the preparation and measurement systems in a manner similar to the analytes of interest. Because surrogates are added to all standards, samples and QC samples, they are used to evaluate overall method performance in a given matrix. Surrogates are used only in organic analyses.

7) Tracers – A tracer is a known quantity of radioactive isotope that is different from that of the isotope of interest but is expected to behave similarly and is added to an aliquot of sample. Sample results are generally corrected based on tracer recovery.

8) Sample Storage blanks shall be used as appropriate. Storage blanks are used to monitor potential cross-contamination of samples due to improper storage conditions. The specifics of this type of monitoring should be described in laboratory specific standard operating procedures implemented by laboratories providing analytical services to S&GRP.

The laboratories are required to analyze samples within the holding time specified by SW-846. In some instances, constituents in the samples not analyzed within the holding times may be compromised by volatilizing, decomposing, or by other chemical changes. Data from samples analyzed outside the holding time are flagged in the HEIS database with an H. The holding times for constituents frequently analyzed by S&GRP are listed in Tables 3-3 and 3-4.

Table C3-3. Groundwater Holding Times

Constituents	Holding Times
Volatile organics	14 days[a]
Semivolatile organics	7 days before extraction 40 days after extraction
Pesticides	7 days before extraction 40 days after extraction
Polychlorinated biphenyls	1 year before extraction 1 year after extraction
Chlorinated herbicides	7 days before extraction 40 days after extraction
Phenols	7 days before extraction 40 days after extraction
Oil and Grease	28 days
Metals (except Hg and Cr+6)	6 months
Hexavalent chromium	24 hours
Mercury	28 days
Alkalinity	14 days
Cyanide	14 days
Bromide	28 days
Chloride	28 days
Fluoride	28 days
Nitrate	48 hours
Nitrite	48 hours
Phosphate	48 hours
Sulfate	28 days
Total organic carbon	28 days
Total organic halides	28 days
Chemical oxygen demand	28 days

a. SW-846, Table 4.1

Table C3-4. Holding Times for Soil and Sediment Analyses

Constituents	Holding Times
Volatile organics	14 days maximum preserved[a]
Semivolatile organics	14 days before extraction 40 days after extraction
Pesticides	14 days before extraction 40 days after extraction
Polychlorinated biphenyls	None before extraction
Chlorinated herbicides	14 days before extraction 40 days after extraction
Phenols	14 days before extraction 40 days after extraction
Oil and Grease	28 days
Metals (except Hg and Cr+6)	6 months
Hexavalent chromium	30 days before extraction 7 days after extraction
Mercury	28 days
Alkalinity	14 days
Cyanide	14 days
Bromide	28 days
Chloride	28 days
Fluoride	28 days
Nitrate	28 days prior to extraction 48 hours after extraction
Nitrite	28 days prior to extraction 48 hours after extraction
Phosphate	28 days prior to extraction 48 hours after extraction
Sulfate	28 days
Total organic carbon	28 days
Total organic halides	28 days
Chemical oxygen demand	28 days

a. Refer to EPA Method 5035A for other potential preservation hold times.

Laboratory Performance

In addition to the laboratory QC, laboratory performance is assessed through evaluation of performance evaluation (PE) programs, double-blind standards and laboratory audits. PE programs are national studies in which blind standards are analyzed for chemical and radiological constituents. The most common PE programs are the Water Pollution and InterLaB RadCheM Proficiency programs managed by Environmental Resources Associates (ERA) and the Mixed Analyte Performance Evaluation Program (MAPEP) managed by the Department of Energy. The performance evaluation program results for each laboratory are evaluated against the evaluation criteria in Table 3-5 by Sample Data and Reporting (SDR) staff.

In addition to the national PE programs, S&GRP maintains an internal double-blind performance assessment program. Double-blind standards, which are prepared to look like groundwater samples, are submitted to the laboratories in triplicate or quadruplicate on a quarterly basis. These standards provide useful information on the precision and accuracy of the laboratory methods. The constituent list and spiking levels are subject to change to assist in the evaluation of laboratory performance and resolution of potential problems. Specific information on the constituents, spiking levels, and laboratory performance is maintained in the SDR project files. The results of the double-blind standard performance assessment are evaluated quarterly by SDR staff. Acceptance criteria for double-blind samples are provided in Tables 3-4 and 3-5.

Laboratory activities are regularly assessed by surveillance and auditing processes to ensure that quality problems are prevented and/or detected. Evaluation of laboratory and analytical activities is performed by various oversight organizations. Audits are performed on the commercial laboratories by the DOE Consolidated Audit Program (DOECAP). These audits are based on the DOE Quality Systems for Analytical Services (QSAS) requirements. Assessments are performed for on-site laboratories, such as WSCF. Assessments are performed by integrated contractor assessment teams to the requirements of the Hanford Analytical Quality Assurance Requirements Document (HASQARD). Surveillances are performed by CHPRC Environmental Quality Assurance staff. They can cover any areas of interest including laboratory, field, or data management processes.

Laboratory performance issues identified through QC evaluations are communicated to the laboratory for resolution. Each laboratory implements a corrective action program which is used to track and document issue resolution. S&GRP monitors laboratory corrective action and performance to ensure the corrective actions taken are adequate to resolve the issues and prevent recurrence.

Table C3-5. Double-Blind Standards Suggested Frequency and Acceptance Criteria

Constituent	Sample Frequency	Control Limits[b] (%)
General Chemical Parameters		
Specific conductance	Quarterly	≤25
Total organic carbon (potassium hydrogen phthalate spike)	Quarterly	≤25
Total organic halides (2,4,5-trichlorophenol spike)	Semiannually	≤25
Total organic halides (carbon tetrachloride, chloroform, and trichloroethene spike)	Semiannually	≤25
Ammonia and Anions		

Table C3-5. Double-Blind Standards Suggested Frequency and Acceptance Criteria

Constituent	Sample Frequency	Control Limits[b] (%)
Chloride	Quarterly	≤25
Cyanide	Semiannually	≤25
Fluoride	Quarterly	≤25
Nitrate as Nitrogen	Quarterly	≤25
Nitrite as Nitrogen	Quarterly	≤25
Metals		
Arsenic	Annually	≤20
Barium	Annually	≤20
Cadmium	Semiannually	≤20
Chromium (total)	Quarterly	≤20
Cobalt	Semiannually	≤20
Copper	Semiannually	≤20
Hexavalent chromium	Quarterly	≤20
Iron	Semiannually	≤20
Magnesium	Annually	≤20
Manganese	Annually	≤20
Nickel	Annually	≤20
Potassium	Annually	≤20
Silver	Annually	≤20
Sodium	Annually	≤20
Vanadium	Annually	≤20
Zinc	Annually	≤20
Volatile Organic Compounds		
Carbon tetrachloride	Quarterly	≤25
Chloroform	Semiannually	≤25
Trichloroethene	Quarterly	≤25
Radiological Parameters		
Gross alpha (plutonium-239 spike)	Quarterly	≤30
Gross beta (strontium-90 spike)	Quarterly	≤30
Cesium-137	Semiannually	≤30
Cobalt-60	Semiannually	≤30

Table C3-5. Double-Blind Standards Suggested Frequency and Acceptance Criteria

Constituent	Sample Frequency	Control Limits[b] (%)
Iodine-129	Semiannually	≤30
Neptunium-237	Annually	≤30
Plutonium-239	Quarterly	≤30
Strontium-90	Annually	≤30
Technetium-99	Quarterly	≤30
Tritium	Semiannually	≤30
Uranium-238	Quarterly	≤30

(a) Blind standards were generally submitted in triplicate or quadruplicate.

(b) Each result must be within the specified percentage of the known value to be acceptable.

Table C3-6. Performance Evaluation Program Acceptance Criteria

Requirement	Frequency	Acceptance Criteria	Corrective Action
General Chemical Parameters			
Participation in National PE program	Annual	80%	Review laboratory CAP. Divert samples to alternative laboratory, if necessary.
		No consecutive failures	Review laboratory CAP. Divert samples to alternative laboratory, if necessary.
Double-blind PE program	Quarterly	80%	Notify laboratory. Review data. Divert samples to alternative laboratory, if necessary.

CAP - Corrective action plan
PE - Performance evaluation

The field and laboratory QC and laboratory performance is reviewed quarterly and results are compiled for evaluation and trending. The results of the evaluations are documented in the quarterly and annual groundwater reports.

C4. Documents and Quality Records

Documents shall be prepared, reviewed, approved, issued, used, and revised to prescribed processes, specify requirements, or establish designs. Records shall be specified, prepared, reviewed, approved, and maintained.

The most current version of this QA Project Plan is posted on the GRP web site under the Procedures/GRP Quality Assurance Project Plan heading.

The tasks performed by the S&GRP typically result in the publication of a plan or report that is subsequently retained in the Integrated Document Management System (IDMS). Records associated with the S&GRP will be maintained in accordance with HNF-RD-210, *Records Management Program* and PRC-PRO-IRM-10588, *Records Management Process.*

Specific record retention requirements will be documented in the above implementing procedures. Records include but are not limited to the following:

- Plans or reports
- Completed procedure data sheets
- QAIP records
- Procurement documents or submittals
- M&TE calibration records
- Nonconformance Reports.

Contract related documentation will be managed in accordance with PRC-PRO-TQ-16405, *Submittal Management System.*

Field log books are controlled and maintained in accordance with PRC-PRO-IRM-10863, *Notebooks and Logbooks.*

S&GRP procedures will provide guidance on records generated for specific groundwater remediation and protection activities.

Environmental data is controlled in the Environmental Information System and *Sample Management and Reporting system* per procedure series GRP-EE-1.0-2.X, GRP-EE-9.0-X.XX, and CP-GPP-EE-9.0-X.XX.

Documentation related to the maintenance of groundwater treatment facilities is produced and retained in accordance with PRC-PRO-WKM-12115, *PRC Work Management.*

C5. Work Processes

Work shall be performed in accordance with established technical standards and administrative controls using approved instructions or procedures. Items shall be identified and controlled to ensure their proper use. Items shall be maintained to prevent their damage, loss or deterioration. Equipment used by S&GRP personnel or subcontractors for process monitoring or data collection shall be calibrated and maintained as appropriate.

C5.1 Quality Objectives and Criteria

Data used to make environmental decisions are collected and managed in accordance with data quality objectives (DQOs) to ensure that data quality is maintained. The DQO process ensures the data collected is of a type, quantity, and quality commensurate with the importance and intended application for the data. Parameters of Quality Assurance Objectives (QAOs) for groundwater data include precision, accuracy, completeness, comparability, and representativeness. DQOs and QAOs ensure that decisions made using the data are technically and scientifically sound and legally defensible. The S&GRP utilizes a DQO process adapted from EPA-QA/G-4; EPA/240/B-06/001, *Guidance on Systematic Planning Using the Data Quality Objectives Process.* This is described in GRP-EE-01-1.2, "Data Quality Objectives."

Non-direct measurement data feeds into the DQO process. These data would consist of previous DQO reports, existing remedial investigation/feasibility study (RI/FS) reports, existing SAPs and data stored in the Waste Information Data System (WIDS), Hanford Environmental Information System (HEIS), Hanford Geographic Information System (HGIS), and Integrated Document Management System (IDMS).

C5.2 Customer Data Quality Requirements

Parameters that are normally used by the customer to define project data quality requirements and to evaluate results include precision, accuracy, comparability, and representativeness.

- Precision is a measure of the degree to which individual measurements of the same property under similar conditions approach the same value. The precision of an analytical measurement is evaluated using replicate standards and/or samples. Acceptance criteria are established for each applicable test method.
- Accuracy refers to the degree to which a measurement agrees with an accepted reference or true value. Accuracy is evaluated by the use of certified standards, control standards, and/or spiked samples to calculate percent recovery. Acceptance criteria for percent recovery are established for each applicable test method.
- Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under correct normal conditions.
- Comparability expresses the degree to which one data set can be compared to another. The operating conditions of instruments, consistency of analyst training, stability of the analytical environment, and use of approved procedures are controlled to the extent possible to provide comparability of data. Confirmatory sampling can be performed to provide another indication of comparability.
- Representativeness is the degree to which data accurately and precisely represent a characteristic of a population, a parameter variation at a sampling point, a process condition, or an environmental condition. Sample custody procedures are employed to properly maintain sample representativeness during testing.

C5.3 Sampling Methods

Sampling in support of S&GRP activities is performed in accordance with GRP-FS-04-G-029, Non-VOC *Soil and Sediment Sampling;*, GRP-FS-04-G004, *Operational Monitoring Groundwater Sampling,* GRP-FS-G-028, *Field Characterization and Treatment Monitoring Activities Groundwater Sampling,* GRP- FS-04-G-030, *VOC Soil and Sediment Sampling;* GRP-FS-04-G-033, *Routine and Non-Routine Soil-Gas Sampling;* and GRP-FS-04-G-023, *Container Sampling*. Samples are often obtained during the implementation of GRP-EE-02-14.1, *Drilling, Remediating, and Decommissioning Resource Protection Wells, and Geotechnical Soil Borings;* GRP-EE-02-14.2, *Geoprobe, Driving and Push Technology Installations;* GRP-EE-01-5.2, *Test Pit Excavation in Contaminated Areas* or GRP-EE-01-5.3, *Test Pit Excavation in Archeological Areas.* Failures that occur in the sampling process or sample handling are controlled in accordance with PRC-PRO-QA-9769, *Surveillance Process*, PRC-PRO-QA-052, *Issues Management* (CRRS), PRC-PRO-QA-298, *Nonconforming Items*, GRP-EE-01-2.7, *Sample Issue Resolution*, or GRP-EE-01-2.10, *Sample Management and Reporting – Request for Data Review (RDR)* as appropriate. Sampling methods shall include method references in the Bibliography section of sampling procedures.

C5.4 Sample Handling and Custody

Sample chain of custody is described in GRP-FS-04-G-016, *Chain of Custody/Sample Analysis Request*. Sample handling is addressed in GRP-FS-04-G-012, *Sample Packaging and Shipping*, and GRP-FS-04-G-020, *Sample Storage Units*. Coordination of sampling is addressed in GRP-EE-01-2.0, *Sample Event Coordination*.

C5.5 Analytical Methods

Statements of Work (SOW) issued to onsite and offsite laboratories specify compliance with DOE/RL-96-68, *Hanford Analytical Services Quality Assurance Requirements Documents* (HASQARD). SOWs are issued in compliance with PRC-PRO-AC-186, *Statements of Work*.

Analytical methods are specified in the Sampling and Analysis Plans generated for specific operable units, waste sites or other discrete unit. When a failure occurs in the analytical system the Task Lead, and Sample and Data Management person resolve the issue in accordance with GRP-EE-01-2.7, *Sample Issue Resolution*.

Onsite measurements are acquired as described in field screening and field analytical procedures.

C5.6 Data Review, Verification, Validation, and Reporting

Analytical data generation is governed by applicable procedures. Typically, data validation is performed by a qualified vendor. Data verification is performed in accordance with GRP-EE-01-2.4, *Sample Management and Reporting - Data Package Verification*. Environmental analytical data is validated in accordance with GRP-EE-01-2.5, *Sample Management and Reporting - Data Package Validation Process*. In similar fashion other pertinent data is gathered and recorded per operating procedures. The levels of data validation and specific validation review requirements are stated in HNF-20433, *Data Validation Procedure for Chemical Analysis*, and HNF-20434, *Data Validation Procedure for Radiochemical Analysis*.

C5.7 Reconciliation with User Requirements

The Data Quality Assessment process compares field sampling activities against those proposed in sampling documents and provides an evaluation of the resulting data. This process is described in GRP-EE-01-1.22, *Data Quality Assessment*. Data Quality Assessments are performed on a task by task basis. When a data acquisition campaign has been completed and data validation has been performed, the Task Lead implements GRP-EE-01-1.22 or hires a subcontractor to do so. These Data Quality Assessments are subject to independent review by the QAE.

Problems affecting quality such as not meeting the DQOs or QAOs will be evaluated and dispositioned per the contractor Quality Assurance Program. Programmatic deficiencies shall be promptly identified and corrected in accordance with the Issues Management system as defined in PRC-PRO-QA-052, *Issues Management*.

Corrective maintenance, periodic/preventative maintenance, maintenance work plans, test procedures, engineering modifications, and construction activities performed within the S&GRP facilities are controlled in accordance with PRC-PRO-WKM-12115, *PRC Work Management*.

C6. Design

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 is granted to implement the design.

Design activities will be conducted in accordance with the QA Program controls described in PRC-MP-QA-599, Section 6.0, "Design" and the technical requirements specified in PRC-RD-EN-1819, *CHPRC Engineering Requirements*, PRC-PRO-IRM-309, *Computer Software Management*, and PRC-RD-EN-440, *Engineering Document Change*. Additional design control implementing procedures are listed in Attachment C-3.

C7. Procurement

Procured items and services shall meet established requirements and shall perform as specified. Prospective suppliers shall be evaluated and selected on the basis of specified criteria as appropriate with respect to the graded approach. Subcontractor QA programs are reviewed by the S&GRP QAE for inclusion of applicable program elements.

Procurement will be conducted in accordance with the following implementing procedures:

- PRC-PRO-QA-268, *Control of Purchased/Acquired Items and Services*
- PRC-PRO-AC-123, *Requesting Materials and Services*
- PRC-PRO-QA-259, *Graded Approach*
- PRC-PRO-AC-186, *Statements of Work*
- PRC-RD-EN-1819, *CHPRC Engineering Requirements*
- PRC-PRO-TQ-16405, *Submittal Management System.*
- PRC-PRO-MS-40213, *Subcontractor Oversight*

C8. Inspections and Tests

Inspection and testing of specified items, services, and processes shall be conducted using established acceptance and performance criteria. Equipment used for inspections and tests by S&GRP personnel or subcontractors shall be calibrated and maintained as appropriate.

C8.1 Instrument/Equipment Testing, Inspection, and Maintenance

Instrument and equipment testing, inspection, and maintenance of S&GRP plant equipment is controlled per PRC-PRO-WKM-12115, *PRC Work Management*. Instrumentation used in the field for measuring groundwater levels and groundwater quality are controlled by GRP-FS-04-G-005, *Control of Monitoring Instruments* or GRP-EE-01-7.4, *Requirements for Use of Field Measurement Equipment*.

Calibration of analytical equipment (gas chromatograph, spectrophotometer, pH meter, etc.) is performed analytically in accordance with HASQARD, DOE/RL-96-68 Volumes 3 & 4, as well as the manufacturer's procedures for calibration.

C8.2 Acceptance

At the conclusion of well construction tasks, a final acceptance walk down is performed and documented per GRP-EE-02-14.1. If QA participates in the walk down, a surveillance report is issued. Field activity reports, geologic logs, and other well specific records are reviewed and approved by a supervising geologist prior to publication in a borehole summary report or in IDMS. At the conclusion of construction projects that support operations, the completed or modified system is tested and inspected as directed by project design and procurement documents.

C8.3 Measuring and Test Equipment (M&TE)

The M&TE used by the S&GRP includes, but is not limited to, data collection equipment such as water level pressure transducers, e-tapes, steel measuring tapes, and water quality instrumentation (pH, conductivity, turbidity, dissolved oxygen, etc.). This equipment is addressed in GRP-FS-04-G-005, *Control of Monitoring Instruments* and GRP-EE-01-7.4, *Requirements for Use of Field Measurement Equipment*. The M&TE used for activities affecting quality are controlled and calibrated, and/or adjusted at specific intervals, to maintain precision and accuracy within prescribed limits in accordance with PRC-PRO-MN-490, *Calibration Management Program or* DOE/RL-96-68 *HASQARD* volumes 3 & 4 as appropriate. Procurement activities for M&TE are governed by PRC-PRO-QA-268.

The Industrial Hygiene Equipment Laboratory (IHEL) is responsible for the industrial hygiene sampling and monitoring equipment used in support of the S&GRP. Specific IHEL responsibilities include:

- Procuring and maintaining an inventory of sampling and monitoring equipment.
- Procuring and maintaining an inventory of associated consumables.
- Calibration of sampling and monitoring equipment.
- Repair of sampling and monitoring equipment.

Radiological instrumentation is purchased, maintained, and calibrated by the Pacific Northwest National Laboratory (PNNL) through the contract requisition process.

The equipment will be uniquely identified and traceable to its calibration data. Equipment will be maintained using a documented process to ensure continuing data quality and process capability.

C9. Management Assessment

Managers shall assess their management processes. Problems that hinder the organization from achieving its objectives shall be identified and corrected.

Assessments will be conducted in accordance with the process described in PRC-PRO-QA-246, *Management Assessment*, and will focus on compliance with documented requirements and procedures. The following status reports are prepared:

- Management assessment results prepared by the Operational Assurance group in accordance with PRC-PRO-QA-246.
- Quarterly trending analysis reports of corrective action data and monthly indicators prepared by Issues Management per PRC-PRO-QA-052.
- Nonconformance reports trended by QA Programs in accordance with PRC-PRO-QA-298.

C10. Independent Assessment

Independent assessments will be conducted periodically by the Operational Assurance Assessments organization.

Data Quality Assessments are performed in accordance with GRP-EE-01-1.22. These assessments are performed by or at the direction of the Task Lead once a discrete body of data has been validated. These data quality assessments are subject to independent review by the QAE. A minimum of 5% of DQAs will be reviewed by QA.

QA reports to management occur by the following methods. Three QA surveillances are scheduled by the S&GRP QAE per year. In a typical year there are numerous unscheduled surveillances performed by the S&GRP QAE. These surveillances examine programmatic and technical aspects of the S&GRP work scope. The cognizant S&GRP manager is provided with the results of such surveillances. When QA is assigned to verify completion of corrective actions, the verification is documented on a surveillance report transmitted to cognizant management. Company-wide independent assessments and surveillances are performed that examine aspects of the QA program. Findings and observations are reported to management for corrective action through the implementation of PRC-PRO-QA-052.

Management assessments performed by S&GRP provide input to the CRRS system. CRRS data is analyzed quarterly by CHPRC Quality and Performance Assurance, and fed back to management.

Attachment C-1 - Additional QA Requirements Specific to Field Sampling

C-1-1Field Sampling Quality Assurance

This attachment is applicable to all S&GRP personnel who collect samples in support of S&GRP tasks and projects. Sample collection under RCRA, Comprehensive Environmental Response Comprehensive Liability Act (CERCLA), and Washington State Hazardous Waste Management Act as delineated in the TPA, shall meet the regulatory requirements through the implementation of work-controlling sampling documents, procedures, and this QAPjP.

C-1-2 Personnel Qualifications – Sampling personnel must receive training from a competent person prior to being qualified to perform sampling for S&GRP. On-the-Job Training (OJT), administered by a qualified person, is the preferred method.

C-1-3.1 Quality Systems – Physical: The sample storage facility shall have controlled access. All groundwater wellheads shall have locking well caps. Sampling equipment shall be maintained and decontaminated prior to use as appropriate. Sampling operations and sample storage areas shall be maintained to prevent the spread of contamination. Adequate storage areas shall be available for reagents, solvents, standards, and reference materials to prevent cross contamination and degradation. Purge water generated shall be managed in accordance with GRP-EE-01-1.11, *Purge Water Management*.

C-1-3.2 Quality Systems – Technical: The design of a field sampling effort should be performed as a part of the DQO process. Details should then be incorporated into sampling and analysis plans (SAP) or characterization plans (CP). Minor changes can be made to the original work scope outlined in sampling and analysis instructions (SAI), SAPs, or in the field by the Project Engineer to accommodate field conditions provided that the changes do not negatively impact the technical adequacy of the job. Such changes will be documented as a revision to the work-controlling document or with justifications in a field logbook. Sampling methods shall be based upon industry-recognized sampling methods from agency published source documents where possible. Each sampling method performed in the field shall have an applicable procedure describing the necessary equipment and collection steps for the media and contaminant to be sampled. Items, services, and processes that do not meet established requirements shall be identified in accordance with PRC-PRO-QA-298, *Nonconforming Items*, and PRC-PRO-QA-052, *Issues Management,* or GRP-EE-01-2.7, *Sample Issue Resolution*, as appropriate. Changes or corrections to data shall be made by drawing a single line through the incorrect information, writing the correct information, and initialing and dating the new entry.

C-1-4.1 Sampling Operations – The field logbook provides a daily handwritten record of sampling activities and is the primary record. Logbooks are managed in accordance with PRC-PRO-IRM-10863. Logbook entries shall be made in indelible and reproducible ink. Data may also be entered on pre-made data forms. Each sample has a unique number. Numbers are issued in accordance with GRP-EE-01-2.0, *Sample Event Coordination*. Sample preservation shall be consistent with regulatory requirements and as described on the sample authorization form (SAF). One member of the sampling team is designated the sample custodian. The sample custodian maintains custody until the samples are secured in a sample storage area accessible only to authorized personnel. Custody is documented and transferred in accordance with GRP-FS-04-G-016, *Chain of Custody/Sample Analysis Request*. Custody seals are placed on individual sample bottles such that the seal will be broken if the bottle is opened. Samples are shipped to analytical laboratories in accordance with GRP-FS-04-G-012, *Sample Packaging and Shipping*.

C-1-4.2 Quality Control During Sampling – See Section 3.0

C-1-5 Sampling Data Review – Frequent reviews are performed on sampling documentation for completeness, correct number and locations of samples, and to confirm that samples were shipped correctly to provide an additional aspect of quality control.

Attachment C-2 - Additional QA Requirements Specific to Onsite Measurement

Onsite Measurements Quality Assurance

C-2-1 Personnel Qualification & Training – Onsite measurement personnel must receive OJT from a competent person prior to being qualified to perform onsite measurements for S&GRP.

C-2-2 Quality Assurance Objectives – Basic information about the nature of the data collection and use shall be communicated between the onsite measurement team and the client before sample collection begins. The formal DQO process is the preferred method to accomplish this. In the absence of a formal DQO, the manager of Remediation Support and the Project Lead shall agree upon analytical method, detection levels, data assessment requirements, QC levels, and data management requirements for the work to be performed. Data quality requirements are commonly expressed in terms of precision, accuracy, comparability, and representativeness.

C-2-3 Systems – Commercial software used by S&GRP and vendor supplied software designed to interface with a specific instrument is exempt from acceptance testing. Other software is managed by PRC-PRO-IRM-309. Software manuals shall be made readily available to personnel using the software. Software errors found during use shall be reported to the manager of Remediation Support for resolution.

C-2-4 Documentation – Final data deliverable reports are generated using GRP-EE-05-1.7, *Preparation, Control and Review of Organic/Inorganic Data Packages.*" Sample Management and Reporting shall maintain the reports as record copies until they are transferred through the information resource management service provider to the Records Holding Area.

C-2-5 Technical Systems – Technical systems are employed to ensure that the techniques used are applicable and properly employed by qualified analysts. These systems include sample exchanges, standards programs, control of standards and reagents, data reduction and reporting, data assessment and audits. These systems include chain of custody, control of reagents and standards through labeling and tracking shelf life, internal checks of instruments, and preparation of data packages (including comparison of onsite measurement data vs. laboratory data).

C-2-6 Sample Traceability – Sample traceability will be documented in the analyst's logbook when performing insitu or analyst-collected data.

C-2-7 Calibration – The performance of testing equipment is controlled through initial calibration and periodic checks to verify that the equipment remains within calibration criteria. Instruments and equipment with operations and functions that directly affect data quality are calibrated or inspected. The procedure for calibrating a specific instrument (including frequency and acceptance criteria) is described in the applicable test procedure and/or manufacturer's instruction. Results of the calibration shall be documented and anomalies will be communicated to the customer.

Standards used for calibration are prepared from National Institute of Standards and Technology (NIST) certified solutions or from reagent materials that are checked against NIST certified standards as appropriate. A logbook record is maintained of standard preparation including a description of the method of preparation, date, preparer's name, and lot number of originating stock. Standards are labeled with

contents, preparation date, concentration, preparer's initials, unique number for traceability and expiration date.

Balances and scales used for onsite measurements shall be checked daily with a known check weight. Check weights are to be within the range typically observed during data acquisition. Check weight results are recorded in a controlled log book. Balances are to be calibrated annually.

C-2-8 Procedures – Onsite measurement procedures are processed in accordance with PRC--PRO-MS-589, *CH2M Hill Plateau Remediation Company Procedures*. Administrative and technical procedures are issued under the procedure series GRP-EE-01-X.XX (environmental investigation procedures) and GRP-EE-05-X.XX (field screening procedures) series. The current version of each procedure is accessible on the S&GRP web site. Procedure users should verify that they have the current revision before use. Test procedures shall be qualified prior to use. Qualification may be based upon comparison of split sample results from approved analytical laboratories, comparison to another approved onsite method or through measurement of a sufficient number of reference samples. Procedure qualification results shall be documented. Results of the procedure qualification shall be documented and anomalies will be communicated to the customer.

C-2-9 Data Management – Data collection may occur either electronically or manually as described in the applicable test procedure. Entries into logbooks shall be made in a manner that can be easily read, understood and reproduced with a standard photocopier. Data reduction shall be performed in a manner that ensures consistent and accurate results. This is supported by the controls established for use of software. Significant figures reflect the limits of a particular test method. The basic rules associated with significant figures are provided in *Standard Practices for Using Significant Digits in Test Data to Determine Conformance with Specifications* (ASTM 1993). Data review and reporting is performed in accordance with GRP-EE-05-1.7, *Preparation, Control, and Review of Field Screening Organic/Inorganic Data Packages.*

C-2-10 Quality Control (QC) – QC checks provide information on the precision, accuracy, sensitivity, and reliability of reported results. Two levels of QC have been established to distinguish between qualitative and quantitative data needs.

- QC-1 provides identification that an analyte is present and may provide a rough order of magnitude of the concentration. A minimum level of QC will be performed including a beginning standard and blank with other QC as required by specific procedure.
- QC-2 provides a greater level of QC as directed by specific procedures. This may include initial and continuing calibration check standards, blanks, matrix spikes, duplicates, and lab control samples. This data may be quantitative.

The QC level will be selected with the concurrence of the customer.

C-2-11.0 Data Quality Assessment – Procedures to Assess Data Quality: This section provides various formulas that are typically employed to compute QC parameters used to assess data quality. The specific QC parameters will be monitored and evaluated based on customer needs and the selection of QC levels (defined in Section 10.0).

C-2-11.1 Precision – Precision has been defined in Section 5 of this plan. If calculated from duplicate measurements, the following equation is used:

$$RPD = \frac{(C_1 - C_2)x100}{(C_1 + C_2)/2}$$

where: RPD = relative percent difference
C_1 = larger of the two observed values
C_2 = smaller of the two observed values.

If calculated from three or more replicates, use relative standard deviation (RSD) rather than RPD:

$$RSD = (s/\bar{y})x100$$

where: RSD = relative standard deviation
s = standard deviation
$\bar{y}$ = mean of replicate analyses.

Standard deviation, s, is defined as follows:

$$S = \sqrt{\frac{\sum_{i=1}^{n}(y_i - \bar{y})^2}{n-1}}$$

where: s = standard deviation
y_i = measured valued of the ith replicate
$\bar{y}$ = mean of replicate measurements
n = number of replicates.

C-2-11.2 Accuracy - Accuracy has been defined in Section 5 of this plan. For measurements where matrix spikes are used:

$$\%R = 100x\left[\frac{S-U}{C_{sa}}\right]$$

where: %R = percent recovery
S = measured concentration in spiked aliquot
U = measured concentration in unspiked aliquot
C_{sa} = actual concentration of spike added.

For situations where a standard reference material (SRM) is used instead of or in addition to matrix spikes:

$$\%R = 100x\left[\frac{C_m}{C_{srm}}\right]$$

where: %R = percent recovery
C_m = measured concentration of SRM
C_{srm} = actual concentration of SRM.

C-2-11.3 Method Detection Limits - The method detection limit (MDL) is defined as follows:

$$MDL = t_{(n-1,1-\alpha=0.99)}xS$$

where: MDL = method detection limit
S = standard deviation of the replicate analysis
$t_{(n-1,1-\alpha=0.99)}$ = Students' t-value appropriate to a 99% confidence level and a standard deviation estimate with n-1 degree of freedom.

The MDLs will be established and documented for all test procedures in accordance with GRP-EE-05-1.15, *Method Detection Limits*. At a minimum, MDLs will be determined prior to initial use of the test procedure (including revisions that could affect the test sensitivity) and annually thereafter. Any exceptions to the requirement for determination of MDLs will be documented in the specific test procedure. For specific tests that are inactive for long periods of time, the requirement for an annual MDL determination may not be met and the MDL will be determined prior to any subsequent use of the test.

Periodically it may be necessary to perform a test prior to determining the MDL to meet the customer's immediate project needs. In such cases, the MDL may be determined after performing the test, with prior

concurrence from the customer. Results of the MDL shall be documented and any anomalies will be communicated to the customer.

C-2-11.4 Control Charts – Control charts are a graphic tool for viewing the statistical performance of a method to enable early detection of outlying data points. Control charts are not used at this time. Project defined recovery limits for standards are utilized instead.

C-2-11.5 Collaborative Testing – In addition to an internal QC program, the onsite measurement team may participate in performance evaluation programs and sample collaborative sample testing programs with other laboratories as a method of assessing data quality. If materials and/or programs are available, collaborative testing may be performed when required by the customer to meet specific project needs.

Projects are also encouraged to perform periodic confirmation of onsite measurement test results using EPA-approved or other analytical laboratory methods and QA/QC procedures.

C-2-12 Records – Documents that provide objective evidence of the quality of work and of the associated activities conducted by S&GRP in conjunction with onsite measurement include the following:

- Chain of Custody records
- Sample analysis data sheets
- Results of reviews, audits, and corrective actions
- Project reports
- Training records
- Calibration records
- Instrument logs
- Maintenance and repair records.

C-2-14 Preventive Maintenance – Analysts are responsible for complying with instrument maintenance schedules and maintaining maintenance records. A logbook shall be set up to record all maintenance and repairs for each instrument.

C-2-18 Procurement Control – The analyst will review received items and reagents to determine if the items/reagents meet specifications established in the requisition. If an item does not meet requirements, it will be dispositioned in accordance with PRC-PRO-QA-298. Acceptability of new standards will be determined by comparison with previously acceptable standards. New reagents and standards will be separated from other reagents and standards until they have been checked and accepted.

Attachment C-3 - Matrix of Implementing Procedures

S&GRP QAP IMPLEMENTATION MATRIX		
CHPRC QAP	PROJECT PROCEDURES	
	CHPRC-Wide Procedures	**S&GRP Procedures**
SECTION 1 PROGRAM		
Quality Assurance Program Plans	CHPRC-00189, Environmental Quality Assurance Program Plan	GRP-TI-0001, *Groundwater Remediation Project Conduct of Operations Matrix*
QA Requirements Flowdown	PRC-MP-MS-19361, *CH2M Hill Plateau Remediation Project Execution Plan* PRC-MP-MS-003, *Integrated Environment, Safety and Health Management System Description* PRC-PRO-MS-40117, *Requirements Management Process* PRC-PRO-NS-2701, *Authorization Agreement*	HNF-30052, *Soil & Groundwater Remediation Project, Project Execution Plan*
Quality Planning		
Organization, Responsibilities, and Interfaces	Business Process Guide, *Buyers Technical Representative Assignment and Duties* PRC-RD-AC-10320, *CHPRC Acquisition System Requirements* PRC-RD-LEG-10348, *Legal and Ethical Conduct*	HNF-30052, *Soil & Groundwater Remediation Project, Project Execution Plan* GRP-POL-0001, ***S&GRP Integrated Environment, Safety, and Health Management Roles, Responsibilities, and Functions***
Readiness Reviews	PRC-PRO-OP-055, *Startup Readiness*	GRP-EE-02-14.1, *Drilling, Remediating and Decommissioning Resource Protection Wells, and Geotechnical Soil Borings* *GRP-EE-02-14.2, Geoprobe, Casing Driving, and Push Technology Installations*
Stop Work Authority	PRC-PRO-SH-7085, *Safety Responsibilities* PRC-PRO-SH-3468, *Stop Work Responsibility*	
Graded Application of QA Program	PRC-PRO-QA-259, *Graded Approach* PRC-PRO-NS-8317, *Safety Basis Implementation and Maintenance* PRC-PRO-NS-700, *Safety Basis Development*	
SECTION 2, PERSONNEL TRAINING AND QUALIFICATION	CHPRC-00073, *CHPRC Radiological Control Manual* HNF-GD-10624, *A Systems Approach to Training* PRC--RD-TQ-11061, *Training Requirements* PRC-PRO-TQ-164, *Integrated Training Electronic*	HNF-18361 *Purgewater Storage and Treatment Facility (PSTF) Dangerous Waste Training Plan* HNF-22459 *GRP 90-Day Accumulation Area*

S&GRP QAP IMPLEMENTATION MATRIX		
CHPRC QAP	**PROJECT PROCEDURES**	
	CHPRC-Wide Procedures	**S&GRP Procedures**
Training and Qualification Program	*Matrix* PRC-PRO-TQ-175, *Training Program Descriptions* HNF-GD-11236, *Development of Training, Qualification, and Certification Programs* HNF-PRO-263, *Qualification and Certification of Inspection and Test Personnel* PRC-RD-SH-7459, *Environmental Training* PRC-PRO-TQ-40164, *Personnel Training and Qualification*	*Dangerous Waste Training Plan*
Training and Indoctrination	*Operations Supervisor Fundamentals Training Program Description* PRC-PRO-TQ-164, *Integrated Training Electronic Matrix* PRC-PRO-TP-166, *Transportation Safety Training* PRC-PRO-TQ-179, *Obtaining Training Equivalencies, Waivers, and Extensions* HNF-PRO-263, *Qualification and Certification of Inspection and Test Personnel* PRC-PRO-TQ-459, *Environmental Training* HNF-GD-10624, *A Systems Approach to Training* PRC-RD-TQ-11061, *Training Requirements* PRC-PRO-TQ-175, *Training Program Descriptions* HNF-GD-11236, *Development of Training, Qualification, and Certification Programs* CHPRC-00073, *CHPRC Radiological Control Manual* PRC-PRO-TQ-40164, *Personnel Training and Qualification*	
Qualification and Certification	Welding Manual HNF-RD-9062, *Welder Performance Qualification* HNF-RD-9063, *General Requirements for Welding, Brazing, and Plastic Bonding Procedures* HNF-GD-11236, *Development of Training, Qualification, and Certification Programs* HNF-PRO-263, *Qualification and Certification of Inspection and Test Personnel* CHPRC-00073, *CHPRC Radiological Control Manual* PRC-PRO-TQ-40164, *Personnel Training and Qualification*	
Training and Qualification Records	PRC-PRO-TQ-249, *Training Records Administration* HNF-PRO-263, *Qualification and Certification of Inspection and Test Personnel* PRC-PRO-TQ-459, *Environmental Training* PRC-PRO-TQ-40164, *Personnel Training and Qualification*	
SECTION 3 QUALITY IMPROVEMENT	PRC-PRO-QA-052, *Issues Management* PRC-PRO-EM-060, *Reporting Occurrences and Processing Operations Information*	GRP-EE-01-2.7, *Sample Issue Resolution* HNF-28242, Software Management Plan

S&GRP QAP IMPLEMENTATION MATRIX		
CHPRC QAP	PROJECT PROCEDURES	
	CHPRC-Wide Procedures	**S&GRP Procedures**
Deficiency Identification	PRC-PRO-QA-298, *Nonconforming Items* CHPRC-00073, *CHPRC Radiological Control Manual* PRC-PRO-QA-246, *Management Assessment* PRC-PRO-EP-15333, *Environment Protection Processes,* Section 5.56	
Corrective Action Management	PRC-PRO-QA-052, *Issues Management* PRC-PRO-QA-298, *Nonconforming Items* CHPRC-00073, *CHPRC Radiological Control Manual* PRC-PRO-QA-246, *Management Assessment*	
Nonconformance Control	PRC-PRO-EM-058, *Event Initials Investigation and Critique Meeting Process* PRC-PRO-QA-298, *Nonconforming Items*	GRP-EE-01-2.7, *Sample Management and Reporting –Sample Issue Resolution* GRP-EE-01-2.10, *Sample Management and Reporting – Request for Data Review*
Performance Data Analysis	PRC-PRO-QA-052, *Issues Management* PRC-PRO-QA-298, *Nonconforming Items* PRC-PRO-CN-14990, *Construction Management* PRC-PRO-QA-24741, *Performance Analysis Process*	GRP-EE-01-1.2, *Data Quality Objectives*
Control of Suspect/ Counterfeit Items	PRC-PRO-QA-301, *Control of Suspect/Counterfeit and Defective Items*	
SECTION 4, DOCUMENTS AND RECORDS Documents	PRO-PRO-IRM-112, *Forms Administration* PRC-PRO-IRM-211, *Submitting Documents to the Administrative Record File and Public Information Repositories* PRC-PRO-IRM-232, *Project Files Management* PRC-PRO-EN-440, *Engineering Document Change* PRC-PRO-EN-2001, *Facility Modification Package Process* PRC-PRO-MS-589, *CH2M Hill Plateau Remediation Company Procedures* PRC-RD-EN-1819, *CHPRC Engineering Requirements* PRC-PRO-EN-2001, *Facility Modification Package Process* PRC-PRO-EN-8016, *Design Change Notice Process* PRC-PRO-IRM-8310, *Document Control Processes*	GRP-EE-01-1.4, *Descriptions of Work for Well Drilling and Decommissioning* GRP-EE-01-2.1, *Sample Management and Reporting - Sample Documentation Processing* GRP-EE-01- 2.2, *Sample Management and Reporting - Data Package Receipt and Control* GRP-EE-09-2.11, *Environmental Information Systems - Hanford Environmental Information System (HEIS) Method Naming Procedure* RC-1-01, *Development, Approval, and Control of RCP RAD CON Management Directives and Standing Instructions* RCSI-08-001 *Preparation of Environmental Survey Task Instructions*
Records	PRC-PRO-IRM-10588, *Records Management Process,* PRC-PRO-IRM-232, *Project Files Management* PRC-RD-EN-1819, *CHPRC Engineering Requirements*	GRP-EE-01-1.16, *Sample Management and Reporting - Sampling Documenation Preparationand Control* GRP-EE-01-2.2, *Sample Management and Reporting – Data Package Receipt and Control*

S&GRP QAP IMPLEMENTATION MATRIX		
CHPRC QAP	PROJECT PROCEDURES	
	CHPRC-Wide Procedures	S&GRP Procedures
		GRP-EE-01-2.4, *Sample Management and Reporting – Data Package Verification* GRP-EE-01-2.5, *Sample Management and Reporting – Data Package Validation Process* GRP-EE-01-2.6, *Sample Management and Reporting – Management of Sample and data Management Records* GRP-EE-01-2.7, *Sample Management and Reporting – Sample Issue Resolution* HNF-20433, *Data Validation Procedure for Chemical Analysis* HNF-20434, *Data Validation Procedure for Radiochemical Analysis.* GRP-EE-01-7.0, *Geologic Logging* GRP-EE-02-14.1, *Drilling, Remediating and Decommissioning Resource Protection Wells, and Geotechnical Soil Borings* GRP-EE-02-14.2, *Geoprobe, Driving and Push Technology Installations.* GRP-EE-09-1.1, *Environmental Information Systems – Waste Information Data System: Site Identification, Classification and Reclassification* GRP-EE-09-1.3, *Environmental Information Systems – Waste Information Data System: Data Collection and Data Entry* GRP-EE-09-1.12, *Environmental Information Systems – Waste Information Data System: Library Management* CP-15383, *Common Requirements of the Format for Electronic Analytical Data* GRP-PRO-027, *GRP Records Management System* GRP-PRO-023, *Back-up and Archiving Process Related Digital Files* GRP-EE-02-14.3, *Well Maintenance*
SECTION 5, WORK PROCESSES Work Process Documents	PRC-RD-MN-10859, *Maintenance Management* PRC-PRO-WKM-079, *Job Hazard Analysis* PRC-PRO-TP-156, *Onsite Hazardous Material Shipments* PRC-PRO-TP-157, *Offsite Hazardous material Shipments* PRC-PRO-RP-379, *External Dosimetry Program* PRC-PRO-RP-380, *Internal Dosimetry Program* HNF-RD-11440, *Physical Protection of Property and Facilities* PRC-PRO-MS-589, *CH2M Hill Plateau Remediation Project Company Procedures* PRC-PRO-NS-700, *Safety Basis Development* PRC-PRO-CN-14990, *Construction Management* PRC-PRO-NS-8317, *Safety Basis*	PRC-MP-MS-19361, Project Execution Plan GRP-EE-01-1.3, *Work Plan Review and Control* GRP-EE-01-1.6, *Environmental Information Systems – Survey Requirements and Techniques* GRP-EE-01-1.9, *Naming, Numbering, and Tracking of Groundwater Resource Protection Well Geoprobe Geotechnical Soil Boring and River Substrate and Aquifer Porewater Monitoring Tubes* GRP-EE-01-2.0, *Environmental Information Systems – Sample Event Coordination* GRP-EE-01-1.16, *Sample Management and Reporting –Sampling Documentation Preparation and Control*

S&GRP QAP IMPLEMENTATION MATRIX		
CHPRC QAP	PROJECT PROCEDURES	
	CHPRC-Wide Procedures	S&GRP Procedures
	Implementation and Maintenance PRC-PRO-EP-25415, *CERCLA Response Actions* PRC-PRO-SH-409, *Industrial Hygiene Monitoring, Reporting and Records Management* PRC-PRO-OP-40126, *Equipment and Piping Labeling*	GRP-EE-01-2.11, *Sample Management and Reporting – Manual Entry of Sample Analysis Data* GRP-EE-01-2.12, *Sample Management and Reporting Group Operations Plan* GRP-EE-01-2.13, *Sample Management and Reporting-Groundwater Monitoring Sample Event Scheduling and Sample Document Preparation* GRP-EE-01-3.0, *Chain of Custody* GRP-EE-01-3.1, *Sample Packaging and Shipping* GRP-EE-01-3.2, *Field Decontamination of Sampling Equipment* GRP-EE-01-4.0, *Non-VOC Soil and Sediment Sampling* GRP-EE-01-4.1, *Groundwater Sampling* GRP-EE-01-4.2, *Sample Storage and Shipping Facility* GRP-EE-01-4.4, *Container Sampling* GRP-EE-01-4.5, *Sample Compositing* GRP-EE-01-4.6, *VOC Soil and Sediment Sampling* GRP-EE-01-5.1, *Soil-Gas Sampling* GRP-EE-01-5.2, *Test Pit Excavation in Contaminated Areas* GRP-EE-01-5.3, *Test Pit Excavation in Archeological Areas* GRP-EE-01-6.2, *Field Cleaning and/or Decontamination of Geoprobe and Drilling Equipment* GRP-EE-01-6.3, *Well Development and Testing* GRP-EE-01-7.0, *Geologic Logging* GRP-EE-01-7.4, *Requirements for Use of Field Measurement Equipment* GRP-FS-04-G-004, *Operational Monitoring Groundwater Sampling* GRP-FS-04-G-005, *Control of Monitoring Instruments* *GRP-FS-04-FS-012, Sample Packaging and Shipping* *GRP-FS-04-G-013, Laboratory Cleaning of Ssampling Equipment* GRP-FS-04-G-014, *Measurement of Groundwater Levels* GRP-FS-04-G-015, *Bottle Preservation* *GRP-FS-04-G-016, Chain of Custody/Sample Analysis Request* GRP-FS-04-G-017, Project and Sample Identification for Sampling Services GRP-FS-04-G-018, Grundfos Pump Decontamination,

S&GRP QAP IMPLEMENTATION MATRIX		
CHPRC QAP	PROJECT PROCEDURES	
	CHPRC-Wide Procedures	S&GRP Procedures
		GRP-FS-04-020, Sample Storage Units GRP-FS-04-G-022, *Biotic Sampling* GRP-FS-04-G-023, *Container Sampling* GRP-FS-04-G-024, *Collecting PCB Wipe Samples* *GRP-FS-04-G-025, Millipore Water System* *GRP-FS-04-G-028, Field Characterization and Treatment Monitoring Activities Groundwater Sampling* *GRP-FS-04-G-029, Non-VOC Soil and Sediment Sampling* *GRP-FS-04-G-030, VOC Soil and Sediment Sampling* *GRP-FS-04-G-033, Routine and Non-Routine Soil-Gas Sampling* *GRP-FS-04-G-037, Field Decontamination of Sampling Equipment* GRP-FS-04-G-038, pH Screening in Soil and Waste GRP-FS-04-G-025, Millipore Water Sampling GRP-FS-04-G-029, Non-VOC Soil and Sediment Sampling GRP-FS-04-G-030, VOC Soil and Sediment Sampling GRP-FS-04-G-033, Routine and Non-Routine Soil-Gas Sampling GRP-FS-04-G-037, Field Decontamination of Sampling Equipment GRP-FS-04-G-038, pH Screening in Soil and Waste GRP-EE-05-4.0, Analysis of Volatile Organic Compounds RC-4.01, *Drinking in a Contamination Area* RCP 4.5.2, *Performance of Environmental Radiological Measurements* *GRP-PRO-026 Mobile Laboratories and Sample Shipping Facility Chemical Hygiene Plan*
	PRC-RD-TP-7900, *Transportation and Packaging Program Requirements*	GRP-EE-01-1.22, *Data Quality Assessment* GRP-EE-05-X.XX, *Field Screening and Analytical Techniques* GRP-EE-02-14.1, *Drilling, Remediating and Decommissioning Resource Protection Wells, and Geotechnical Soil Borings* GRP-EE-02-14.2, *Geoprobe, Driving and Push Technology Installations.* GRP-EE-02-14.3, *Well Maintenance* GRP-EE-02-14.4, *Installation, Removal, and Repositioning of Pumps In Groundwater Resource Protection Wells*

S&GRP QAP IMPLEMENTATION MATRIX		
CHPRC QAP	PROJECT PROCEDURES	
	CHPRC-Wide Procedures	S&GRP Procedures
		GRP-EE-09-1.4, *Environmental Information Systems – Waste Information Data System: Site Walkdowns* GRP-EE-09-1.5, *Environmental Information Systems – Waste Information Data System: Interviews* GRP-FS-04-X-XXX-XXX, *Unit Specific Groundwater Operations Operating Procedures* GRP-EE-05-4.0: *Analysis of Volatile Organic Compounds in Vapor Samples Using the Brüel and Kjær 1302 and Innova 1312 Multi-gas Analyzers*
Identification and Control of Items	DOE-0336 *Hanford Site Lockout/Tagout* PRC-PRO-PMT-133, *Tagging and Recording Property* HNF-PRO-140, *Utilizing General Supplies and Convenience Storage Inventory Systems* PRC-PRO-QA-297, *Inspection, Test and Operating Status* PRC-PRO-AC-335, *Use and Control of Purchasing Card* PRC-RD-EN-1819, *CHPRC Engineering Requirements* PRC-PRO-QA-5432, *Hold Point Application in Technical Work Documents* PRO-PRO-OP-40126, *Equipment and Pipe Labeling*	GRP-EE-01-3.0, *Chain of Custody* GRP-EE-01-7.4, Requirements for Use of *Field Measurement Equipment* GRP-FS-04-G-016, *Chain of Custody/Sample Analysis Request* GRP-FS-04-G-017, *Project and Sample Identification for Sampling Services* GRP-FS-04-G-027, *Chain of Custody for Field Characterization and Treatment Monitoring Activities*
Handling, Shipping, and Storing	PRC-RD-SH-11198, *Storing, Using and Handling Compressed Gasses* PRC-PRO-EN-129, *Controlling Spare Parts Inventory Requirements* HNF-RD-11408, *Property and Material Management Requirements* HNF-PRO-140, *Utilizing General Supplies and Convenience Storage Inventory* PRC-PRO-TP-156, *Onsite Hazardous Material Shipments* PRC-PRO-TP-157, *Offsite Hazardous Material Shipments* PRC-PRO-EP-15333, *Environmental Protection Processes* HNF-PRO-375, *Management of Central Warehouse Facilities and Stored Material* PRC-RD-SH-10994, *Occupational Carcinogen Control* PRC-PRO-SH-10468, *Chemical Management Process* PRC-RD-EN-1819, *CHPRC Engineering Requirements* PRC-PRO-EN-8323, *Management of HEPA Filter Systems*	GRP-EE-01-3.1, *Sample Packaging and Shipping* GRP-FS-04-G-012, *Operational Monitoring Sample packaging and Shipping* GRP-EE-01-1.11, *Purge Water Management* GRP-OP-0006, *Waste Packaging and Handling at S&GRP* GRP-FS-04-G-020, *Sample Storage Units*

S&GRP QAP IMPLEMENTATION MATRIX		
CHPRC QAP	PROJECT PROCEDURES	
	CHPRC-Wide Procedures	S&GRP Procedures
Process Monitoring or Data Collection Instruments	CHPRC-00073, *CHPRC Radiological Control Manual* PRC-PRO-MN-490, *Calibration Management Program* DOE/RL-96-68 *HASQARD*	GRP-EE-01-7.4, Requirements for Use *of Field Measuring Equipment* GRP-FS-04-G-005, *Control of Monitoring Instruments* GRP-EE-05-X.XX, *Field Screening and Analytical Techniques* RC-2-07, *Portable Environmental Survey Instrument Operation* RC-2-01, *Operation of the SAIC PD-3/PD-3i Electronic Dosimeter System* RC-2-07, *Eberline E-600*
Control of Computer Systems	PRC-PRO-IRM-309, *Computer Software Management*	*HNF-28242, Software Management Plan*
SECTION 6, DESIGN	PRC-RD-SH-11827, *CHPRC Hanford Electrical Safety Program Requirements* PRC-PRO-EN-097, *Engineering Design and Evaluation (Natural Phenomena Hazard)*	GRP-EE-01-1.4, *Descriptions of Work for Well Drilling and Decommissioning* DOE/RL-2003-013, *Hanford Site Well Management Plan*
Design Input	PRC-PRO-IRM-309, *Computer Software Management* PRC-PRO-EN-440, *Engineering Document Change l* PRC-RD-EN-1819, *CHPRC Engineering Requirements* PRC-PRO-CN-14990, *Construction Management* PRC-PRO-EN-2001, *Facility Modification Package Process*	

S&GRP QAP IMPLEMENTATION MATRIX		
CHPRC QAP	PROJECT PROCEDURES	
	CHPRC-Wide Procedures	S&GRP Procedures
	PRC-PRO-NS-8317, *Safety Basis Implementation and Maintenance* PRC-PRO-NS-700, *Safety Basis Development*	
Design Process	PRC-MP-MS-19361, *CH2M Hill Project Execution Plan* PRC-PRO-IRM-309, *Computer Software Management* PRC-PRO-EN-440, *Engineering Document Change l* PRC-RD-EN-1819, *CHPRC Engineering Requirements* PRC-PRO-CN-14990, *Construction Management* PRC-PRO-EN-2001, *Facility Modification Package Process* PRC-PRO-EN-8016, *Design Change Notice Process* PRC-PRO-EP-40205, *CHPRC Environmental Calculation Preparation and Issue*	
Design Verification	PRC-PRO-EN-8336, *Design Verification* PRC-PRO-IRM-309, *Computer Software Management* PRC-PRO-EN-440, *Engineering Document Change* PRC-RD-EN-1819, *CHPRC Engineering Requirements* PRC-PRO-CN-14990, *Construction Management* PRC-PRO-EN-2001, *Facility Modification Package Process* PRC-PRO-EN-8016, *Design Change Notice Process* PRC-PRO-EP-25415, *CERCLA Response Actions*	
Design Changes	PRC-PRO-IRM-309, *Computer Software Management* PRC-PRO-EN-440, *Engineering Document Change* PRC-RD-EN-1819, *CHPRC Engineering Requirements* PRC-PRO-CN-14990, *Construction Management* PRC-PRO-EN-2001, *Facility Modification Package Process* PRC-PRO-EN-8016, *Design Change Notice Process*	
Design Documentation and Records	PRC-PRO-IRM-232, *Project Files Management* PRC-PRO-IRM-309, *Computer Software Management* PRC-PRO-EN-440, *Engineering Document Change* PRC-RD-EN-1819, *CHPRC Engineering Requirements* PRC-PRO-CN-14990, *Construction Management* PRC-PRO-EN-2001, *Facility Modification Package Process* PRC-PRO-EN-8016, *Design Change Notice Process* PRC-PRO-EP-25415, *CERCLA Response Actions* *PRC-PRO-EN-8259, CHPRC Calculation Preparation and Issue (Including OCRWM)* PRC-PRO-EP-40205, *CHPRC Environmental*	

S&GRP QAP IMPLEMENTATION MATRIX		
CHPRC QAP	PROJECT PROCEDURES	
	CHPRC-Wide Procedures	S&GRP Procedures
	Calculation Preparation and Issue	
Computer Software	PRC-PRO-IRM-309, *Controlled Software Management* PRC-RD-EN-1819, *CHPRC Engineering Requirements*	HNF-28242, *Software Management Plan*
SECTION 7, PROCUREMENT Procurement Planning	PRC-PRO-AC-123, *Requesting Materials and Services* PRC-PRO-EN-129, *Controlling Spare Parts Inventory* PRC-PRO-QA-268, *Control of Purchased/Acquired Items and Services* PRC-PRO-AC-335, *Use and Control of Purchasing Card* HNF-PRO-501, *Counterintelligence Compliance for Procurement Request Originators* PRC-RD-EN-1819, *CHPRC Engineering Requirements* PRC-PRO-CN-14990, *Construction Management*	
Content of Procurement Documents	PRC-PRO-AC-123, *Requesting Materials and Services* PRC-PRO-EN-129, *Controlling Spare Parts Inventory* PRC-PRO-AC-186, *Statements of Work* PRC-PRO-QA-268, *Control of Purchased/Acquired Items and Services* PRC-PRO-EN-301, *Control of Suspect/Counterfeit and Defective Items* HNF-PRO-501, *Counterintelligence Compliance for Procurement Request Originators* PRC-RD-EN-1819, *CHPRC Engineering Requirements* PRC-PRO-CN-14990, *Construction Management*	GRP-EE-01-1.4, *Descriptions of Work for Well Drilling and Decommissioning*
Supplier Evaluation and Selection	PRC-PRO-QA-268, *Control of Purchased/Acquired Items and Services* PRC-PRO-AC-335, *Use and Control of Purchasing Card* PRC-PRO-QA-3144, *Supplier Quality Assurance Program Evaluation*	
Control of Supplier Nonconformance	PRC-PRO-QA-268, *Control of Purchased/Acquired Items and Services* PRC-PRO-CN-14990, *Construction Management*	
Acceptance of Items and Services	PRC-PRO-QA-268, *Control of Purchased/Acquired Items and Services* PRC-PRO-QA-283, *Control of Inspections* PRC-PRO-EN-286, *Testing of Equipment and Systems* PRC-PRO-QA-297, *Inspections, Test and Operating Status* PRC-PRO-AC-335, *Use and Control of Purchasing Card*	GRP-EE-02-14.1, *Drilling, Remediating and Decommissioning Resource Protection Wells, and Geotechnical Soil Borings* GRP-EE-02-14.2, *Geoprobe, Driving and Push Technology Installations.*

S&GRP QAP IMPLEMENTATION MATRIX		
CHPRC QAP	**PROJECT PROCEDURES**	
	CHPRC-Wide Procedures	**S&GRP Procedures**
	PRC-RD-EN-1819, *CHPRC Engineering Requirements* PRC-PRO-CN-14990, *Construction Management* PRC-PRO-EN-8323, *Management of HEPA Filter Systems*	
Commercial Grade Items	PRC-PRO-QA-268, *Control of Purchased/Acquired Items and Services* PRC-RD-EN-1819, *CHPRC Engineering Requirements*	
Control of Supplier-Generated Documents	PRC-PRO-AC-123, *Requesting Materials and Services Requisition/Contract Requisition Process* PRC-PRO-IRM-232, *Project Files Management* PRC-PRO-QA-268, *Control of Purchased/Acquired Items and Services* PRC-RD-EN-1819, *CHPRC Engineering Requirements*	
Control of Suspect/Counterfeit Items	PRC-PRO-EM-060, *Reporting Occurrences and Processing Operations Information* PRC-PRO-QA-268, *Control of Purchased/Acquired Items and Services* PRC-PRO-QA-301, *Control of Suspect/Counterfeit and Defective Items*	
SECTION 8, INSPECTION AND ACCEPTANCE TESTING Inspection and Acceptance Testing	PRC-PRO-QA-283, *Control of Inspections* PRC-PRO-EN-286, *Testing of Equipment and Systems* HNF-PRO-1607, *Visual Weld Inspection* PRC-RD-EN-1819, *CHPRC Engineering Requirements* PRC-PRO-CN-14990, *Construction Management* PRC-PRO-QA-5432, *Hold Point Application in Technical Work Documents*	
Inspection and Acceptance Process	HNF-PRO-263, *Qualification and Certification of Inspection and Test Personnel* PRC-PRO-QA-283, *Control of Inspections* PRC-PRO-EN-286, *Testing of Equipment and Systems* HNF-PRO-1607, *Visual Weld Inspections* PRC-RD-EN-1819, *CHPRC Engineering Requirements* PRC-PRO-CN-14990, *Construction Management* PRC-PRO-QA-5432, *Hold Point Application in Technical Work Documents*	
Inspection and Acceptance Testing Results	PRC-PRO-QA-283, *Control of Inspections* PRC-PRO-EN-286, *Testing of Equipment and Systems* HNF-PRO-1607, *Visual Weld Inspections* PRC-RD-EN-1819, *CHPRC Engineering Requirements*	

S&GRP QAP IMPLEMENTATION MATRIX		
CHPRC QAP	PROJECT PROCEDURES	
	CHPRC-Wide Procedures	S&GRP Procedures
	PRC-PRO-QA-5432, *Hold Point Application in Technical Work Documents*	
Inspection and Testing Status	PRC-PRO-QA-283, *Control of Inspections* PRC-PRO-EN-286, *Testing of Equipment and Systems* PRC-PRO-QA-297, *Inspection, Test and Operating Status* HNF-PRO-1607, *Visual Weld Inspections* PRC-RD-EN-1819, *CHPRC Engineering Requirements*	
Calibration of Measuring and Test Equipment	PRC-PRO-MN-490, *Calibration Management Program*	GRP-EE-01-7.4, *Requirements for Use of Field Measurement Equipment* GRP-FS-04-G-005, *Control of Monitoring Instruments*
SECTION 9, MANAGEMENT ASSESSMENT	PRC-PRO-QA-246, *Management Assessment* CHPRC-00073, *CHPRC Radiological Control Manual* PRC-RD-SH-7652, *Safety and Health Inspections*	
Management Assessments		
Corrective Action	PRC-PRO-QA-052, *Issues Management* PRC-PRO-QA-246, *Management Assessment* CHPRC-00073,*CHPRCRadiological Control Manual*	

Attachment C-4 - Safety Classification and Quality Level for S&GRP

1. There are currently no Quality Class 1 or 2 structures, systems or components (SSCs) under the purview of S&GRP. Environmental Analytical Laboratory Services are Quality Class 1. S&GRP does perform work, and procure goods and services that are Enhanced Commercial, as defined in PRC-PRO-QA-259, *Graded Approach*.

2. The following are required to be at least QL3 per PRC-PRO-QA-259:

   a. Items where independent verification is required by a national consensus standard (AWS D1.1, ANSI B31.3, ASME Section VIII.

   b. Items or services with the potential to cause radiological harm.

   c. Items and services that require additional controls beyond commercial practices based upon engineering evaluation.

- Items or services that perform a safety function (defense in depth)
- Items or services that minimize impact to the environment
- Items or services that perform a function to minimize damage to a facility or its critical equipment

3. Additional Items and Services in S&GRP that are Enhanced Commercial include:

   a. Design and construction of critical elements of insitu groundwater barriers.

   b. Testing of instruments used to demonstrate regulatory compliance.

   c. Procurement of services or standards used to calibrate instruments used to collect environmental data.

   d. Self performance or procurement of services for well drilling, well construction, well decommissioning, geotechnical test borings, environmental investigation wells, geophysical logging.

   e. Well maintenance (maintenance where well modification is involved requiring the filing of a resource protection well report).

   f. Procurement of selected materials used in self performed well construction (permanent well screens and casing).

   g. Procurement of services related to analytical laboratory work.

   h. Procurement of services related to groundwater/vadose modeling.

   i. Procurement of services related to acquisition of Geophysical data.

   j. Procurement of items or services that could directly impact data quality (e.g. sample bottles).

   k. Procurement of services to develop CERCLA and RCRA response action documents that include tasks requiring the use of computational and analytical software, including spreadsheets. Such tasks would include, but not be limited to vadose zone and groundwater contaminant fate and transport modeling and the conduct of human health, ecological, and protection of groundwater risk assessments. CERCLA and RCRA response action documents include the administrative and technical plans and reports developed to support the selection and implementation of removal and/or remedial actions.

   l. Procurement of selected items that are susceptible to counterfeiting as described in DOE G 414.1-3 Suspect/Counterfeit Items Guide (e.g., graded fasteners, circuit breakers, ratchet type tie downs and other items as determined by the DA and QA). Purchase orders for such items shall include clauses or statements regarding procurement of potentially suspect or counterfeit items and shall require receipt inspection.

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Appendix D

Deactivation & Decommissioning Quality Assurance Project Plan

D1. Purpose

The purpose of this Quality Assurance Project Plan (QAPjP) is to describe how the Deactivation & Decommissioning (D&D) Project implements the Quality Assurance (QA) requirements defined in this EQAPP and D&D project procedures.

The scope of this appendix is limited to a description of the QA requirements, which are not already addressed in the programmatic section of this EQAPP or other governing QAPPs described below, that apply to the D&D Project's work scope described in D&D 20197, *Deactivation and Decommissioning Project Execution Plan* (D&D PEP) and in specific project execution plans (SPEPs).

The D&D Project uses the resources of the Soil & Groundwater Remediation Project (S&GRP) to conduct a wide range of waste site investigation activities including drilling, test pit excavation, coordination of geophysical data acquisition, sampling, aquifer testing, field screening/analysis, coordination of laboratory services, and data management. The D&D Project acquires the use of S&GRP resources through day to day coordination with S&GRP management. Activities performed by S&GRP are performed in accordance with their procedures (Appendix C of this EQAPP).

The QA requirements addressed in the following QAPPs are also applicable to specific D&D Project activities, but are not repeated in this appendix:

- The QA requirements associated with the National Emission Standards for Hazardous Air Pollutants (NESHAP) are addressed in Appendix I of this EQAPP, *NESHAP Quality Assurance Project Plan for Radioactive Air Emissions*.
- The QA Requirements associated with Near-Facility Environmental monitoring are addressed in HNF-EP-0538-11, *Near-Facility Environmental Monitoring Quality Assurance Project Plan*.
- The QA requirements associated with transportation and packaging activities are addressed in HNF-25689, *Transportation and Packaging Quality Assurance Program Plan*.

D2. Organization, Responsibilities, and Authority

The organizational structure, interfaces, levels of authority, and functional responsibilities for managing, performing, and assessing D&D activities are defined in the CHPRC QAP and in the programmatic Section 1 of this EQAPP.

D3. Quality Assurance Program Requirements

D3.1 Nuclear Facility Quality Assurance Program Requirements

The D&D Project work scope includes the deactivation, surveillance and maintenance, and decommissioning of nonreactor nuclear facilities, which include radioactive waste sites. These facilities consist of hazard category 2 and 3 nuclear facilities, as well as below hazard category 3 nuclear facilities (i.e., radiological facilities) as defined in U.S. Department of Energy (DOE) standard DOE-STD-1027-92, Change Notice 1, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*. The D&D Project activities that affect or may affect the safety of these facilities or that involve, or will involve, radioactive and/or fissionable materials in such form and quantity that a nuclear hazard or a nuclear explosive hazard potentially exists to the workers, the public, or the environment, are subject to the QA requirements established in Title 10, Code of Federal Regulations (CFR), Part 830, Subpart A, *Quality Assurance Requirements* (10 CFR 830).

The D&D Project activities that affect or may affect the safety of nonnuclear facilities, which include industrial facilities, nonradioactive hazardous waste sites, and activities involving only incidental use and generation of radioactive materials or radiation, such as check and calibration sources, use of radioactive sources in research and experimental and analytical laboratory activities, electron microscope, and X-ray machines, are subject to the contractually imposed QA requirements of DOE Order 414.1C, Contractor Requirements Document, *Quality Assurance*. The QAP also describes the CHPRC QA Program that implements the requirements of DOE O 414.1C.

No exceptions are taken to the QA requirements described in the QAP.

D3.2 Environmental Data Quality Assurance Requirements

D&D Project activities include time-critical and non-time-critical *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) response actions, key facility CERCLA response actions, permitted *Resource Conservation and Recovery Act of 1976* (RCRA) treatment, storage, and/or disposal unit closures, waste site remediation, waste designation, and non-CERCLA/RCRA facility demolition. Sample collection, preservation, transportation, and analysis activities performed in support of the CERCLA/RCRA activities are required to comply with the QA requirements in Article XXXI, QUALITY ASSURANCE, of the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) and in Sections 6.5, "Quality Assurance" and 7.8, "Quality Assurance" of the Tri-Party Agreement, Attachment 2, *Action Plan* (Tri-Party Agreement Action Plan). The implementation of these QA requirements ensures that environmental data are of the type, quantity, and quality needed and expected.

Specifically, these QA requirements address the establishment and achievement of DQOs, the establishment and implementation of quality assurance project plans (QAPjPs), and the use of U.S. Environmental Protection Agency (EPA) approved analytical laboratory test methods and QA and Quality Control (QC) plans. These QA requirements are further defined and implemented through DOE/RL 96 68, *Hanford Analytical Services Quality Assurance Requirements Document* (HASQARD), Volumes 1 through 4. The D&D Project implements these QA requirements through the use of project/facility-specific procedures.

Sampling and analysis activities performed in support of any non-CERCLA/RCRA activities are conducted in accordance with the QA requirements for nuclear or nonnuclear facilities, as applicable, which are described above. As such, the establishment of DQOs, SAPs, and QAPjPs is not required.

D3.2.1 Data Quality Objectives

In support of CERCLA/RCRA sampling and analysis activities, DQOs are established in accordance with the EQAPP and EPA QA/G-4, *Guidance for the Data Quality Objectives Process*, and the HASQARD. The DQOs form the basis for ensuring the data derived from sampling and analysis are the right type, quantity, and quality for decision-making. The DQO process is used to develop a scientific and resource-effective approach for sampling and analysis, as well as data quality assessment criteria (i.e., precision, accuracy, representativeness, comparability, and completeness) which are used to assess the degree to which the DQOs are satisfied.

D3.2.2 Sampling and Analysis Plans

When CERCLA/RCRA sampling and analysis activities are required, SAPs are prepared and approved using, as guidance, the provisions of EPA/SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (chapters 1 and 9). The sampling and analysis approach, DQOs, and the data quality assessment criteria are defined in the SAPs.

D3.2.3 Analytical Laboratory Test Methods

Analytical laboratory test methods comply with applicable Ecology and/or EPA test method requirements (e.g., SW-846, ASTM, EPA 600 series, etc.). These test methods are selected and identified in SAPs and are imposed on analytical laboratories through procurement documents.

Two on-site laboratories are used to perform sample analysis for the D&D Project: the Waste Sampling and Characterization Facility (WSCF) and the 222-S Laboratory.

When off-site laboratory analysis is required, it is obtained from approved contract laboratories in accordance with PRC-PRO-QA-268, *Control of Purchased/Acquired Items and Services*.

D3.3 Environmental Technology Quality Assurance Requirements

Environmental technologies include, but are not limited to, facilities, structures, systems, or components that are used to remediate environmental contamination; prevent, control, or remove pollutants; or treat, dispose of, or store hazardous, radioactive, or mixed wastes. For example, an engineered barrier or cap constructed over the top of a waste burial site is a form of environmental technology.

The QA requirements applicable to environmental technologies relate principally to planning, implementing, and assessing their design, construction, and operation. These requirements are established based on the guidance provided in EPA QA/G-11, *Guidance on Quality Assurance for Environmental Technology Design, Construction, and Operation*.

D3.3.1 Construction Quality Assurance Plans

Construction quality assurance (CQA) plans are prepared and implemented in accordance with:

(1) EPA guidance document EPA/530-SW-86-031, *Technical Guidance Document: Construction Quality Assurance for Hazardous Waste Land Disposal Facilities*, for the design, construction, and acceptance of engineered barriers over any land based waste management unit within a source-based operable unit (Regulatory Analysis Memorandum 06-002: *Applicability of Construction Quality Assurance Plan Requirements to Barrier Construction in Tri-Party Agreement Source-Based Operable Units*).

(2) *Hanford Site RCRA Permit* (WA7 89000 8967) for the design, construction, and acceptance of RCRA corrective actions.

These plans are prepared and implemented under the direction of a CQA Officer. The CQA plan identifies those observations, inspections, tests, and measurements performed before, during, and after construction, that are necessary and sufficient to ensure construction meets or exceeds all applicable design criteria and specifications, good engineering practices, and regulatory requirements and agreements. If characterization is performed as part of construction, then the associated environmental data are controlled in accordance with the QA requirements described in Section 4.1.2, above.

D3.3.2 Construction Quality Assurance Officers

The qualification requirements applicable to CQA Officers are defined in CQA plans and include professional engineer registration.

D3.3.3 Certification of Construction

Upon completion of construction, the CQA Officer provides a signed certification that the CQA plan was successfully carried out and that the construction meets or exceeds all applicable requirements.

As there are no Safety Class or Safety Significant items associated with the D&D Project work scope, the graded approach is consistent with that appropriate for General Service items, as defined in PRC-PRO-QA-259.

D3.4 Price-Anderson Amendments Act

The Price-Anderson Amendments Act (PAAA) applies to nuclear facilities. As such, D&D Project compliance with the QA Program is enforceable by DOE in accordance with the rules specified in Title 10, *Code of Federal Regulations*, Part 820, "Procedural Rules for DOE Nuclear Activities" (10 CFR 820). Potential noncompliances with applicable QA Program requirements are identified, reported, tracked, and corrected in accordance with PRC-PRO-NS-2243, *Identification, Reporting, and Tracking of Nuclear Safety and Worker Safety and Health Requirement Noncompliances & PAAA/Worker Safety and health Enforcement Activities*, and PRC-PRO-QA-052, *Issues Management.*

D3.5 Suspect/Counterfeit Items Program

The D&D Project implements the requirements of PRC-PRO-QA-301, *Control of Suspect/Counterfeit and Defective Items,* commensurate with the facility/activity hazards and mission impact.

D3.6 Software Quality Assurance Program

The D&D Project implements the QA requirements of PRC-PRO-IRM-309, *Controlled Software Management.*

D3.7 Nondestructive Assay Management Program

The D&D Project implements the QA requirements associated with Nondestructive Assay in accordance with PRC-RD-EN-10484, *Nondestructive Assay Management Program.*

D3.8 Welding Program

The D&D Project implements the QA requirements associated with welding (including brazing, braze welding, and bonding); weld inspection, testing, and examination; welder and weld procedure qualification; and procurement, control, and use of welding materials in accordance with PRC-RD-WLD-23775, *Administrative Control of Welding.*

D3.9 Conduct of Operations

The D&D Project implements the QA requirements associated with Conduct of Operations in accordance with D&D-28194, *Conduct of Deactivation and Decommissioning Operations.*

D3.10 Specific QA Requirements

D3.10.1 Quality Assurance Program

The CHPRC QA Program, as it applies to D&D Project activities, consists of the QAP, this EQAPP, and the following interfacing documents:

- HNF-25689, *Transportation and Packaging Quality Assurance Program Plan*
- HNF-EP-0538-11, *Near-Facility Environmental Monitoring Quality Assurance Project Plan*
- DOE/RL-96-68, *Hanford Analytical Services Quality Assurance Requirements Document* (HASQARD)

- *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement)
- *Hanford Federal Facility Agreement and Consent Order*, Attachment 2, "Action Plan" (Tri-Party Agreement Action Plan)
- *Hanford Site RCRA Permit* (WA7 89000 8967)
- DQOs, SAPs (including their associated QAPjPs), and CQA plans.

D3.10.2 Personnel Training and Qualification (Refer to Section 3 of this EQAPP)

D3.10.3 Quality Improvement (Refer to Section 10 of this EQAPP)

D3.10.4 Documents and Records (Refer to Section 5 of this EQAPP)

D3.10.5 Work Processes (Refer to Section 8 of this EQAPP)

D3.10.6 Design

Processes used to design new or modified equipment, structures, systems, and components are conducted in accordance with project/facility-specific procedures. The processes include the use of sound engineering and scientific principles and standards; incorporation of applicable requirements and design bases in design work; identification and control of design interfaces; and verification of the adequacy of design outputs and products.

Following successful design verification, designs of environmental technologies are also validated. Validation requirements are documented and may be addressed in CQA plans or other project planning documents. Validation includes, but is not limited to, technical assessments, qualification tests, pre-operational tests, and use of models and mockups.

D3.10.7 Procurement (Refer to Section 4 of this EQAPP)

D3.10.8 Inspection and Acceptance Testing (Refer to Section 8 of this EQAPP, Work Processes)

D3.10.9 Management Assessment (Refer to Section 9.2.1 of this EQAPP)

D3.10.10 Independent Assessment (Refer to Section 9.2.2 of this EQAPP)

Appendix E

Sludge Treatment

Quality Assurance Project Plan

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Sludge Treatment Project

Quality Assurance Project Plan

The Sludge Treatment Project (STP) has committed to comply with the PRC-MP-QA-599, *CHPRC Quality Assurance Program* and this EQAPP, CHPRC-00189.

The STP implements the requirements of the governing documents through the CHPRC implementing procedures, 100K Project procedures, or a combination of both. As a minimum, personnel shall be appropriately trained to the procedures they will be working with prior to the start of the work effort. Management shall determine the method, type, and amount of training required for the specific job. The level of documentation necessary to verify worker training shall be identified in applicable STP Project procedures. No work, subject to the requirements of the governing documents, shall be started prior to the necessary development, review, approval, and issuance of the appropriate work documents or procedures to control the work. Procedures and work documents used to perform work shall be controlled and used at the work location. If work cannot be completed as directed in the existing procedures, the work shall be stopped. Work shall not resume until appropriate procedure modifications, reflecting the correct work practices, are approved and issued.

The STP Quality Assurance Project Plan (QAPjP) are based on achievement of quality as a line responsibility, where each performer is accountable for the quality of the work assigned. Line management is responsible for the effectiveness of quality for the STP.

The purpose of this Appendix is to identify the controls necessary to achieve the STP mission in a safe, consistent, and reliable manner. This appendix is founded on the CHPRC QAP, which is based on 10 CFR 830 Subpart A, Quality Assurance Requirements and DOE O 414.1C, Attachment 2, Contractor Requirements Document (CRD), Quality Assurance.

This Appendix demonstrates that the STP QAPjP and implementing procedures provide equivalent controls in effect to meet the requirements detailed in this EQAPP.

Activities within the scope of HASQARD are those sampling and analytical services, including field and laboratory test protocols, related to Hanford Site cleanup (TPA Activities), which covers both radiological and non-radiological analysis and is based on EPA QA/R-5, ANSI N42.2, EPA SW-846, and EPA's Contract Laboratory Program protocols. Sample collection and analysis shall implement the requirements of HASQARD when those activities support the following:

1. Dangerous or mixed waste permitting, closure, and post-closure activities, including baseline characterization, cleanup operations, clean closure determinations, and long-term site monitoring.
2. Dangerous or mixed waste treatment, storage, and disposal units including waste characterization, and inlet and outlet waste stream analysis.
3. Remedial and corrective action activities.
4. Research and development efforts supporting any of the above.
5. Waste remediation activities.

Occupational Radiation Protection requirements are governed by Title 10, Code of Federal Regulations, Part 835, and implemented in accordance with HNF-SP-1145, *Radiation Protection Program*.

Performance and Use

This Appendix is the programmatic control used to apply the applicable quality assurance requirements for the STP. This Appendix shall be used to comply with the requirements of the CHPRC QAP and for the additional requirements to meet 10 CFR 71, Subpart H and 10 CFR 72, Subpart G.

E1. Organization and Functional Responsibilities (Refer to Section 1 of the EQAPP)

E2. Quality Management Processes (Refer to Section 1 of this EQAPP)

E3. Personnel Training and Qualification (Refer to Section 3 of this EQAPP)

E4. Quality Improvement (Refer to Section 10 of this EQAPP)

E5. Documents and Records (Refer to Section 5 of this EQAPP)

E6. Work Processes (Refer to Section 8 of this EQAPP)

NOTE: All special processes, such as welding, brazing, heat treating, and non-destructive examinations (NDE) are performed in accordance with approved procedures

E7. Design (Refer to Section 8, Work Processes, Section 6, Computer Hardware and Software of this EQAPP)

E8. Procurement (Refer to Section 4 of this EQAPP)

Basic areas affecting procurement include procurement planning, procurement document content, supplier evaluation and selection, supplier performance monitoring, items and services acceptance, commercial grade items (CGI), acceptance methods, and procurement document control (including supplier-generated documents).

NOTE: Critical characteristics of CGIs used in Safety Class or Safety Significant applications shall be identified by the design authority. The design authority shall also identify the CGI acceptance method.

E8.1 Inspection and Acceptance Testing (Refer to Section 8, Work Processes, of this EQAPP)

The STP shall implement the requirements of the CHPRC QAP, Section 8, "Inspection and Acceptance Testing" and, as applicable, the inspection and testing requirements of 10 CFR 71, Subpart H, and 10 CFR 72, Subpart G.

E8.1.1 Inspection

Inspection of items under fabrication, construction, or otherwise in process shall be performed, as necessary, to verify quality. If in process inspection of items is impossible or disadvantageous, indirect control by monitoring of process methods, equipment, and personnel shall be provided. Both inspection and process monitoring shall be provided when control is inadequate without both.

E8.1.2 Calibration

Calibration shall be performed using certified equipment of known relationship to a nationally recognized standard or to a documented calibration basis. Calibration standards should have greater accuracy than the equipment or standards that are being calibrated.

E8.1.3 Method and Frequency of Measuring and Test Equipment

The method and frequency of measuring and test equipment (M&TE) calibration shall be based on the equipment or instrument type, stability characteristics, required accuracy, intended use, or other applicable conditions. The M&TE shall be handled and stored to provide protection and maintain accuracy.

E9. Management Assessment (Refer to Section 9.2.1, Management Assessments, of this EQAPP)

E10. Independent Assessment (Refer to Section 9.2.2, Independent Assessments, of this EQAPP)

E10.1 Scientific Investigation

Scientific investigation requirements are not identified in the CHPRC QAP. The STP shall implement the requirements of HASQARD in sampling, analytical services, and test protocols through implementation of EPA guidance for Data Quality Objectives (DQO), Data Quality Assessments (DQA), and the EQAPP.

The procedures for performance of field sampling, laboratory analysis, and test protocols are defined in HASQARD. DQOs, QAPjPs and DQAs shall define and ensure STP data quality.

STP managers shall ensure that DQOs, and DQAs, when required, are in compliance with EPA guidance and HASQARD.

E11. Software (Refer to Section 6 of this EQAPP

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Appendix F

Waste & Fuels Management
Quality Assurance Project Plan

F1. Scope

This document is the Quality Assurance Project Plan (QAPjP) for the Waste & Fuels Management Project (W&FM) that implements the requirements of PRC-MP-QA-599, *CH2M Hill Plateau Remediation Company Quality Assurance Program* (QAP), *The Environmental Quality Assurance Program Plan*, (EQAPP) CHPRC-00189, and the Hanford Federal Facility Agreement and Consent Order (Tri Party Agreement) Sections 6.5 and 7.8.

As described in PRC-MP-MS-19361, CH2M Hill Plateau Remediation Company (CHPRC), *Project Execution Plan* (PEP), the W&FM is responsible for the treatment, storage, and disposal of liquid and solid wastes generated at the Hanford Site as well as those wastes received from other U.S. Department of Energy (DOE) and non DOE Sites. W&FM operations include:

- Solid Waste Operations Complex (SWOC)
  - Solid Waste Storage and Disposal
    - Hanford Site Low Level Burial Grounds (LLBG)
    - Mixed Waste Disposal Units (trenches 31 and 34)
    - Central Waste Complex (CWC)
    - Waste Retrieval
  - T Plant Complex (T Plant)
  - Waste Receiving and Processing Facility (WRAP).
- Liquid Waste and Fuels Storage Facilities (LWFS)
  - Effluent Treatment Facility (ETF)
  - 310/340 Treated Effluent Disposal Facility (TEDF)
  - Waste Encapsulation Storage Facility (WESF)
  - Canister Storage Building (CSB)
- Waste Services
  - Transportation & Packaging

This QAPjP provides the requirements and implementing controls for the W&FM to manage and operate DOE owned facilities, and support activities, in accordance with the requirements of the EQAPP and :

- Title 10, Code of Federal Regulations, Part 830, Nuclear Safety Management, Subpart A, Quality Assurance Requirements (10 CFR 830) for nuclear facilities. The requirements of 10 CFR 830 is subject to enforcement actions under the rules of the Price Anderson Amendments Act (PAAA).
- DOE O 414.1C, Quality Assurance, for all activities and facilities not within the scope of 10 CFR 830;
- DOE/RL-89-10, Hanford Federal Facility Agreement and Consent Order, which specifies that Agreement sampling and analysis activities be conducted in accordance with the following EPA documents:
  - Guidance for the Data Quality Objectives Process, EPA/600/R-96/05, EPA QA/G-4.
  - EPA Requirements for Quality Assurance Project Plans, EPA/240/B-01/003, EPA QA/R-5.
- DOE/RL-96-98, Hanford Analytical Services Quality Assurance Requirements Document (HASQARD), establishes the requirements for sampling and analytical services for the Hanford Site Tri-Party Agreement activities in support of:

- Dangerous or mixed waste permitting, closure, and post-closure activities including baseline characterization, clean up operations, clean closure determinations, and long-term site monitoring.
- Dangerous or mixed waste treatment, storage, and disposal units including waste characterization and inlet and outlet waste stream analysis.
- Remedial and corrective action activities.
- Research and development efforts supporting any of the above.
- Waste remediation activities.

NOTE: The graded approach may not be used in either the implementation of the Unreviewed Safety Question (USQ) process or in implementing technical safety requirements necessary to ensure the safe operation of a nuclear facility. Also the graded approach process shall not be used to gain relief from the requirements of 10 CFR 830 or DOE O 414.1C which apply to the scope of work performed, rather it shall be used to determine the scope and degree of rigor of the application of those requirements.

In nuclear facilities, the Safety Equipment List (SEL) and safety-basis documents such as Safety Analysis Report (SAR), Interim Safety Basis (ISB), or Safety Analysis Report for Packaging (SARP), identify the structures, systems and components (SSC) important to safety functions in a facility or project. Safety-basis documents have hazard analysis and accident scenarios that identify SSCs whose proper functioning is critical to preventing or mitigating non-routine events. These SSCs are identified on the applicable SELs with their safety designation using the safety classification system found in PRC-PRO-NS-700, Safety Basis Development.

Cognizant design organizations identify critical characteristics in design drawings, specifications, etc. of SSC determined to be necessary to preserving safety support functions. These organizations also apply design criteria to safety SSCs by using recommended codes and standards, as required by PRC-PRO-NS-700. To preserve the integrity of SSC safety functions, Quality Assurance Engineers assist design organizations in applying quality requirements, as necessary, to those SSCs identified on the SEL.

The QA Program requirements of this QAPjP are to be applied to nuclear and non nuclear facilities and related activities using a graded approach in accordance with PRC-PRO-QA-259, Graded Approach. A graded approach permits a range of control over items and activities that is commensurate with the level of risk they present.

The graded approach for nuclear and non nuclear applications gives flexibility in the degree of rigor involved when implementing QA program requirements. This allows them to be applied in the best way feasible to items and activities. Use of the graded approach must involve consideration of the factors listed below when determining the quality assurance requirements and the degree of rigor to be applied in their implementation to an activity or process.

1. Nuclear safety classification of the item or activity, as described above.
2. Level of risk and impact associated with a failure or deficiency.
3. Age, status, and condition of a facility, process, or an item.
4. History of problems with facility processes or items.
5. Adequacy of existing controlling documentation.
6. Complexity of product, service, or activity involved.
7. Control of potential project delays and costs if failures or deficiencies occur.

8. The graded approach for environmental activities that involve generating, acquiring or using environmental data is based on the intended use of the data, the analytical protocol selected, and on parameters of accuracy, precision, comparability, completeness, and representativeness. These are part of the Quality Assurance Objectives defined in a project's implementation plans, procedures, and documents.

Items, services, and processes having no engineered safety function per PRC-PRO-NS-700 are classified as General Service (GS). Typically, W&FM environmental activities would be categorized under this GS safety classification. The graded approach for GS items and activities consist of:

1. Using the administrative processes established in the CHPRC procedures and W&FM- specific procedures (see Attachments) to manage, perform, and assess the work being performed (e.g., document control, work control, records and data management, Issues Management, waste characterization, data review and validation, sample control, etc.).

2. The design authority, on a case-by-case basis, may determine a need to apply additional quality assurance controls, such as inspection, testing, sample custody controls, analytical QC checks, reviews, and approvals, to mitigate the risk associated with an item failure or performing a task. If additional controls are necessary, drawings, specifications, plans or other work instructions will be prepared that identify the characteristics and functions to be verified, inspected, or tested, along with the necessary acceptance criteria to measure conformance.

The W&FM equates project risk to the risk of failures of facility structures, systems and components (SSC) and the consequences their failure has to the health and safety of the public worker and/or impact to the environment. These factors are considered as part of the hazards and accident analysis process and when the safety classification of the SSC is determined. On a case-by-case basis, W&FM management has the option of applying additional controls to any item or service to provide confidence that the SSC will perform satisfactory in service.

Activities shall be controlled through appropriate planning, staffing, procedures, reviews, verification, and deficiency resolution.

Routine administrative and business activities do not normally require control beyond the combination of any applicable DOE Orders or routine management and business practices. Such activities do not require documentation of the application of this QAPjP.

All W&FM personnel and their activities shall comply with the EQAPP and this QAPjP to the extent the graded approach dictates. Additional facility or QAPjPs will be prepared to cover specific activities that are not covered by this QAPjP or the EQAPP.

F2. Organizational Responsibilities and Authority (Refer to Section 1 of the EQAPP)

F2.1 Organizational Structure

The structure, interfaces, functional responsibilities and levels of authority established for the CHPRC organization are defined in the QAP, Part 1, Section 1, and in the CHPRC Project Execution Plan (PRC-MP-MS-19361).

QA personnel report to levels of W&FM management that allow them sufficient organizational freedom and authority to perform their duties and are functionally independent from organizations responsible for performing work and from groups generating environmental data.

F2.2 Responsibilities

The achievement of quality in all activities is the responsibility of all W&FM employees. W&FM roles and responsibilities under the Integrated Environmental, Safety and Health Management System are defined in WMP 100, Section 4.6, "W&FM Integrated Environment, Safety, and Health Management Roles, Responsibilities, and Functions.

F3. Specific Requirements

The ten QA Program criteria discussed later in this subsection parallel the ten criteria in PRC-MP-QA-599, QAP. Documented compliance with the QAP is found collectively in this W&FM QAPjP, applicable CHPRC procedures, and W&FM implementing procedures. Attachments F2 through F9 identify additional implementation references specific to facilities and activities.

W&FM ensures that environmental, safety, health, and quality requirements are integrated into its work activities through the Integrated Environmental, Safety and Health Management System (ISMS) as detailed in PRC-POL-SH-5053, CHPRC Safety, Health, Security, Quality, and Environmental Policy.

Due to the diversity and complexity of activities, emergence of new procedures or cancellations is common. Consequently, the procedures listed in the attachments are for reference and should not be construed to be a complete list. The absence of a procedure from the attachments does not preclude compliance to that procedure.

W&FM imposes applicable QA requirements on sub-tier contractors by:

- Passing QA requirements to organizations through work-agreement documents.
- Passing QA requirements to sub-tier contractors on the Evaluated Supplier List (ESL) through procurement documents, in accordance with this document.
- Requiring sub-tier contractors not on the ESL to develop a QA Program Plan or work to the CHPRC QAP.

F3.1 Management (Refer to Section 1 of the EQAPP)

F3.1.1 Quality Assurance Program

This QAPjP, including its attachments, documents the application of the QAP to W&FM's scope of work and incorporates applicable requirements from codes and standards.

Other approved QAPPs and QAPjPs for W&FM scope of work include:

- CHPRC-00189, CHPRC Environmental Quality Assurance Program Plan (EQAPP)
- This EQAPP, Appendix I, NESHAP Quality Assurance Project Plan for Radioactive Air Emissions
- QAPP OCRWM 001, Quality Assurance Program Plan for Implementation of the OCRWM QARD for Hanford Spent Nuclear Fuel Program

F3.1.1.1 Quality Planning

Management at all levels shall plan, organize, and provide the support necessary to apply the EQAPP and this W&FM QAPjP to their activities and facilities.

F3.1.1.2 Quality Assurance Program Interfaces

Internal interfaces between projects, functional groups, and service providers are defined in CHPRC and W&FM procedures and work agreement documents. Responsibilities and authorities connected with external interfaces are documented in contract and procurement documents.

F3.1.1.3 Environmental Quality Assurance

The W&FM environmental program implements the requirements of all applicable environmental regulations including but not limited to the Resource Conservation and Recovery Act (RCRA), National Emissions Standards for Hazardous Air Pollutants (NESHAP), the National Environmental Policy Act (NEPA), and the following chapters of Washington Administrative Code (WAC):

- WAC 173 216, "State Waste Discharge Permit"
- WAC 173 218, "Underground Injection Control Program"
- WAC 173-303, "Dangerous Waste Regulations"
- WAC 173 400 "General Regulation for Air Pollution Sources"
- WAC 173 401 "Operating Permit Regulation"
- WAC 173 460 "Controls for New Sources of Toxic Air Pollutants"
- WAC 246 247 "Radiation Protection - Air Emissions,"

The requirements contained in EPA QA/R-5 apply to all W&FM environmental activities that deal with the collection, evaluation, and use of data associated with environmental investigation, monitoring, or remedial operations under the Tri Party Agreement.

The design, construction, testing, operation, and closure of any treatment, storage, or disposal facility operating under a permit (e.g., RCRA Part B permit) issued by the State of Washington, Department of Ecology (Ecology) or EPA must meet the EPA QA/R-5 requirements.

The following W&FM facilities operate within interim status (WAC 173 303 400):

- T Plant Complex
- WRAP
- Central Waste Complex
- WESF
- Low Level Burial Grounds
- Canister Storage Building.

EPA QA/R-5 establishes the basic set of requirements by which a system of quality programs involving environmental data collection can be planned, implemented, and assessed. W&FM shall implement environmental quality program elements that address the following:

- Project/Task Organization
- Problem Definition/Background
- Project/Task Description
- Quality Objectives and Criteria
- Special Training/Certification
- Documents and Records
- Sampling Process Design

- Sampling Methods
- Sample Handling and Custody
- Analytical Methods
- Quality Control
- Instrument/Equipment Testing, Inspection, and Maintenance
- Instrument/Equipment Calibration and Frequency
- Inspection/Acceptance of Supplies and Consumables
- Non-direct Measurements
- Data Management
- Assessments and Response Actions
- Reports to Management
- Data Review, Verification, and Validation
- Verification and Validation Methods
- Reconciliation with User Requirements.

Attachment F1 describes the means by which these elements are implemented within the W&FM.

Laboratories that provide analytical support to W&FM environmental activities are required to have documented QA programs that address DOE/RL-96-98.

Examples of data and samples not subject to the environmental requirements in EPA QA/R-5 are those related to system operational information (i.e., process control information), compliance with a nuclear facility safety-basis document (e.g., Safety Analysis Report, Interim Safety Basis), or assessing or monitoring worker exposure to hazardous constituents both non-radioactive and radioactive. Samples taken under the NESHAP air-monitoring program are within the scope of HNF-EP-0528, NESHAP Quality Assurance Project Plan for Radioactive Air Emissions, and hence, lie outside the scope of EPA QA/R-5.

F3.1.1.4 Stop Work Authority

All W&FM employees are accountable to stop activities when conditions jeopardizing safety or quality are recognized. The QA Manager supporting a facility or activity may order a suspension of activities, if conditions affecting quality have not been addressed by cognizant management. Any suspension of subcontractor activities will be issued through the applicable CHPRC Contract Specialist.

All W&FM organizations shall implement systematic approaches for performing their work in a manner that will achieve quality objectives while safely and effectively accomplishing W&FM missions.

The W&FM QA organization supporting a facility or activity defines the QA program and has independent authority to assess the systematic implementation of requirements specified for W&FM activities. It also has direct access to management at a level necessary for effecting appropriate action. QA has sufficient authority, access to work areas, and organizational freedom to:

1. Identify quality problems.
2. Initiate, recommend, or provide solutions to quality problems through designated channels.
3. Verify implementation of solutions and ensure that further processing, delivery, installation, or use of defective materials, equipment, and services are controlled until proper disposition of the nonconformance, deficiency, or unsatisfactory condition has occurred.

Facility/Program Quality Assurance Engineers interface with their QA Manager for assistance and technical advice on QA programmatic matters and implementation issues associated with the W&FM QA Program.

The W&FM organization structure and assignment of responsibility is designed to assure that quality is achieved and maintained by those who perform the work. The achievement of quality is verified by persons not directly responsible for supervising or performing the work.

10 CFR 830.122 (a) Program
DOE O 414.1C, Contractor Requirements Document 2(a)(1) Criterion 1 – Program

F3.2 Personnel Training and Qualification (Refer to Section 3 of the EQAPP)

Employees are trained and qualified in accordance with WMP 200, *Procedures*, Section 5.1, "Training and Qualification Program," to perform assigned tasks in a manner that minimizes risk to the environment, public, coworkers, facilities, and equipment as well as to themselves. Training and qualification requirements for specific positions are based on a management analysis of the duties and tasks associated with those positions. Continuing training is provided to personnel to maintain their job proficiency.

Training records are maintained and updated in accordance with WMP 200, *Procedures*, Section 5.1, "Training and Qualification Program," to ensure personnel receive initial training, retraining, and re testing to maintain the required level of qualification and/or certification.

Personnel performing inspections for quality acceptance shall be trained and certified in accordance with HNF-PRO-263, *Qualification and Certification of Inspection and Test Personnel*. Personnel performing tasks at a satellite accumulation area, 90 day accumulation area, and those performing TSD unit inspections and verification are not considered inspectors within the scope of HNF-PRO-263. Personnel performing nondestructive examinations (NDE) shall be trained and certified in accordance with written procedures based on ASNT-SNT-TC-1 or other standards applicable to the work performed.

The specific standards used shall be identified in implementing documents for qualification and certification. CHPRC Quality Assurance is responsible for training and certifying W&FM inspection personnel. The CHPRC QA Level III Inspection Coordinator, in accordance with HNF-PRO-263, maintains the records of inspector qualifications and certifications.

W&FM personnel performing environmental sampling activities and other functions that impact data quality shall satisfy the training requirements established by their responsible managers prior to performing work. This includes sampling personnel, statisticians, QA staff, supervisors and management personnel.

W&FM personnel assigned positions at either interim or final status TSD units under the Hanford Facility RCRA permit (WA7890008967) or 90 day accumulation areas shall also satisfy the training requirements in the Dangerous Waste Training Plan (DWTP) prepared in accordance with PRC-PRO-TQ-459, *Environmental Training*. Employees occupying positions listed on the DWTP must complete the training identified in the DWTP within 6 months or within 6 months of assignment to a new position within the facility, whichever is later.

10 CFR 830.122, (b) Personnel Training and Qualification
DOE O 414.1C, Contractor Requirements Document 2(a)(2) Criterion 2 - Personnel Training and Qualification
EPA QA/R-5, A8 Special Training/Certification

F3.3 Corrective Action and Quality Improvement (Refer to Section 10 of the EQAPP)

Through designated channels, all members of W&FM organizations have authority to identify problems affecting quality and to initiate, recommend, and provide solutions to them.

F3.3.1 Control of Nonconforming Items

Items, services, and processes not conforming to specified requirements shall be identified, controlled, and corrected as soon as practicable. Controls are to provide the means to identify, document, evaluate, segregate (when practical), and disposition nonconforming items as well as to notify affected organizations. When items cannot be segregated, precautions are to be taken to avoid their inadvertent use or installation. Hold tags, In- Process tags, and Conditional Accept envelopes are used in accordance with PRC-PRO-QA-298, *Nonconforming Items*, to control nonconforming items.

Only Quality Assurance personnel are authorized to place or remove Hold tags, In-Process tags, and Conditional Accept envelopes. The status of nonconforming items shall be tracked to closure. PRC-PRO-QA-298defines the method for controlling, documenting, evaluating, and dispositioning nonconforming items and for processing nonconformance reports (NCR).

Environmental samples are considered to be nonconforming when the quality or integrity of the sample can no longer be assured and the nonconformance reporting process will be used to document the nonconforming condition, unless another problem reporting mechanism is defined in project plans or procedures. Some examples of sample nonconformances are: Chain-of-custody is missing or broken, sampling instructions not followed, sample traceability is lost or sample identification numbers were duplicated.

Any suspect/counterfeit items (S/CI) detected will be controlled in accordance with PRC-PRO-QA-301, *Control of Suspect/Counterfeit and Defective Items* and Attachment F10 of this QAPjP.

F3.3.2 Corrective Action

W&FM shall promptly identify and correct deficiencies in accordance withPRC-PRO-QA-052, *Issues Management*.

F3.3.3 Operational Readiness Issues Management

Issues identified in Operational Readiness Reviews (ORR) and Readiness Assessments (RA) conducted within W&FM will be evaluated for corrective action in accordance with PRC-PRO-OP-055, *Startup Readiness*.

F3.3.4 Quality Improvement (Refer to the EQAPP Program Requirement 10)

F3.3.5 Lessons Learned

When lessons learned are identified, they will be distributed and beneficially used in accordance with PRC-PRO-MS-067, *Lessons Learned*.

F3.3.6 Professional Disagreements

Professional disagreements will be handled in accordance with W&FM management practices, within the chain of command.

F3.3.7 Data Quality Issues

When W&FM identifies environmental data that has failed to comply with the project's Data Quality Objectives or QA Objectives, an investigation is initiated to evaluate the potential impact on the quality of

the data and its intended end use. Commensurate with the significance of the problem, the problem will be documented through the data validation, occurrence reporting, nonconformance reporting processes or other problem reporting mechanism as defined in the project plans or procedures. If the problem is identified as a deficiency, corrective action will be initiated in accordance with PRC-PRO-QA-052, *Issues Management*.

10 CFR 830.122 (c) Quality Improvement
DOE O 414.1C, Contractor Requirements Document 2(a)(3) Criterion 3 - Quality Improvement
EPA QA/R-5, C1 Assessments and Response Actions

F3.4 Documents and Records (Refer to Section 5 of the EQAPP)

F3.4.1 Document Control (Refer to Section 5 of the EQAPP)

Documents that specify quality requirements or prescribe activities affecting quality, including environmental compliance related activities, are prepared, reviewed, approved, issued, and revised in accordance with approved procedures. W&FM Project policies and administrative procedures are developed, reviewed, approved and maintained in accordance with PRC-PRO-MS-589, *CH2M Hill Plateau Remediation Company Procedures*, Controlled W&FM documents that have been superseded or canceled are identified and kept as records for their specified retention period in accordance with their approved Records Inventory and Disposition Schedule (RIDS).

F3.4.2 Records (Refer to Section 5 of the EQAPP)

Documentation associated with the RCRA TSD activities shall comply with the RCRA permit if the facility is under final status; if under interim status comply with the applicable regulations for documentation. Documentation shall be maintained for each TSD unit in the Hanford Facility Record. The Hanford Facility Record will be maintained until 10 years after post-closure or corrective action is complete and certified for that facility, whichever is later. Each TSD unit is responsible for maintaining the documentation associated with TSD Unit-Specific File; the CHPRC Environmental & Regulation organization maintains the General Information File portion and Site- level records.

Note: To be consistent with the Tri Party Agreement requirements for record keeping documents that contain information that is either considered or relied on to arrive at a record of decision or a permit must be added to the Administrative Record File. Some of the documents generated by the TSD units may satisfy this requirement and must also be sent to the Administrative Record File, refer to, PRC-PRO-IRM-211, *Administrative Record File and Public Information Repositories,* for the types of records to be maintained as part of this file.

10 CFR 830.122 (d) Documents and Records
DOE O 414.1C, Contractor Requirements Document 2(a)(4) Criterion 4 - Documents and Records
EPA QA/R-5, A9 Documents and Records

F3.5 Performance (Refer to Section 8 of the EQAPP)

F3.5.1 Work Processes (Refer to Section 8 of the EQAPP)

F3.5.1.1 Control of Measuring and Test Equipment (M&TE) used for process monitoring or data collection equipment.

Tools, gages, instruments, analytical instruments, sampling equipment, and other M&TE used for activities affecting quality are controlled and calibrated and/or adjusted at specified intervals to maintain precision and accuracy within prescribed limits in accordance with PRC-PRO-MN-490, *Calibration Management Program*.

F3.5.1.2 Control of Processes

Management will ensure the policies, procedures, and instructions controlling work performance are prepared, controlled, and implemented. The level of detail within work documents will be commensurate with the complexity and risk associated with the work. Included will be definitions of performance standards and acceptance criteria for work processes. Management will also ensure qualified personnel are assigned to accomplish work, trained in the requirements of the job and retrained when the work process changes. Management will ensure work process documents are readily accessible to the workers and work is completed in accordance with applicable requirements.

Maintenance of W&FM facility equipment is conducted using work documents in accordance withPRC-RD-MN-10859, *Maintenance Management*, PRC-PRO-WKM-12115, *Work Management*, and PRC-PRO-MN-19304, *Periodic Maintenance Process*. The level of detail contained within these instructions and the administrative controls associated with the work are defined by the graded approach. Unless specifically called out in project work documents, W&FM facilities generally do not have facility equipment that might impact environmental data quality. [Calibration and maintenance of radioactive air emissions equipment are subject to the requirements in the NESHAP QA Project Plan HNF-EP-0528 and are not being addressed here.] However, for those W&FM facilities with such equipment, for example sample storage refrigerators, procedures will identify the maintenance and monitoring activities along with the frequencies they will be performed.

Maintenance of transportation packages is conducted using work documents in accordance withPRC-PRO-TP-19358, *Surveillance and Maintenance of Reusable Radioactive Material Packaging*.

Employees will advise their supervisors or managers of work that cannot be performed safely and/or in accordance with work control documents.

F3.5.1.3 Identification and Control of Items

Identification and control of items is established and maintained to ensure that only correct items are used or installed. When used, marking or labeling shall not be detrimental to the item.

To lend credibility to environmental data generated from field sampling activities, it must be demonstrated that the samples have reached the laboratory without alteration and the sample has been in the possession of only authorized personnel allowed to handle or store it. Samples collected for environmental compliance reasons (e.g., waste designation) will follow the chain of custody protocol identified in WMP-200, *Procedures*, Section 3.12, "Chain of Custody for Environmental Media and Waste Samples."

F3.5.1.4 Handling, Shipping, and Storing

The handling, marking, storing, preserving, packaging, and shipping of materials and environmental samples are controlled to minimize deterioration and to prevent damage, loss, or misuse.

Methods used to control packaging, shipping, receiving, storage, handling, cleaning, and preserving items shall be documented in accordance with applicable procedures. Required marking and labeling of items shall be maintained throughout the cycles of packaging, shipping, handling, and storing.

F3.5.1.5 Environmental Data Generation

To assure the generation of reliable data, all aspects of the environmental data collection process must be controlled to allow work to be performed in a uniform and repeatable manner. To achieve this W&FM performs tasks associated with data collection, data reduction, review, validation and reporting in accordance with approved work plans, procedures, or other forms of work instructions.

Analytical data reports generated by laboratories will be prepared in accordance with an approved Statement of Work, Contract, SAP, Letter of Instruction, or other procurement/work agreement documents used to acquire analytical services.

F3.5.1.6 Environmental Data Management

Environmental data will be managed to ensure the integrity and quality of the data is preserved. Data processing activities will be controlled to ensure that the introduction of errors are minimized while environmental data is being collected, transferred, stored, analyzed and reviewed. W&FM data processing work instructions will include some or all of the following controls to avoid errors during data handling and manipulation:

- Perform periodic checks/reviews to assure data is not lost or incorrectly transcribed when transferred from one format to another.
- Minimize the number of data transfer steps and the number of personnel handling the data.
- Institute access control and accountability measures to protect hardcopy and electronic database files.
- Perform periodic reviews of manual calculations to ensure the results obtained are accurate and correct.
- Control software programs used to perform critical data reduction functions in accordance with PRC-PRO-IRM-309, Controlled Software Management.

F3.5.1.7 Environmental Data Validation/Assessment

The W&FM will review environmental data for project usability. This review will ensure that the data satisfies the project's specified Data Quality Objectives (DQOs) or other data quality requirements. Full (CLP type) data validation is generally not required for routine waste characterization activities. The frequency and level of validation/assessment will be described in the project's QA Project Plan or other work documents. As a minimum, the following problem areas must be resolved:

- Deviations from sampling strategy/procedures as identified in the sampling plan,
- Missed holding times,
- Improper or inadequate sample preservation, sample containers, or other sample handling problems,
- Chain of Custody or other sample integrity problems,
- Laboratory QC sample result problems (e.g., QC sample results outside method specific tolerances).

Problems in any of these areas may result in data being rejected or used as qualified data if the problems do not impact the data usage as defined by the DQOs or other QA objectives. The results of this review, along with the resolution of the problems, will be documented in accordance with the project's corrective action or data review/validation/assessment processes.

F3.5.1.8 Quality- Affecting Software (Refer to Section 6 of the EQAPP)

Quality- affecting software used for work processes shall be controlled in accordance with PRC-PRO-IRM-309, *Controlled Software Management.*

10 CFR 830.122 (c) Work Processes
DOE O 414.1C, Contractor Requirements Document 2(b)(1) Criterion 5 - Work Processes
EPA QA/R-5, B6 Instrument/Equipment Testing, Inspection, and Maintenance
EPA QA/R-5, B7 Instrument/Equipment Calibration and Frequency
EPA QA/R-5, B8 Inspection/Acceptance of Supplies and Consumables

EPA QA/R-5, D1 Data Review, Verification, and Validation
EPA QA/R-5, D2 Verification and Validation Methods

F3.5.2 Design (Refer to Section 8, Work Processes, of the EQAPP)

F3.5.2.1 Requirements

Requirements upon which a final design is based include performance requirements, regulatory requirements, national and local codes, standards, environmental conditions, safety significance, and structure/equipment interfaces and shall be verified during the review process.

F3.5.2.2 Verification and Validation

In accordance with the requirements of PRC-RD-EN-1819, *CHPRC Engineering Requirements*, design adequacy is verified and validated by qualified individuals other than those who created the original design. Verification and validation shall be completed before approval and implementation of the design.

Computer software used to originate or verify safety or other risk significant design solutions during the design process shall be validated. The validation shall be identified and documented prior to using the software.

F3.5.2.3 Changes

Design changes are governed by the same control measures applied to the original design. Proposed facility modifications will be controlled in accordance with PRC-PRO-EN-2001, *Facility Modification Package Process.*

Changes to engineering text documents that are not associated with facility modifications or a design activity are controlled in accordance with PRC-PRO-EN-440, *Engineering Document Change.* Construction related changes occurring prior to turnover to the facility operations organization will be controlled in accordance with PRC-PRO-EN-8016, *Design Change Notice Process.* Computer programs that affect design quality shall be controlled to ensure changes are documented and approved by authorized personnel.

F3.5.2.4 Control

Design information sent across organizational interfaces shall be documented and controlled. Interface points shall be identified and controlled, and transmittal efforts coordinated. When W&FM is not performing the design activities, W&FM shall procure the necessary design services, including software development services in accordance with the procurement process. Applicable quality- affecting requirements shall be passed down in procurement documents to the vendor performing design or software development. Further, W&FM shall review and assess vendor design activities for compliance with procurement requirements.

F3.5.2.5 Planning Environmental Data Collection Activities

Prior to planning new characterization activities, acceptable or process knowledge may be used to evaluate whether additional sampling and analysis is required when the regulations do not require analytical data to support the characterization and it is determined to be adequate for that purpose. The DQO process is used by W&FM to plan and design a sampling and analysis program to evaluate the physical and chemical properties of a waste stream. EPA's DQO process described in EPA/600/R-96/055(EPA QA/G-4), *Guidance for the Data Quality Objectives Process*, can be used to satisfy this requirement or alternative methods can be used to establish data quality requirements. The DQOs must be established prior to starting sampling and analysis activities to ensure the proper type, quantity and quality of data is collected to support the data user's needs. The application of the DQO process is designed to be flexible depending

upon the data needs and therefore the level of rigor applied to DQO development is defined by the graded approach. Project and facility procedures, plans or other work instructions will define their DQOs or other QA Objectives along with the methods used to establish those requirements.

After completion of the DQOs or other QA Objectives, a Sample and Analysis Plan (SAP), Waste Analysis Plan (WAP) or equivalent will be developed. As a minimum, the sampling documents will include:

- A sampling design that provides for a sufficient number of samples to support the decisions in the DQOs or other QA Objectives and obtains samples that are representative of the waste being characterized. In addition, the analytical methods selected must measure the parameters of concern at the required level of detection, precision and accuracy established in the DQOs or QA Objectives.
- Identification of the sampling methods and equipment to be used and methods to clean the sampling equipment if they are not single use.
- Criteria for selecting sample sites or identification of sampling locations, amounts and frequencies.
- Types of sample containers to be used along with any preservation, holding times and custody requirements that may be applicable.
- Sample identification methods and any special instructions for handling, subdividing or compositing the samples in the field that may be applicable.
- Identification of field QC samples (e.g., field duplicates, trip blanks, field blanks, etc.) to be taken and their frequencies.
- Instructions for taking any required field measurements or other sampling information, and methods for documenting the data collected.

10 CFR 830.122 (f) Design
DOE O 414.1C, Contractor Requirements Document 2(b)(2) Criterion 6 - Design
EPA QA/R-5, A6 Project/Task Description
EPA QA/R-5, A7 Quality Objectives and Criteria
EPA QA/R-5, B1 Sampling Process Design

F3.5.3 Procurement (Refer to Section 4 of the EQAPP)

The procurement of items and services is controlled to ensure conformance with specified requirements. Such controls provide for the following, as appropriate:

- Quality Assurance Program requirements,
- Design bases,
- Source evaluation and selection,
- Verification of supplier- furnished information,
- Source inspections,
- Control of nonconforming items,
- Audits and surveillances.

Procurement activities are planned and documented to ensure requirements are accurately, completely, and clearly communicated to the supplier using CHPRC procurement process procedures. QA procurement

requirements are specified in PRC-MP-QA-599 and PRC-PRO-QA-268, *Control of Purchased/Acquired Items and Services.*

CHPRC manages the contract and procurement activities, including the CHPRC supplier evaluation program and the Evaluated Suppliers List (ESL). CHPRC performs oversight of the Mission Support Contractor to ensure performance of source and receipt inspections.

Supplier-generated documents required by the procurement contract are identified, controlled, approved, and issued as discussed in Subsection 3.1.4.

Reported deficiencies pertaining to purchased items or services will be reviewed by the appropriate technical and QA organizations. Any necessary remedial or corrective actions will be performed in accordance with Subsection 3.1.3.

Designs requiring commercial-grade items (CGI) for use in safety-class or safety-significant installations or applications may adhere to the following acceptable requirements that are alternatives to others presented in this section:

- Cognizant design organizations shall identify CGI and their critical characteristics.
- Cognizant design organizations shall specify the acceptance method used for CGI and provide assurance that items received will meet specified critical characteristics.
- Procurement documents shall indicate that the material or item is intended to be procured as CGI.

The W&FM procures environmental analytical services from evaluated off-site laboratories operating under a Quality Assurance Program meeting the requirements identified in Subsection 3.1.1 Item 4. The W&FM typically obtains on-site analytical services from the Waste Sampling and Characterization Facility (WSCF) for low activity samples, and the 222-S Laboratory for high activity samples. The laboratory specific QA Program Plans evaluated for use are:

- ATL-MP-1011, Advanced Technologies and Laboratories Quality Assurance Project Plan for 222-S Laboratory, and
- HNF-SD-CP-QAPP-017, Waste Sampling and Characterization Facility Quality Assurance Program Plan

Before delivery of the samples to the analytical laboratory, the unique analytical requirements shall be communicated to the laboratory. These requirements include the following:

- Required analytical method(s) and the parameters to be measured.
- Data quality needs (DQO requirements or as a minimum the precision, accuracy, and detection limits required).
- Types of samples to be analyzed (sample matrix).
- Types of QC samples, frequencies and acceptance criteria.
- Sample handling requirements (e.g., holding, custody and preservation requirements).
- Turnaround time (amount of time from sample receipt to data delivery) in the laboratory.
- Data reporting requirements.

These instructions can be provided to the laboratory through the applicable procurement or work agreement document such as a Statement of Work, Letter of Instruction, Contract, or Sample Analysis Plan. Analytical Services can assist W&FM in providing this information to the laboratories as needed.

The W&FM may procure environmental sampling services from off site suppliers that are approved for use in accordance with the procurement process.

10 CFR 830.122 (g) Procurement
DOE O 414.1C, Contractor Requirements Document 2(b)(3) Criterion 7 – Procurement

F3.5.4 Inspection and Acceptance Testing

F3.5.4.1 Inspections and Testing

Systems, structures, and components that require inspecting or testing are identified by design documents, required codes and standards, and/or safety basis documents (Safety Analysis Reports, Interim Safety Basis, etc.).

Inspections shall be performed in accordance with PRC-PRO-QA-283, Control of Inspections, and HNF-PRO-1607, Visual Weld Inspection.

Inspection planning shall be documented and include hold, witness, and verification points; methods used; acceptance criteria; and a method for recording inspection results.

Test requirements and acceptance criteria shall be identified, documented, and approved by the cognizant design authorities.

Inspections and tests shall be performed by qualified personnel in accordance with approved test procedures and inspection plans to ensure only accepted items are installed, used, or operated. Personnel doing inspections shall verify that M&TE instruments used are properly calibrated and maintained. Those M&TE instruments shall be identified in the record documentation. The status of the inspections and tests shall be identified on the items or in documents traceable to the items in accordance with PRC-PRO-QA-297, *Inspection, Test, and Operating Status*. Final acceptance shall be verified and documented.

The W&FM shall assure these requirements are passed on to subcontractors through the procurement process when appropriate. Subcontractors are responsible for verifying and documenting the final acceptance of their structures, systems, or components.

10 CFR 830.122 (h) Inspection and Acceptance Testing
DOE O 414.1C, Contractor Requirements Document 2(b)(4) Criterion 8 - Inspection and Acceptance Testing

F3.6 Assessment (Refer to Section 9 of the EQAPP)

F3.6.1 Management Assessment (Refer to Section 9.2.1 of the EQAPP)

Management assessments identify strengths and weaknesses affecting the achievement of organizational objectives. This information is useful in devising meaningful action to improve quality. Effective management assessments must also evaluate knowledge of employees, adequacy of communication throughout the organization, and adequacy of resources.

Under the environmental QA program, management assessments may also be referred to as management system assessments or technical system assessments. The focus of management system assessments are to evaluate the effectiveness of the management controls that are established to achieve and assure data quality. While technical system assessments are done to evaluate the effectiveness or the performance of

the technical system and its elements and focus on compliance to documented requirements, specifications and objectives. Technical system assessments consist of a review of field sample and collection activities, specific procedures, and related documentation. System assessments should be conducted prior to or shortly after new systems are operational and should continue on a regularly scheduled basis during the lifetime of the project or continued operation.

The W&FM management assessments will be planned, scheduled, conducted, evaluated, and, where appropriate, trended in accordance with PRC-PRO-QA-246, Management Assessment.

Management will review and analyze assessment results for compliance issues, conditions adverse to quality, opportunities for quality improvement, including lessons learned, and applicability to their areas of functional responsibility.

10 CFR 830.122 (i) Management Assessment
DOE O 414.1C, Contractor Requirements Document 2(c)(1) Criterion 9 - Management
EPA QA/R-4, C1 Assessments and Response Actions

F3.6.2 Independent Assessment (Refer to Section 9.2.2 of the EQAPP)

Independent assessments performed in compliance with 10 CFR 830.122 (i) "Independent Assessment," and DOE O 414.1C, *Contractor Requirements Document*, 2(c)(2), "Criterion 10 - Independent Assessment," are the responsibility of CHPRC in accordance with PRC-MP-QA-599, *Project Hanford Quality Assurance Program Description*, Section 10, "Independent Assessment." When requested, the W&FM will assist the CHPRC independent assessment organization(s) in its activities. Assessment results are documented and reported to management for review and, as appropriate, action.

Groups such as the U.S. Environmental Protection Agency, State of Washington Department of Ecology, Defense Nuclear Facilities Safety Board, DOE Richland Operations Office, and DOE Headquarters may perform Independent Assessments. The follow up activities for these assessments will be the same as for the assessments performed by CHPRC.

<u>Performance Audit/Performance Evaluation</u>

Performance audits or performance evaluation (PE) studies are independent checks to measure the performance of a laboratory's analytical operations. Individual projects or facilities may elect to perform their own performance audit by introducing check samples (blinds or double blind samples) for analysis by the laboratory to provide an independent evaluation of the adequacy of the measurement system. If initiated, project and facility procedures, plans or other work instructions will define how these audits will be scheduled, performed, documented and when corrective action will be taken and verified.

The W&FM may also request contracted laboratories to participate in specific inter-laboratory PE program(s), based on the analysis they are performing. These instructions shall be communicated to the laboratory through a Statement of Work, Contract, copies of the SAPs or some other procurement or work agreement document. Specific PE programs that the WSCF and 222S laboratories participate in are detailed in their laboratory Quality Assurance Program Plans.

10 CFR 830.122 (j) Independent Assessment
DOE O 414.1C, Contractor Requirements Document 2(c)(2) Criterion 10 - Independent Assessment
EPA QA/R-4, C1 Assessments and Response Actions

Attachments

Attachment F1: Basic Requirements QA/R5 Implementation Matrix

Attachment F2: Solid Waste Storage and Disposal

Attachment F3: T Plant Complex

Attachment F4: Waste Receiving and Processing Facility

Attachment F5: Waste Services

Attachment F6: Waste Encapsulation and Storage Facility

Attachment F7: Liquid Processing

Attachment F8: Canister Storage Building/200 Area Interim Storage Area

Attachment F9: W&FM Suspect/Counterfeit Items Plan

Attachment F1

Basic Requirements QA/R-5 Implementation Matrix

Basic Requirements QA/R-5 Implementation Matrix

Environmental Quality Program Elements	Implementing Documents	
	CHPRC-Procedures	W&FM Procedures
A4 Project/Task Organization	PRC-MP-MS-19361, *Fluor Hanford Project Execution Plan* CHPRC-00189, *Environmental Quality Assurance Program Plan*	WMP-100 Section 4.0, Charters
A5 Problem Definition/ Background	PRC-MP-MS-19361, *Fluor Hanford Project Execution Plan*	WMP-100 Section 4.0, Charters
A6 Project/Task Description	PRC-MP-MS-19361, *Fluor Hanford Project Execution Plan*	WMP-100 Section 4.0, Charters
A7 Quality Objectives and Criteria		WMP-200, Section 6.1, Waste Acceptance Program
A8 Special Training/ Certification	PRC-PRO-TQ-459, *Environmental Training* PRC-PRO-TQ-164, *Integrated Training Electronic Matrix* HNF-PRO-263, *Qualification and Certification of Inspection and Test Personnel*	HNF-7499, W&FM Training Implementation Matrix WMP-200, Section 2.5, Control of On-Shift Training
A9 Documents and Records	PRC-PRO-MS-589, *Project Hanford Management System Documents* PRC-PRO-IRM-9679, *Control of Administrative Plans, Reports, Studies, and Description Documents* PRC-PRO-IRM-10588, *Records Management Processes* PRC-RD-EN-1819, *CHPRC Engineering Requirements* PRC-PRO-IRM-8310, *Document Control Program*	
B1 Sampling Process Design (Experimental Design)	PRC-PRO-EP-15333, *Environmental Protection Processes* PRC-PRO-EP-15334, *Effluent and Environmental Monitoring* PRC-PRO-EN-10484, *Nondestructive Assay Management Program* PRC-RD-EP-15332, *Environmental Protection Requirements*	

Basic Requirements QA/R-5 Implementation Matrix

Environmental Quality Program Elements	Implementing Documents	
	CHPRC-Procedures	W&FM Procedures
B2 Sampling Methods	PRC-PRO-EP-15333, *Environmental Protection Processes* PRC-PRO-EP-15334, *Effluent and Environmental Monitoring* PRC-PRO-EN-10484, *Nondestructive Assay Management Program* PRC-RD-EP-15332, *Environmental Protection Requirements*	Specific methods to be used are identified in approved Work Agreement documents, such MOU, LOI, or SOW, between Facility/Project and Contracted Lab.
B3 Sample Handling and Custody	HNF-SD-CP-QAPP-017, *WSCF Quality Assurance Plan*	WMP-200, Section 3.12, Chain of Custody for Environmental Media and Waste Samples
B4 Analytical Methods	HNF-SD-CP-QAPP-017, *WSCF Quality Assurance Plan* PRC-PRO-EN-10484, *Nondestructive Assay Management Program*	Specific methods to be used are identified in approved Work Agreement documents, such as MOU, LOI, or SOW, between Facility/Project and Contracted Lab.
B6 Instrument/Equipment Testing, Inspection, and Maintenance	PRC-PRO-MN-490, *Calibration Management Program* HNF-SD-CP-QAPP-017, *WSCF Quality Assurance Plan*	
B7 Instrument/Equipment Calibration and Frequency	PRC-PRO-MN-490, *Calibration Management Program* HNF-SD-CP-QAPP-017, *WSCF Quality Assurance Plan*	
B8 Inspection/Acceptance of Supplies and Consumables	PRC-PRO-AC-123, *Requesting Materials and Services* PRC-PRO-QA-268, *Control of Purchased / Acquired Items and Services* PRC-PRO-SH-10468, *Chemical Management Process*	
B9 Non-direct Measurements		
B10 Data Management	HNF-SD-CP-QAPP-017, *WSCF Quality Assurance Plan*	

Basic Requirements QA/R-5 Implementation Matrix

Environmental Quality Program Elements	Implementing Documents	
	CHPRC Procedures	W&FM Procedures
C1 Assessments and Response Actions	PRC-PRO-QA-052, *Issues Management* PRC-PRO-QA-246, *Management Assessments* PRC-PRO-QA-9662, *Independent Assessment Process* PRC-PRO-QA-9769, *Surveillance Process* PRC-PRO-EN-10484, *Nondestructive Assay Management Program* HNF-SD-CP-QAPP-017, *WSCF Quality Assurance Plan*	
C2 Reports to Management	PRC-PRO-QA-052, *Issues Management* PRC-PRO-QA-9662, *Independent Assessment Process* PRC-PRO-QA-9769, *Surveillance Process* HNF-SD-CP-QAPP-017, *WSCF Quality Assurance Plan*	
D1 Data Review, Verification, and Validation	HNF-SD-CP-QAPP-017, *WSCF Quality Assurance Plan*	
D2 Verification and Validation Methods	HNF-SD-CP-QAPP-017, *WSCF Quality Assurance Plan*	
D3 Reconciliation with User Requirements	HNF-SD-CP-QAPP-017, *WSCF Quality Assurance Plan*	

Attachment F2

Solid Waste Storage and Disposal Facility/Project- Specific Implementation

1. Facility/Project Name

Solid Waste Storage and Disposal (SWSD)

2. Scope

The SWSD project is chartered to provide waste storage, limited treatment, disposal and retrieval services for the W&FM. The SWSD performs all necessary facility/project operations and is responsible for work assignment, regulatory compliance, safety, training, radiological control, maintenance, quality assurance, process engineering, configuration control, and subcontractor activities within the following buildings and areas:

- Low-Level Burial Grounds (LLBG) - Used to dispose of low level radioactive waste. Hazard Category 2 is assigned to operations in all open TRU trenches, burial ground 4C, or the caissons in 4B. Hazard Category 3 for the rest of the burial grounds.
- Mixed Waste Disposal Units (MWDU) [Trenches 31 and 34] - Resource Conservation and Recovery Act (RCRA) compliant Subtitle C trenches for mixed waste storage and disposal. Currently Trench 34 is receiving mixed waste for disposal and Trench 31 is available for storage of mixed waste. At a future date, Trench 31 will be placed in the disposal mode as waste management needs dictate. These trenches can also be used for disposal of radioactive contaminated Toxic Substance Control Act (TSCA) polychlorinated biphenyl (PCB) waste. The MWDU is assigned a Hazard Category 3 rating.
- Central Waste Complex (CWC) - Stores and treats RCRA mixed waste, radioactively contaminated PCB waste, TRU waste, TRU mixed waste, and low-level waste (LLW). The CWC also includes RCRA-compliant modules for storage of alkali metal products (not waste) and low-flash-point waste. The CWC is assigned a Hazard Category 2 rating, while the German Log Pad in 2420-W is assigned a Hazard Category 3 and Sodium Storage has a less than Hazard Category 3 rating.
- The Waste Retrieval Project is responsible or exhuming, characterizing, processing, and dispositioning containers of Retrievably Stored Waste (RSW) from the 200 Area Low-Level Burial Grounds.

3. Facility/Project Organization

Refer to the W&FM Organizational Charts, and WMP-100, *Policies*, Section 4.6, "W&FM Integrated Environment, Safety, and Health Management Roles, Responsibilities, and Functions" for SWSD responsibilities. In addition, refer to WMP 342, *Solid Waste Storage and Disposal Procedure*, Section 1.1, "Staffing and Organization Plan" for other SWSD responsibilities. Major organizational interfaces between SWSD and other site contractors are no different from other W&FM projects or facilities and is defined by the W&FM and Project Hanford level documents and procedures.

4. Description of the Facility's Safety Documentation

<u>Safety Basis</u>

- HNF-14741, *SWOC Master Documented Safety Analysis*

Technical Safety Requirements

- HNF-15280, *Technical Safety Requirements for the Solid Waste Operations Complex*

Safety Equipment List

- HNF-SD-WM-SEL-012, *LLBG and CWC Safety Equipment List*

Environmental

The CWC and the LLBG are currently under interim status requirements in accordance with WAC 173-303. The CWC has a Part A permit for container treatment and storage and LLBG has a Part A permit for container storage and disposal. The CWC Part A, Revision 4, was approved by the State of Washington, Department of Ecology (Ecology) on February 18, 1997 and the LLBG Part A, Revision 9, was approved by Ecology on March 6, 1997.

5. Facility's Graded Application of the QA Program Description

The SW&FM's graded approach is the same as defined in Section 1.0 of the W&FM QAPjP.

6. SW&FM Implementation Matrix

SW&FM project-specific procedures that implement the CHPRC QAP are listed in Table 1 of this attachment. Table 2 lists the SW&FM project-specific procedures that implement the environmental sampling and analysis QA requirements.

Table 1. Solid Waste Storage and Disposal QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Section 1, Program	
Quality Assurance Program Plans	
Project Hanford QA Requirements Flow-down	
Policy and Planning	
Organization, Responsibilities, and Interfaces	WMP-342, Section 1.1, *Staffing and Organization Plan*
Readiness Review	
Assessments	
Graded Application of Project Hanford QA Program	
Quality Assurance Computer Software	WMP-342 Section 1.8, *Software Configuration Control* WMP-342 Section 1.15, *Software Management Plan*
Section 2, Personnel Training & Qualification	
Fluor Hanford Training and Qualification Program	
Training and Indoctrination	
Qualification and Certification	
Training and Qualification Records	

Table 1. Solid Waste Storage and Disposal QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Section 3, Quality Improvement	
Issues Identification	
Issues Management	
Price-Anderson Amendments Act Reportability	
Nonconformance Control	
Performance Data Analysis	
Feedback and Improvement	
Section 4, Documents and Records	
Documents	
Records	WMP-342, Section 1.2, *Records Program*
Section 5, Work Processes	
Work Process Documents	
Special Processes	
Identification and Control of Items	WMP-342, Section 1.7, *Nuclear Material Control in MBA 291*
Handling, Shipping and Storage	WMP-342, Section 5.1, *Packaging Requirements for SWSD*
Process Monitoring or Data Collection Instruments	
Control of Computer Software	
Nondestructive Assay	
Section 6, Design	
Design Input	
Design Process	
Design Verification	
Computer Software Controls	
Design Change Control	
Design Documentation and Records	
Section 7, Procurement	
Procurement/Acquisition Planning	
Content of Procurement/Acquisition Documents	
Supplier Evaluation and Selection	
Supplier Performance Monitoring	
Acceptance of Items and Services Acceptance Methods	

Table 1. Solid Waste Storage and Disposal QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Commercial Grade Items for Use in Nuclear Safety Applications	
Procurement/Acquisition Document Control, including Supplier-generated Documents	
Suspect/Counterfeit Items	
Software Acquisition	
Section 8, Inspection and Acceptance Testing	
Inspection and Acceptance Testing Planning	
Inspection and Acceptance Testing Process	
Inspection and Acceptance Testing Records	
Inspection and Acceptance Testing Status	
Calibration of Measuring and Test Equipment	
Computer Program Testing	
In-process Inspection	
Section 9, Management Assessment	
Management Assessments	

Table 2. Solid Waste Storage and Disposal QA/R-5 Implementation Matrix

Environmental Quality Program Elements	Implementing Documents
A4 Project/Task Organization	WMP-342, Section 1.1, *Staffing and Organization Plan*
A5 Problem Definition/ Background	
A6 Project/Task Description	
A7 Quality Objectives and Criteria	HNF-1886, *Central Waste Complex Waste Analysis Plan* HNF-5841, *Low-Level Burial Grounds Waste Analysis Plan* HNF-EP-0063, *Hanford Site Solid Waste Acceptance Criteria*
A8 Special Training/ Certification	
A9 Documents and Records	
B1 Sampling Process Design (Experimental Design)	
B2 Sampling Methods	SW-080-003, *Obtain Samples Using Liquid Collection Systems* SW-080-010, *Radioactive Mixed Waste and Disposal Facilities Trench Sampling*

Table 2. Solid Waste Storage and Disposal QA/R-5 Implementation Matrix

Environmental Quality Program Elements	Implementing Documents
B3 Sample Handling and Custody	SW-080-003, *Obtain Samples Using Liquid Collection Systems* SW-080-010, *Radioactive Mixed Waste and Disposal Facilities Trench Sampling*
B4 Analytical Methods	SW-080-003, *Obtain Samples Using Liquid Collection Systems* HNF-1886, *Central Waste Complex Waste Analysis Plan* HNF-5841, *Low-Level Burial Grounds Waste Analysis Plan*
B6 Instrument/Equipment Testing, Inspection, and Maintenance	
B7 Instrument/Equipment Calibration and Frequency	
B8 Inspection/Acceptance of Supplies and Consumables	
B9 Non-direct Measurements	
B10 Data Management	HNF-1886, *Central Waste Complex Waste Analysis Plan* HNF-5841, *Low-Level Burial Grounds Waste Analysis Plan*
C1 Assessments and Response Actions	
C2 Reports to Management	
D1 Data Review, Verification, and Validation	WMP-342 Section 5.3, *Data Verification & Acceptance of Contractor Supplied Radioassay Results*
D2 Verification and Validation Methods	WMP-342 Section 5.3, *Data Verification & Acceptance of Contractor Supplied Radioassay Results*
D3 Reconciliation with User Requirements	

Attachment F3

T Plant Complex Facility-Specific Implementation

1. Facility/Project Name

T Plant Complex (T Plant)

2. Scope

T Plant provides waste treatment, storage, head gas sampling, and equipment decontamination services. T Plant performs all necessary facility/project operations and is responsible for regulatory compliance, safety, training, radiological control, maintenance, quality assurance, process engineering, configuration control, and subcontractor activities within the following facilities located in the 200 West Area of the Hanford Site.

- 2706-T Building. Used for equipment and vehicle decontamination and the treatment, sampling, verification, repackaging, and storage of radioactive and mixed waste.
- 221-T Building (including canyon, head-end, and rail tunnel). Used for equipment decontamination and the treatment, sampling, verification, repackaging, and storage of radioactive and mixed waste, including North Load-out Pit sludge from K- Basins. The 221-T building has been prepared to store sludge removed from K- Basins.
- Other areas within the T Plant Complex TSD permit boundary are, or can be, used for treatment and storage of radioactive waste and mixed waste.

The T Plant Complex is assigned a Hazard Category of 2 (non-reactor nuclear facility). Hazard Category 2 facilities show the potential of significant consequences only in the Site area.

3. Facility/Project Organization

Refer to the W&FM Organizational Charts, and WMP-100, *Policies*, Section 4.6, "W&FM Integrated Environment, Safety, and Health Management Roles, Responsibilities, and Functions," for T Plant responsibilities. In addition, refer to WMP-340, *T Plant Administration Procedure*, Section 3.5, "Staffing Plan" for other T Plant responsibilities. The T Plant Facility Manager is assigned responsibility for implementing the QA Program and is responsible for the safe and efficient operation of the T Plant Complex. The Facility Manager is responsible for maintaining compliance with various regulatory standards and managing the T Plant Complex in order to complete the restoration mission of the Hanford Site.

While the T Plant Facility Manager retains overall responsibility for achieving and verifying the achievement of quality, authority and responsibility has been delegated to the following functional managers to carry out these responsibilities.

- Environmental Compliance Officer (ECO)/Environmental Scientist - The ECO is responsible for the day-to-day compliance activities of the T Plant Complex. In this role, the ECO will report and prioritize compliance issues to the T Plant Manager and RL as appropriate. The ECO serves as the Point of Contact (POC) for any environmental inspections, audits, tours, technical assistance visits, etc. In addition, the ECO assists to assure the T Plant operates in a manner consistent with applicable environmental regulations.

- Operations Manager - In support of T Plant activities, the Operations Manager provides direct line supervision to T Plant personnel.
- Radiological Control (RC) Manager - The T Plant RC Manager directs the radiological support of the T Plant operations. The RC Manager provides a broad range of RC support and services to T Plant programs and selected services to RL. The manager monitors, analyzes, and reports RC experiences and performances. Improvement actions are implemented as needed to ensure a safe and healthy work place.
- Project Support Manager - The Project Support Manager coordinates and prioritizes the activities of the functional support group personnel assigned to the T Plant facilities. The Project Support group includes: Industrial Safety, Fire Systems Engineer, Training, Budget Analyst, Industrial Hygiene, Issues Management, and technical and administrative procedures process.
- Engineering Manager – The Engineering Manager provides engineering support by maintaining a staff of engineers in the appropriate engineering disciplines for all T Plant components and systems. This position maintains the T Plant technical basis and configuration management.
- Maintenance Manager - The Maintenance Manager directs activities for work control and maintenance of the operating plant and supports the project.

Major organizational interfaces between The T Plant Complex and other Site contractors are no different from other W&FM projects or facilities and is defined by the W&FM and Project Hanford levelCHPRC documents and procedures.

4. Description of the Facility's Safety Documentation

Safety Basis

- HNF-14741, SWOC Master Documented Safety Analysis

Technical Safety Requirements

- HNF-15280, Technical Safety Requirements for the Solid Waste Operations Complex

Safety Equipment List

- HNF-18697, Safety Equipment List, T Plant Complex Safety Significant Structures, Systems, and Components

Environmental

The T Plant Complex is currently under interim status requirements in accordance with WAC 173-303. The T Plant Complex has a Part A permit application for tank treatment and storage, container storage, other treatment, and a containment building that was approved by the State of Washington, Department of Ecology on December 23, 1998.

5. Management Systems not Defined by the W&FM QAPjP

The following activity of T Plant is not subject to the environmental requirements (QA/R-5) listed in the W&FM QAPjP.

Liquid effluents generated by the T Plant Complex are sampled and transferred to TEDF following WMP-340, Section 3.7, *Wastewater System Management and Administration*, and plant operating procedure DO-100-035, *Verify and Sample Waste*. The samples are taken and analyzed in accordance with HNF-SD-

LEF-PLN-002, *200 Area TEDF Effluent Sampling and Analysis Plan*. Quality Assurance requirements for that activity are described in HNF-SD-LEF-QAPP-002, *Liquid Waste Processing Facilities Quality Assurance Project Plan*. The transfer of liquid effluents between T Plant and TEDF is controlled through the work agreement document HNF-SD-W049H-ICD-001, *200 Area Treated Effluent Disposal Facility Interface Control Document*.

6. Facility's Graded Application of the QA Program Description

The T Plant graded approach is the same as defined in Section 1.0 of the W&FM QAPjP.

7. T Plant Implementation Matrix

T Plant Complex specific procedures that implement the CHPRC QAP are listed in Table 1 of this attachment. Table 2 lists the T Plant specific procedures that implement the environmental sampling and analysis QA requirements.

Table 1. T Plant Complex QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Section 1, Program	
Quality Assurance Program Plans	
Project Hanford QA Requirements Flow-down	
Policy and Planning	
Organization, Responsibilities, and Interfaces	WMP-340, Section 3.5, *Staffing Plan* WMP-340, Section 4.15, *T Plant Management Expectations*
Readiness Review	
Assessments	
Graded Application of Project Hanford QA Program	
Quality Assurance Computer Software	
Section 2, Personnel Training & Qualification	
Fluor Hanford Training and Qualification Program	
Training and Indoctrination	WMP-340, Section 4.15, *T Plant Management Expectations*
Qualification and Certification	WMP-340, Section 3.5, *Staffing Plan*
Training and Qualification Records	
Section 3, Quality Improvement	
Issues Identification	WMP-340, Section 4.13, *Management Oversight* WMP-340, Section 4.15, *T Plant Management Expectations*
Issues Management	WMP-340, Section 4.13, *Management Oversight*
Price-Anderson Amendments Act Reportability	
Nonconformance Control	

Table 1. T Plant Complex QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Performance Data Analysis	
Feedback and Improvement	WMP-340, Section 4.13, *Management Oversight*
Section 4, Documents and Records	
Documents	WMP-340, Section 3.4, *Operations Procedure Distribution* WMP-340, Section 3.6, *Control of Operations Data Sheets* WMP-340, Section 4.5, *RCRA/TSCA Inspections* WMP-340, Section 4.15, *T Plant Management Expectations*
Records	WMP-340, Section 2.4, *Records Program* WMP-340, Section 2.6, *Key Control* WMP-340, Section 2.8, *MBA 271 Routine/Special Physical Inventory Plan* WMP-340, Section 3.1, *Access Control* WMP-340, Section 3.2, *Health Physics Rounds and Routines* WMP-340, Section 4.13, *Management Oversight*
Section 5, Work Processes	
Work Process Documents	WMP-340, Section 1.6, *Radiological Work Planning Review* WMP-340, Section 2.8, *MBA 271 Routine/Special Physical Inventory Plan* WMP-340, Section 3.4, *Operations Procedure Distribution* WMP-340, Section 4.3, *Toxic and Radioactive Air Emission Compliance* WMP-340, Section 4.15, *T Plant Management Expectations*
Special Processes	
Identification and Control of Items	WMP-340, Section 1.8, *Inventory Control Program*
Handling, Shipping and Storage	
Process Monitoring or Data Collection Instruments	
Control of Computer Software	
Nondestructive Assay	
Section 6, Design	
Design Input	
Design Process	WMP-340, Section 4.15, *T Plant Management Expectations*
Design Verification	

Table 1. T Plant Complex QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Computer Software Controls	
Design Change Control	
Design Documentation and Records	
Section 7, Procurement	
Procurement/Acquisition Planning	
Content of Procurement/Acquisition Documents	
Supplier Evaluation and Selection	
Supplier Performance Monitoring	
Acceptance of Items and Services Acceptance Methods	
Commercial Grade Items for Use in Nuclear Safety Applications	
Procurement/Acquisition Document Control, including Supplier-generated Documents	
Suspect/Counterfeit Items	
Software Acquisition	
Section 8, Inspection and Acceptance Testing	
Inspection and Acceptance Testing Planning	
Inspection and Acceptance Testing Process	
Inspection and Acceptance Testing Records	
Inspection and Acceptance Testing Status	
Calibration of Measuring and Test Equipment	
Computer Program Testing	
In-process Inspection	WMP-340, Section 4.5, *RCRA/TSCA Inspections*
Section 9, Management Assessment	
Management Assessments	WMP-340, Section 4.13, *Management Oversight* WMP-340, Section 4.15, *T Plant Management Expectations*

Table 2. T Plant Complex QA/R-5 Implementation Matrix

Environmental Quality Program Elements	Implementing Documents
A4 Project/Task Organization	WMP-340, Section 2.1, *T Plant Waste Management*
A5 Problem Definition/ Background	
A6 Project/Task Description	
A7 Quality Objectives and Criteria	HNF-SD-EN-WAP-005, *Waste Analysis Plan for T Plant Complex* HNF-EP-0063, *Hanford Site Solid Waste Acceptance Criteria* WMP-340, Section 2.1, *T Plant Waste Management*
A8 Special Training/Certification	
A9 Documents and Records	
B1 Sampling Process Design (Experimental Design)	HNF-SD-EN-WAP-005, *Waste Analysis Plan for T Plant Complex*
B2 Sampling Methods	DO-080-001, *Sampling the 221-T Canyon Tanks/Cells* DO-080-007, *Sample 2706-T/211-T Radioactive Liquid and Sludge* DO-080-008, *2706-T Tank Recirculation and Sampling* DO-100-035, *Verify and Sample Waste*
B3 Sample Handling and Custody	
B4 Analytical Methods	HNF-SD-EN-WAP-005, *Waste Analysis Plan for T Plant Complex*
B6 Instrument/Equipment Testing, Inspection, and Maintenance	
B7 Instrument/Equipment Calibration and Frequency	
B8 Inspection/Acceptance of Supplies and Consumables	
B9 Non-direct Measurements	
B10 Data Management	HNF-SD-EN-WAP-005, *Waste Analysis Plan for T Plant Complex* WMP-340, Section 2.1, *T Plant Waste Management*
C1 Assessments and Response Actions	HNF-SD-EN-WAP-005, *Waste Analysis Plan for T Plant Complex*
C2 Reports to Management	
D1 Data Review, Verification, and Validation	
D2 Verification and Validation Methods	
D3 Reconciliation with User Requirements	

Attachment F4

Waste Receiving and Processing Facility
Facility-Specific Implementation

1. Facility/Project Name

Waste Receiving and Processing Facility (WRAP)

2. Scope

The WRAP Facility performs all necessary facility/project operations and is responsible for work assignment, regulatory compliance, safety, training, radiological control, maintenance, quality assurance, process engineering, configuration control, and subcontractor activities within the WRAP.

The WRAP is designed and built to receive, characterize, treat, store, certify, ship contact- handled (CH), TRU, mixed, and low- level waste (LLW) to ultimate disposal. The TRU waste and TRU mixed waste is repackaged when required, certified, and shipped to the Waste Isolation Pilot Plant (WIPP) in Carlsbad, New Mexico, for disposal. The LLW is processed, compacted, and disposed of in the Mixed Waste Trench. Mixed waste not capable of being treated to meet land disposal restrictions (LDR) at WRAP is shipped to an on-site TSD unit to await further treatment.

To accomplish this work WRAP provides:

- Nondestructive examination (NDE) and nondestructive assay (NDA) of CH waste. NDE identifies the physical contents of the waste container to support waste characterization and processing, confirmation, or certification. NDA results are used to determine radioactive content and distribution.
- Gloveboxes designed for opening, sorting, and sampling drummed waste. Sampling is done to characterize retrieved waste and/or to verify the characterization of newly generated containers of TRU, LLW, and mixed waste.
- Limited waste treatment capabilities in the process area gloveboxes include deactivation (neutralization, cementing, absorption, and controlled reaction with water), stabilization (cementing, absorption, and encapsulation), and amalgamation; volume reduction of waste (e.g., super compaction); and sorting and repackaging of waste.
- Limited waste storage capability for TRU, LLW, and mixed waste.

The Master Documented Safety Analysis (MDSA) provides the hazard categorization of WRAP as a Hazard Category 2 non-reactor nuclear facility.

3. Facility/Project Organization

Refer to the W&FM Organizational Charts, and WMP-100, *Policies*, Section 4.6, "W&FM Integrated Environment, Safety, and Health Management Roles, Responsibilities, and Functions," for the WRAP responsibilities. In addition, refer to WMP-350, *Waste Receiving and Processing Facility Procedure*, Section 1.8, "Staffing Plan" for other WRAP responsibilities. The WRAP Facility Manager is assigned responsibility for implementing the QA Program. Major organizational interfaces between the WRAP and other Site contractors are no different from other W&FM projects or facilities and isMajor organizational interfaces between the WRAP and other Site contractors are no different from other W&FM projects or facilities and are defined by the W&FM documents and procedures.

4. Description of the Facility's Safety Basis Documentation

Safety Basis

- HNF-14741, SWOC Master Documented Safety Analysis

Technical Safety Requirements

- HNF-15280, Technical Safety Requirements for the Solid Waste Operations Complex

Safety Equipment List

- HNF-1936, *WRAP Safety Equipment List*

Environmental

The WRAP is currently under interim status requirements in accordance with WAC 173 303. The WRAP has a Part A permit as a waste storage and treatment facility, which was approved by the State of Washington, Department of Ecology (Ecology) on June 28, 1999. The WRAP has also prepared an application for their RCRA Part B permit which was initially submitted for Ecology approval in 1999.

5. Facility's Graded Application of the QA Program

The WRAP graded approach is the same as defined in Section 1.0 of the W&FM QAPjP.

6. WRAP Implementation Matrix

The WRAP project-specific procedures that implement the CHPRC QAP are listed in Table 1 of this attachment. Table 2 lists the WRAP project-specific procedures that implement the environmental sampling and analysis QA requirements.

Table 1. Waste Receiving & Processing Facility QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Section 1, Program	
Quality Assurance Program Plans	
Project Hanford QA Requirements Flow-down	
Policy and Planning	
Organization, Responsibilities, and Interfaces	WMP-350, Section 1.8, *Staffing Plan*
Readiness Review	
Assessments	
Graded Application of Project Hanford QA Program	
Quality Assurance Computer Software	
Section 2, Personnel Training & Qualification	
Fluor Hanford Training and Qualification Program	
Training and Indoctrination	

Table 1. Waste Receiving & Processing Facility QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Qualification and Certification	
Training and Qualification Records	
Section 3, Quality Improvement	
Issues Identification	
Issues Management	
Price-Anderson Amendments Act Reportability	
Nonconformance Control	
Performance Data Analysis	
Feedback and Improvement	WMP-350, Section 5.1, *Environmental Management Program* WMP-350, Section 5.2, *Emissions Systems Monitoring*
Section 4, Documents and Records	
Documents	WMP-350, Section 3.9, *Signature Record Log*
Records	WMP-350, Section 2.3, *Data Management* WMP-350, Section 2.5, *GEA Energy and Efficiency Setup and Baseline Establishment*
Section 5, Work Processes	
Work Process Documents	WMP-350, Section 2.2, *Calculation of Assay Results* WMP-350, Section 3.14, *Glovebox Inventory Measurement Plan* WMP-350, Section 3.18, *WRAP Operating Practices*
Special Processes	WMP-350, Section 1.2, *Fissile and Source Strength Tracking System* WMP-350, Section 3.12, *Nuclear Material Control*
Identification and Control of Items	WMP-350, Section 3.2, *Sample Management Program*
Handling, Shipping and Storage	WMP-350, Section 3.1, *WRAP Shipping Program*
Process Monitoring or Data Collection Instruments	WMP-350, Section 2.1, *Facility Computer System Operation, Backup and Recovery Plan*
Control of Computer Software	WMP-350 Section 4.1, *Software Management Plan*
Nondestructive Assay	WMP-350 Section 2.8, *WRAP NDA Measurement Control Program*
Section 6, Design	
Design Input	
Design Process	
Design Verification	
Computer Software Controls	

Table 1. Waste Receiving & Processing Facility QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Design Change Control	
Design Documentation and Records	
Section 7, Procurement	
Procurement/Acquisition Planning	
Content of Procurement/Acquisition Documents	
Supplier Evaluation and Selection	
Supplier Performance Monitoring	
Acceptance of Items and Services Acceptance Methods	
Commercial Grade Items for Use in Nuclear Safety Applications	
Procurement/Acquisition Document Control, including Supplier-generated Documents	
Suspect/Counterfeit Items	
Software Acquisition	
Section 8, Inspection and Acceptance Testing	
Inspection and Acceptance Testing Planning	
Inspection and Acceptance Testing Process	
Inspection and Acceptance Testing Records	
Inspection and Acceptance Testing Status	
Calibration of Measuring and Test Equipment	
Computer Program Testing	
In-process Inspection	
Section 9, Management Assessment	
Management Assessments	WMP-350, Section 3.17, *Surveillance Program*

Table 2. Waste Receiving & Processing Facility QA/R-5 Implementation Matrix

Environmental Quality Program Elements	Implementing Documents
A4 Project/Task Organization	All RCRA required sampling and analysis activities are coordinated with Waste Services (WS) through a Fluor Hanford Project Interface Description for Waste Management Services provided by the WS Program to the WRAP.
A5 Problem Definition/ Background	
A6 Project/Task Description	
A7 Quality Objectives and Criteria	HNF-2165, *Waste Receiving and Processing Facility Waste Analysis Plan* HNF-EP-0063, *Hanford Site Solid Waste Acceptance Criteria*
A8 Special Training/Certification	
A9 Documents and Records	
B1 Sampling Process Design (Experimental Design)	
B2 Sampling Methods	WMP-350, Section 3.02, *Sample Management Program*
B3 Sample Handling and Custody	WMP-350, Section 3.02, *Sample Management Program*
B4 Analytical Methods	HNF-2165, *Waste Receiving and Processing Facility Waste Analysis Plan*
B6 Instrument/Equipment Testing, Inspection, and Maintenance	
B7 Instrument/Equipment Calibration and Frequency	
B8 Inspection/Acceptance of Supplies and Consumables	
B9 Non-direct Measurements	
B10 Data Management	
C1 Assessments and Response Actions	HNF-2165, *Waste Receiving and Processing Facility Waste Analysis Plan*
C2 Reports to Management	
D1 Data Review, Verification, and Validation	HNF-2165, *Waste Receiving and Processing Facility Waste Analysis Plan*
D2 Verification and Validation Methods	HNF-2165, *Waste Receiving and Processing Facility Waste Analysis Plan*
D3 Reconciliation with User Requirements	

Attachment F5

Waste Services Project-Specific Implementation

1. Facility/Project Name

Waste Services (WS)

2. Scope

Waste Services is responsible for expediting waste from the point of generation to final disposition. This includes wastes generated at the Hanford Site as well as those wastes received from other DOE and non-DOE Sites. To support these waste management activities WS provides a "cross-cutting service" to those waste generators, including other Hanford Site Contractors, such as PNNL, WCH, and CH2M Hill, that use the Hanford TSDs operated by CHPRC or contracted to CHPRC (offsite commercial TSDs) to ensure consistency and compliance with the regulations. WS provides support to these waste generators by coordinating waste life cycle planning, waste accumulation, characterization/designation, packaging and transportation, nondestructive assay (NDA) services management, TSD facility acceptance, treatment activities and waste records/data management and reporting. This includes dangerous, TSCA regulated, low- level, TRU and mixed radioactive wastes. WS maintains the Hanford Site solid waste acceptance criteria document (HNF EP 0063) and serves as the technical authority for waste analysis plans used by the solid waste TSD operations to satisfy permit and Authorization Basis Document requirements. WS also acts as the CHPRC interpretative authority for Transportation and Packaging, and is responsible for implementation and programmatic oversight of the Site Transportation Safety Document.

3. Facility/Project Organization

Refer to the W&FM Organizational Charts, and WMP-100, *Policies*, Section 4.6, "W&FM Integrated Environment, Safety, and Health Management Roles, Responsibilities, and Functions," for WS responsibilities. In addition, refer to WMP-370, *Waste Services Procedure*, Section 1.1, "Waste Services Staffing Plan" for other WS responsibilities.

WS has the following organizational interfaces between the other Hanford Site contractors and Project Hanford organizations:

- Performs waste characterization/designation services for W&FM, WSCF, offsite generators and other Fluor Hanford projects through work agreement documents, contracts, etc. that request such service, which define work scope and areas of responsibilities for these activities.

Note: The waste generators are still responsible for the proper designation of their own waste; however, WS does provide the technical expertise to assist in this task.

- Manages the CHPRC Transportation and Packaging Program, including any associated contracts.
- Obtains analytical services for W&FM, when required, through work agreement documents developed for either the Hanford Site laboratories or off site commercial contracted laboratories.

Major organizational interfaces between WS and Hanford Site contractors are no different from the other W&FM projects or facilities and is defined by the W&FM and Project Hanford level documents and procedures.

4. Description of the Facility's Safety Basis Documentation

WS is not responsible for the operation of any major Hanford Site facility outside of administrative offices. Therefore, there are no facility safety basis documents, Safety Equipment Lists, or Authorization Envelope documents associated with Waste Services.

5. Management Systems not Defined by the W&FM QAPP

The waste acceptance process is unique to WS and implements the requirements out of the Hanford Facility RCRA permit, Authorization Basis documents, WAC 173-303, *Dangerous Waste Regulations*, and DOE O 435.1, *Radioactive Waste Management*. The process is a performance- based program for accepting solid waste to be disposed of at W&FM operated solid waste TSD units. WMP- 200, *Procedures*, Section 6.1, "Waste Acceptance Program," describes the overall program.

Listed below are the major elements of the process, along with the WS specific procedure that implements that activity:

- Waste Stream Approval - Refer to WMP-370, *Waste Services Procedures*, Section 1.6, "Waste Stream Approval Process"
- Pre-shipment Review - Refer to WMP-370, *Waste Services Procedures*, Section 1.7, "Radioactive Waste Acceptance Review" and Section 1.8, "Treatment, Storage and Disposal Transfer and Documentation Process for Waste Containers."
- Waste Designation - Refer to WMP- 370, *Waste Services Procedures*, Section 2.12, "Waste Stream Designation Process"
- Physical and Chemical Screening Determination - Refer to WMP-370, *Waste Services Procedures*, Section 2.26, "Physical/Chemical Characterization of Solid Waste"
- Verification Process (includes physical and chemical screening of selected containers) - Refer to WMP-370, *Waste Services Procedures*, Section 1.10, "Verification Program"
- Waste Receipt and Acceptance - Refer to WMP-370, *Waste Services Procedures*, Section 1.7, "Radioactive Waste Acceptance Review" and Section 1.8, "Treatment, Storage and Disposal Transfer and Documentation Process for Waste Containers"
- Generator's Performance Evaluation Program - Refer to WMP-370, *Waste Services Procedures*, Section 1.11, "Performance Evaluation System"

6. Facility's Graded Application of the QA Program Description

WS applies controls and systems necessary to ensure the quality required by 10 CFR 830.122 using the graded approach described in Section 1.0 of the W&FM QAPP.

The safety classification system used for the Transportation and Packaging Program is described in HNF-PRO-156, *Onsite Hazardous Material Shipments*. The Transportation Hazard Indicator (THI) is assigned to grade the relative safety significance of each on- site packaging system based on the hazard of the contents of the packaging system.

7. Waste Services Implementation Matrix

WS project-specific procedures that implement the CHPRC QAP are listed in Table 1 of this attachment. Table 2 lists the WS project-specific procedures that implement the environmental sampling and analysis QA requirements.

Table 1. Waste Services QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Section 1, Program	
Quality Assurance Program Plans	
Project Hanford QA Requirements Flow-down	
Policy and Planning	
Organization, Responsibilities, and Interfaces	WMP-370, Section 1.1, *Waste Services Staffing Plan*
Readiness Review	
Assessments	
Graded Application of Project Hanford QA Program	
Quality Assurance Computer Software	
Section 2, Personnel Training & Qualification	
Fluor Hanford Training and Qualification Program	
Training and Indoctrination	
Qualification and Certification	
Training and Qualification Records	
Section 3, Quality Improvement	
Issues Identification	WMP-370, Section 1.10, *Verification Program*
Issues Management	WMP-370, Section 1.11, *Performance Evaluation System*
Price-Anderson Amendments Act Reportability	
Nonconformance Control	
Performance Data Analysis	
Feedback and Improvement	WMP-370, Section 1.12, *Commitment and Action Tracking*
Section 4, Documents and Records	
Documents	WMP-370, Section 1.3, *Maintaining Waste Acceptance Criteria Manual* WMP-370, Section 1.4, *Waste Specification Record Approval Process*
Records	WMP-370, Section 2.23, *Technical Services Records Management*

Table 1. Waste Services QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Section 5, Work Processes	
Work Process Documents	WMP-370, Section 1.6, *Waste Stream Approval Process* WMP-370, Section 1.7, *Radioactive Waste Acceptance Review* WMP-370, Section 1.8, *Treatment, Storage and Disposal Transfer and Documentation Process for Waste Containers* WMP-370, Section 2.26, *Physical/Chemical Characterization of Solid Waste*
Special Processes	
Identification and Control of Items	WMP-370, Section 2.12, *Waste Stream Designation Process*
Handling, Shipping and Storage	WMP-370, Section 1.9, *Offsite Shipment of Hazardous Waste*
Process Monitoring or Data Collection Instruments	
Control of Computer Software	
Nondestructive Assay	
Section 6, Design	
Design Input	
Design Process	
Design Verification	
Computer Software Controls	
Design Change Control	
Design Documentation and Records	
Section 7, Procurement	
Procurement/Acquisition Planning	
Content of Procurement/Acquisition Documents	
Supplier Evaluation and Selection	WMP-370, Section 2.14, *Evaluations of Off-Site Treatment, Storage, Disposal and Recycling Facilities*
Supplier Performance Monitoring	
Acceptance of Items and Services Acceptance Methods	
Commercial Grade Items for Use in Nuclear Safety Applications	
Procurement/Acquisition Document Control, including Supplier-generated Documents	
Suspect/Counterfeit Items	

Table 1. Waste Services QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Software Acquisition	
Section 8, Inspection and Acceptance Testing	
Inspection and Acceptance Testing Planning	
Inspection and Acceptance Testing Process	
Inspection and Acceptance Testing Records	
Inspection and Acceptance Testing Status	
Calibration of Measuring and Test Equipment	
Computer Program Testing	
In-process Inspection	
Section 9, Management Assessment	
Management Assessments	

Table 2. Waste Services QA/R-5 Implementation Matrix

Environmental Quality Program Elements	Implementing Documents
A4 Project/Task Organization	Waste sampling activities are coordinated through CHPRC Project Interface Description Documents between Waste Services and individual projects/facilities.
A5 Problem Definition/ Background	
A6 Project/Task Description	
A7 Quality Objectives and Criteria	HNF-EP-0063, *Hanford Site Solid Waste Acceptance Criteria* WHC-SD-EN-WAP-005, *T Plant Waste Analysis Plan* HNF-2165, *Waste Receiving and Processing Facility Waste Analysis Plan* HNF-1886, *Central Waste Complex Waste Analysis Plan* HNF-5841, *Low-Level Burial Grounds Waste Analysis Plan* WMP-370, Section 2.26, *Physical/Chemical Characterization of Solid Waste*
A8 Special Training/Certification	
A9 Documents and Records	WMP-370, Section 2.23, *Waste Services Records Management*
B1 Sampling Process Design (Experimental Design)	WMP-370, Section 2.26, *Physical/Chemical Characterization of Solid Waste* WMP-370, Section 1.10, *Verification Program*

Table 2. Waste Services QA/R-5 Implementation Matrix

Environmental Quality Program Elements	Implementing Documents
B2 Sampling Methods	WMP-370, Section 2.26, *Physical/Chemical Characterization of Solid Waste* WMP-370, Section 1.10, *Verification Program*
B3 Sample Handling and Custody	WMP-370, Section 2.26, *Physical/Chemical Characterization of Solid Waste*
B4 Analytical Methods	HNF-EP-0063, *Hanford Site Solid Waste Acceptance Criteria* WHC-SD-EN-WAP-005, *T Plant Waste Analysis Plan* HNF-2165, *Waste Receiving and Processing Facility Waste Analysis Plan* HNF-5841, *Low-Level Burial Grounds Waste Analysis Plan* HNF-1886, *Central Waste Complex Waste Analysis Plan* WMP-370, Section 1.10, *Verification Program* WMP-370, Section 2.26, *Physical/Chemical Characterization of Solid Waste*
B6 Instrument/Equipment Testing, Inspection, and Maintenance	
B7 Instrument/Equipment Calibration and Frequency	
B8 Inspection/Acceptance of Supplies and Consumables	
B9 Non-direct Measurements	WMP-370, Section 1.15, *Review and Update of Isotope Data for Retrieval of Transuranic Waste* WMP-370 Section 1.18, *Information and Documentation Retrieval* WMP-370 Section 2.12, *Waste Stream Designation Process*
B10 Data Management	WMP-370, Section 2.26, *Physical/Chemical Characterization of Solid Waste*
C1 Assessments and Response Actions	WMP-370, Section 1.11, *Performance Evaluation System*
C2 Reports to Management	WMP-370, Section 1.11, *Performance Evaluation System*
D1 Data Review, Verification, and Validation	WMP-370, Section 1.10, *Verification Program* WMP-370, Section 2.26, *Physical/Chemical Characterization of Solid Waste*
D2 Verification and Validation Methods	
D3 Reconciliation with User Requirements	

Attachment F6

Waste Encapsulation and Storage Facility Facility-Specific Implementation

1. Facility/Project Name

Waste Encapsulation and Storage Facility (WESF)

2. Scope

The WESF is a Hazard Category 2 Non-Reactor Nuclear Facility. The WESF is chartered to provide safe, compliant, and cost- effective stewardship of Hanford's cesium and strontium capsule inventory and the WESF facility. The WESF performs all necessary facility/project operations and is responsible for work assignment, regulatory compliance, safety, radiological control, maintenance, quality assurance, process engineering, configuration control, training, and subcontractor activities within the WESF. The WESF maintains the current inventory of 1312 Cs, 601 Sr capsules and 23 Type W Overpacks, all stored in underwater pools. In the event of potential capsule problems (e.g. leaks and swellings), the WESF has the capability of removing the capsules from the pool cell storage area to a series of remote handled "hot cells" where inspection, testing, and other capsule handling activities can be conducted. While not normally done, the WESF can also load or unload the capsules into transportation casks for transport to or receipt from other facilities. The capsules are expected to be stored at the WESF until capsule disposition is determined (estimated in 2007) and completed (estimated at 2020).

3. Facility/Project Organization

Refer to the W&FM Organizational Charts, and WMP-100, *Policies*, Section 4.6, "W&FM Integrated Environment, Safety, and Health Management Roles, Responsibilities, and Functions," for the WESF responsibilities. The WESF Facility Manager is assigned responsibility for implementing the QA Program. Major organizational interfaces between the WESF and other Site contractors are no different from other W&FM projects or facilities and is Major organizational interfaces between the WESF and other Site contractors are no different from other W&FM projects or facilities and are defined by the W&FM and Project Hanford CHPRC level documents and procedures.

4. Description of the Facility's Safety Basis Documentation

<u>Safety Basis</u>

- HNF-8758, *Waste Encapsulation and Storage Facility Documented Safety Analysis*

<u>Technical Safety Requirements</u>

- HNF-8759, *Waste Encapsulation and Storage Facility Technical Safety Requirements*

<u>Safety Equipment List</u>

- HNF-SD-WM-SEL-008, *WESF Safety Equipment List*

<u>Environmental</u>

The WESF is currently under interim status requirements in accordance with WAC 173- 303. The WESF has a Part A permit as a waste storage facility for the Cs and Sr capsules only. The Part A permit was

approved by the State of Washington, Department of Ecology (Ecology) on August 25, 2000. Although no interim status requirements are identified in WAC 173- 303 for WESF, Ecology has determined the interim status requirements for WESF are:

1. Beta Monitors will be used to check for leaking capsules.
2. Annual inner capsule movement test be performed on normal cesium capsules.
3. An annual inspection of the pool cell area is to be performed.

These activities are done in accordance with WESF procedures EO-040-001, *Pool Cell Surveillance*, 2C18042, *Set-Up Testing and Calibration of WESF Pool Cell Beta Monitor Systems*, 2C18039, *Pool Cell Beta Monitor Loop Functional Test and Calibration Verification for Pool Cells 1, 3, 4, 5, 6, 7 & 12*, and JCS "Tickler" item A 06, inspect/walk down outside of the TSD.

5. Facility's Graded Application of the QA Program Description

The WESF applies the controls and systems necessary to ensure the quality required by 10 CFR 830.122 using the graded approach described in Section 1.0 of the W&FM QAPjP. The WESF uses the Quality Level (QL) designators, as defined in PRC-PRO-QA-259, *Graded Approach*, for procurement activities only.

6. WESF Implementation Matrix

The WESF project- specific procedures that implement the CHPRC QAP are listed in Table 1 of this attachment. Since the WESF does not perform monitoring or waste characterization activities in which the collection and analysis of environmental samples are required to satisfy the RCRA permit, a QA/R-5 Implementation Matrix is not required.

Table 1. WESF QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Section 1, Program	
Quality Assurance Program Plans	
Project Hanford QA Requirements Flowdown	
Policy and Planning	
Organization, Responsibilities, and Interfaces	WMP-331 Section 1.2, *Staffing Plan*
Readiness Review	
Assessments	
Graded Application of Project Hanford QA Program	
Quality Assurance Computer Software	WMP-331 Section 3.24, *WESF – Encapsulation Database System Controls* HNF-6768, *WESF Capsule and Encapsulation Database System (EDS) Configuration Document*
Section 2, Personnel Training & Qualification	
Fluor Hanford Training and Qualification Program	

Table 1. WESF QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Training and Indoctrination	HNF-4263, *WESF Dangerous Waste Training Plan*
Qualification and Certification	
Training and Qualification Records	
Section 3, Quality Improvement	
Issues Identification	
Issues Management	
Price-Anderson Amendments Act Reportability	
Nonconformance Control	
Performance Data Analysis	
Feedback and Improvement	
Section 4, Documents and Records	
Documents	
Records	
Section 5, Work Processes	
Work Process Documents	
Special Processes	
Identification and Control of Items	
Handling, Shipping and Storage	
Process Monitoring or Data Collection Instruments	
Control of Computer Software	
Nondestructive Assay	
Section 6, Design	
Design Input	
Design Process	
Design Verification	
Computer Software Controls	
Design Change Control	
Design Documentation and Records	
Section 7, Procurement	
Procurement/Acquisition Planning	
Content of Procurement/Acquisition Documents	
Supplier Evaluation and Selection	

Table 1. WESF QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Supplier Performance Monitoring	
Acceptance of Items and Services Acceptance Methods	
Commercial Grade Items for Use in Nuclear Safety Applications	
Procurement/Acquisition Document Control, including Supplier-generated Documents	
Suspect/Counterfeit Items	
Software Acquisition	
Section 8, Inspection and Acceptance Testing	
Inspection and Acceptance Testing Planning	
Inspection and Acceptance Testing Process	
Inspection and Acceptance Testing Records	
Inspection and Acceptance Testing Status	
Calibration of Measuring and Test Equipment	
Computer Program Testing	
In-process Inspection	
Section 9, Management Assessment	
Management Assessments	

Attachment F7

Liquid Waste and Fuels Storage Facilities Quality Assurance Project-Plan

7. Facility/Project Name

Liquid Waste and Fuels Storage Facilities (LWFS)

8. Scope

The Liquid Processing scope of the LWFS project screens/evaluates, treats, stores, and disposes of liquid waste while providing safe, cost effective, and environmentally compliant operations. The LWFS performs all necessary facility/project operations and is responsible for work assignment, regulatory compliance, safety, training, radiological control, maintenance, quality assurance, process engineering, configuration control, and subcontractor activities within the following buildings and areas:

- Liquid Effluent Retention Facility (LERF) is a radiological facility for the storage of low activity and low level mixed wastewater.
- Treated Effluent Disposal Facility (TEDF) is an industrial facility for the disposal of non-regulated treated wastewater from facilities in the 200 East and West Areas.
- Effluent Treatment Facility (ETF) is a RCRA-permitted facility treating evaporator process condensate and other waste water. Disposal of treated effluent is at a State-Approved Land Disposal Site under a WAC 173-216 Discharge Permit.
- The 300 Area Retention Transfer System (RTS) collects non-regulated wastewaters from the 300 Area which have the potential to be radioactive. The wastewater is sampled before transfer to the City of Richland sewer system.
- The 340 Facility is comprised of the 340 Building, 340-A Bldg., 340-B Bldg., MO-036 and MO-741. The 340 Facility also includes the 307 Basins and the 3707-F Bldg., which are active components of the 310 TEDF.

The balance of the 340 Complex is currently in a standby mode and is not accepting any radioactive liquid waste generated at the 300 Area.

9. Facility/Project Organization

Refer to the W&FM Organizational Charts, and WMP-100, *Policies*, Section 4.6, "W&FM Integrated Environment, Safety, and Health Management Roles, Responsibilities, and Functions," for LWFS responsibilities.

In addition, refer to WMP 331, Liquid Processing and Capsule Storage Administrative Procedure, Section 1.2, *Staffing Plan*, for other LWFS responsibilities.

10. Description of the Facility's Safety Documentation

Safety Basis

LERF

- WHC-SD-LEF-ASA-002, *Liquid Effluent Retention Facility Auditable Safety Analysis Report*
- HNF-SD-WM-SAD-040, *Liquid Effluent Retention Facility Final Hazard Category Determination*
- HNF-SD-LWPF-SAD-001, *200 Area Effluent Treatment Facility Groundwater Transfer System Final Hazard Category Determination*

ETF

- HNF-SD-ETF-ASA-001, 200 Area ETF Auditable Safety Analysis Report
- WHC-SD-C018H-HC-002, Hazard Categorization Report for the 200 Area Effluent Treatment Facility

310/340 TEDF

- HNF- SD-WM-SAD-025, *Hanford 300 Area TEDF Hazard Classification and Safety Analysis*
- HNF-17720, *340 Waste Handling Facility Hazard Categorization and Safety Analysis*, which lists the facility as a Below Hazard Category 3 Nonreactor Nuclear Facility in Long-Term Surveillance and Maintenance

Safety Basis documentation is not required for Treated Effluent Disposal Facility because it is classified as an industrial facility.

Environmental

The LERF and ETF are final status TSD units permitted for waste storage and treatment under the Hanford Facility (HF) RCRA Permit WA7890008967.

The ETF and TEDF discharge to the soil column and have received the following discharge permits from the State of Washington, Department of Ecology:

- Permit ST4500 - 200 Area Effluent Treatment Facility
- Permit ST4502 - Treatment Effluent Disposal Facility

Water collected in the 300 Area RTS discharges to the Richland sewer system under City of Richland Industrial Wastewater Permit CR-IU010. Sampling for radionuclide analyses is performed to meet the requirements of the State of Washington, Department of Health.

11. Facility's Graded Application of the QA Program Description

The LWFS graded approach is the same as defined in Section 1.0 of the W&FM QAPjP.

12. LWFS Implementation Matrix

LWFS project- specific procedures that implement the CHPRC QAP are listed in Table 1 of this attachment. Table 2 lists the LWFS project- specific procedures that implement the environmental sampling and analysis QA requirements.

Table 1. LWFS – Liquid Processing QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Section 1, Program	
Quality Assurance Program Plans	
Project Hanford QA Requirements Flowdown	
Policy and Planning	
Organization, Responsibilities, and Interfaces	WMP-331, Section 1.2, *Staffing Plan*
Readiness Review	WMP-331, Section 3.10, *ETF/LERF/GTS Plant Restart*
Assessments	
Graded Application of Project Hanford QA Program	
Quality Assurance Computer Software	HNF-SD-LEF-CSCM-001, *Computer Software Configuration Management Plan for 200 East/West Liquid Effluent Facilities*
Section 2, Personnel Training & Qualification	
Fluor Hanford Training and Qualification Program	
Training and Indoctrination	
Qualification and Certification	
Training and Qualification Records	
Section 3, Quality Improvement	
Issues Identification	
Issues Management	
Price-Anderson Amendments Act Reportability	
Nonconformance Control	
Performance Data Analysis	
Feedback and Improvement	
Section 4, Documents and Records	
Documents	WMP-331, Section 6.2, *Waste Generating Plan*
Records	
Section 5, Work Processes	
Work Process Documents	WMP-331, Section 2.1, *Component Status Seals/ Administrative Locks* WMP-331, Section 3.1, *Process Memos*
Special Processes	WMP-331, Section 3.11, *New Waste Stream Acceptance at LERF/ETF*

Table 1. LWFS – Liquid Processing QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Identification and Control of Items	WMP-331, Section 2.4, *Equipment Deficiency Identification and Documentation* WMP-331, Section 3.6, *ETF Radionuclide Inventory Management* WMP-331, Section 3.7, *LERF Fissile Material Inventory* WMP-331, Section 3.9, *NOC Compliance for ETF, Load-In Facility and LERF* WMP-331, Section 6.1, *Issuing and Tracking Solid Waste Containers*
Handling, Shipping and Storage	
Process Monitoring or Data Collection Instruments	
Control of Computer Software	HNF-SD-LEF-CSCM-001, *Computer Software Configuration Management Plan for 200 East/West Liquid Effluent Facilities*
Nondestructive Assay	
Section 6, Design	
Design Input	
Design Process	
Design Verification	
Computer Software Controls	
Design Change Control	
Design Documentation and Records	
Section 7, Procurement	
Procurement/Acquisition Planning	
Content of Procurement/Acquisition Documents	
Supplier Evaluation and Selection	
Supplier Performance Monitoring	
Acceptance of Items and Services Acceptance Methods	
Commercial Grade Items for Use in Nuclear Safety Applications	
Procurement/Acquisition Document Control, including Supplier-generated Documents	
Suspect/Counterfeit Items	
Software Acquisition	
Section 8, Inspection and Acceptance Testing	
Inspection and Acceptance Testing Planning	

Table 1. LWFS – Liquid Processing QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Inspection and Acceptance Testing Process	
Inspection and Acceptance Testing Records	
Inspection and Acceptance Testing Status	
Calibration of Measuring and Test Equipment	
Computer Program Testing	
In-process Inspection	
Section 9, Management Assessment	
Management Assessments	

Table 2. LWFS – Liquid Processing QA/R-5 Implementation Matrix

Environmental Quality Program Elements	Implementing Documents
A4 Project/Task Organization	
A5 Problem Definition/ Background	
A6 Project/Task Description	
A7 Quality Objectives and Criteria	HNF-18677, *LERF, 200 Area ETF, and 200 Area TEDF Sampling and Analysis Plan*
A8 Special Training/Certification	
A9 Documents and Records	
B1 Sampling Process Design (Experimental Design)	HNF-18677, *LERF, 200 Area ETF, and 200 Area TEDF Sampling and Analysis Plan*
B2 Sampling Methods	POP-65J-002, *Sampling* POP-68-002, *200 TEDF Composite and Grab Sampling Procedure*
B3 Sample Handling and Custody	POP-65J-002, *Sampling*
B4 Analytical Methods	HNF-18677, *LERF, 200 Area ETF, and 200 Area TEDF Sampling and Analysis Plan*
B6 Instrument/Equipment Testing, Inspection, and Maintenance	
B7 Instrument/Equipment Calibration and Frequency	
B8 Inspection/Acceptance of Supplies and Consumables	
B9 Non-direct Measurements	
B10 Data Management	

Table 2. LWFS – Liquid Processing QA/R-5 Implementation Matrix

Environmental Quality Program Elements	Implementing Documents
C1 Assessments and Response Actions	
C2 Reports to Management	
D1 Data Review, Verification, and Validation	HNF-20434, *Data Validation Procedure for Radiochemical Analysis* HNF-20433, *Data Validation Procedure for Chemical Analysis*
D2 Verification and Validation Methods	HNF-20434, *Data Validation Procedure for Radiochemical Analysis* HNF-20433, *Data Validation Procedure for Chemical Analysis*
D3 Reconciliation with User Requirements	

Attachment F8

Canister Storage Building/200 Area Interim Storage Area Facility/Project-Specific Implementation

1. Facility/Project Name

Canister Storage Building (CSB)/200 Area Interim Storage Area (ISA)

2. Scope

The Canister Storage Building (CSB)/200 Area Interim Storage Area (ISA) project, collectively referred to as the CSB, performs all necessary facility/project operations and is responsible for work assignment, regulatory compliance, safety, training, radiological control, maintenance, quality assurance, process engineering, and configuration control related to the receipt and storage of spent nuclear fuel (SNF).

3. Facility/Project Organization

The CSB was transferred from the K Basin Closure (KBC) Project to the Waste Stabilization & Disposition (WSD) Project on October 1, 2005. The CSB organizational, programmatic, schedule, technical, and procedural interfaces are listed in KBC-27601, Interface Agreement between the Waste Stabilization and Disposition Project and the K Basins Closure Project for Canister Storage Building Interfaces.

4. Description of the Facility's Safety Documentation

Safety Basis

- HNF-3553 Annex A, *Spent Nuclear Fuel Project Canister Storage Building Final Safety Analysis Report*
- HNF-3553 Annex D, *200 Area Interim Storage Area Final Safety Analysis Report*

Technical Safety Requirements

- HNF-3672, *Canister Storage Building Technical Safety Requirements*
- SNF-5047, *200 Area Interim Storage Area Final Safety Analysis Report*

Safety Equipment List

- SNF-5591, *Spent Nuclear Fuel Project Canister Storage Building Safety Equipment List*

Environmental

The CSB currently operates under a Notice of Construction (AIR 02-713) in compliance with WAC 246-247.

5. Management Systems not Defined by the W&FM QAPjP

CSB operations that have the potential of introducing non-approved materials into a monitored Multi Canister Overpack (MCO) are identified in HNF-SD-SNF-RPT-007, *Application of the Office of Civilian*

Radioactive Waste Management QA Requirements to the Hanford Spent Nuclear Fuel Project. These operations are subject to the requirements of QAPP-OCRWM-001, *Quality Assurance Program Plan for Implementation of the OCRWM QARD for the Hanford Spent Nuclear Fuel Program.*

6. Facility's Graded Application of the QA Program

The CSB's graded approach is the same as defined in Section 1.0 of the W&FM PSQAPD.

7. CSB Implementation Matrix

The CSB facility- specific procedures that implement the CHPRC QAP are listed in Table 1 of this attachment.

Table 1. Canister Storage Building QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Section 1, Program	
Quality Assurance Program Plans	QAPP-OCRWM-001, *Quality Assurance Program Plan for Implementation of the OCRWM QARD for the Hanford Spent Nuclear Fuel Program* (OCRWM Only) CSB-QA-11-012, *Development and Maintenance of the OCRWM/QARD Q-Lists for the CSB Program* (OCRWM)
Project Hanford QA Requirements Flowdown	
Policy and Planning	
Organization, Responsibilities, and Interfaces	100K-MP-001, *100K Project Integrated Environment, Safety and Health Management Roles and Responsibilities*
Readiness Review	
Assessments	
Graded Application of Project Hanford QA Program	
Quality Assurance Computer Software	CSB-CM-6-013, *Software (Non-Process Automation) Configuration Management* CSB-CM-6-017, *Data Management Process for Electronic Data* (OCRWM)
Section 2, Personnel Training & Qualification	
Fluor Hanford Training and Qualification Program	
Training and Indoctrination	
Qualification and Certification	
Training and Qualification Records	
Section 3, Quality Improvement	
Issues Identification	
Issues Management	

Table 1. Canister Storage Building QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Price-Anderson Amendments Act Reportability	
Nonconformance Control	
Performance Data Analysis	
Feedback and Improvement	
Section 4, Documents and Records	
Documents	CSB-MS-1-040, *Management System for an Approved MCO Traveler CP* (OCRWM) CSB-MS-1-042, *Management System for an Approved SSFC Traveler CP*
Records	CSB-MS-1-041, *Management System for MCO Data Package* (OCRWM) MS-1-043, *Management System for SSFC Data Packages* (OCRWM)
Section 5, Work Processes	
Work Process Documents	OP-12-003S, *Prepare Cask/MCO for Shipment to Basin* OP-12-004S, *Receive Cask* OP-12-013S, *Receive and Store Cold MCO Sets* OP-12-014S, *Routine Cask / Cold MCO Operation* OP-15-001S, *Normal MHM Operations* OP-15-002S, *Off Normal MHM Operations* OP-23-002S, *Operate MCO Sample Station* (OCRWM) OP-24-001S, *Perform Routine Operations Surveillance at CSB* OP-29-002S, *200 Area ISA FFTF Fuel Receipt*
Special Processes	OP-23-004S, *MCO to CCA Welding Process* (OCRWM) OP-23-006S, *SSFC to CCA Welding Process* (OCRWM)
Identification and Control of Items	
Handling, Shipping and Storage	CSB-EN-6-014, *Safety Class, Safety Significant Handling, Storage and Shipping*

Table 1. Canister Storage Building QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Process Monitoring or Data Collection Instruments	SP-10-001S, *Stack Monitor Periodic Detector Calibration Check* SP-10-002S, *Stack Monitor Periodic Calibration* SP-10-005S, *Calibration of Exhaust Stack Flow Control Loop F-281A* SP-10-006S, *Inspection and Leak Check of Stack Monitor Sample Line* SP-10-008S, *Functional Check of Stack Monitor System Mass Flow Meters* SP-10-009S, *Functional Check of Stack Monitor Effluent Flow Rate System* SP-15-008S, *Calibration and Interlock Functional Test of MCO Handling Machine* SP-23-001S, *Calibration of Sample Hood Diff Pressure Indicators* SP-23-002S, *Calibration of Sample-Weld Hood Flow Indicators, FI-740 and FI-741* SP-23-003S, *Calibration of Sample Cart Pressure Instrument PIT-721* (OCRWM) SP-23-006S, *Calibration of Sample-Weld Station Pressure Indicators, PDI-734 and PDI-735*
Control of Computer Software	CSB-CM-6-037, *Process Automation Software and Equipment Configuration Management*
Nondestructive Assay	
Section 6, Design	
Design Input	CSB-EN-6-021, *Interface Control Process* (OCRWM)
Design Process	CSB-EN-6-030, *Engineering Process*
Design Verification	
Computer Software Controls	
Design Change Control	
Design Documentation and Records	
Section 7, Procurement	
Procurement/Acquisition Planning	
Content of Procurement/Acquisition Documents	
Supplier Evaluation and Selection	
Supplier Performance Monitoring	
Acceptance of Items and Services Acceptance Methods	
Commercial Grade Items for Use in Nuclear Safety Applications	CSB-EN-6-035, *Dedication of Commercial Grade Items* CSB-EN-6-038, *Certification of Q-Listed Items to OCRWM/QARD* (OCRWM)

Table 1. Canister Storage Building QAP Implementation Matrix

CHPRC QAP	Project/Facility Implementing Procedures
Procurement/Acquisition Document Control, including Supplier-generated Documents	
Suspect/Counterfeit Items	
Software Acquisition	
Section 8, Inspection and Acceptance Testing	
Inspection and Acceptance Testing Planning	
Inspection and Acceptance Testing Process	
Inspection and Acceptance Testing Records	
Inspection and Acceptance Testing Status	
Calibration of Measuring and Test Equipment	
Computer Program Testing	CSB-CM-6-040, *Verification and Validation of SNF Project Software* (OCRWM)
In-process Inspection	
Section 9, Management Assessment	
Management Assessments	

Attachment F9

W&FM Suspect/Counterfeit Items Plan

This Plan is designed to provide an appropriate level of confidence that W&FM facilities will be monitored to protect against the receipt and/or use of suspect/counterfeit items (S/CI). Use of the plan will identify S/CI if, and when they are received or prior to installation and provide for the reporting and disposition of those items.

Applicability

This Plan is applicable to:

Suspect items, defined as an item which visual inspection, testing, or other means indicate that it may not conform to established Government or industry-accepted specifications or national consensus standards; or one whose documentation, appearance performance, material, or other characteristics may have been misrepresented by the supplier or manufacturer.

Counterfeit items, defined as a suspect item that has been copied or substituted without legal right or authority to do so or one whose material, performance, or characteristics are misrepresented by the supplier or manufacturer.

This plan does not apply to items that do not conform to established requirements when the nonconformity results from one or more of the following conditions. Such items are controlled as nonconforming items.

- Defects resulting from inadequate design or production quality control;
- Damage during shipping, handling, or storage;
- Improper installation;
- Deterioration during service;
- Degradation during removal;
- Failure resulting from aging or misapplication; or
- Other controllable causes.

Suspect and counterfeit items encompass a broad range of items, including, but not limited to:

- Threaded fasteners; including assemblies containing fasteners
- Electrical components
- Piping components, including replacement parts and supports
- Preformed metal structures
- Semiconductors
- Elastomers (O-rings and seals) including spares and replacement kits from suppliers other than original equipment manufacturers
- Weld filler material
- Pumps

- Materials; including sheet strip, castings and other forms particularly involving those materials for which require special processing, such as welding or heat treating, to conform to specifications.

Graded Approach

Graded approach is a principal, which dictates that preparation and planning will be commensurate with the degree of complexity and/or inherent risk in the work to be undertaken. The depth of monitoring and the ultimate disposition of suspect parts should be balanced against the degree of risk (cost, schedule impact and liability) if the item failed compared to the cost of surveillance or replacement necessary to prevent recurrence.

Control Requirements

W&FM Quality Assurance personnel shall periodically assess samples of shop stock inventories for S/CI described in DOE G 414.1-3, *Suspect/Counterfeit Items Guide for Use with 10 CFR 830 Subpart A, Quality Assurance Requirements*, and DOE O 414.1C, *Quality Assurance*. Additionally, these assessments shall focus on spares that have the most frequent turnaround and are located in various storage locations.

W&FM Quality Assurance personnel shall perform S/CI inspection of essential spare equipment before plant installation and/or use.

Each Facility/Project shall have a designated S/CI point of contact (POC).

S/CI items shall not be installed during facility modification, upgrades or maintenance activity.

Systems, structures and components that are buried or below grade, or systems, subsystems and components that are not readily visible without disassembly, will not be excavated or disassembled for the sole purpose of looking for S/CI. S/CI examination will be performed when or if items are made accessible for other purposes such as maintenance or modification.

Material Coordinators, Engineering, Maintenance, and Craft personnel shall be aware of S/CI requirements to facilitate the identification of S/CI during performance of their duties

Procurement Requirements

The procurement documents (Master Catalog IDs, Material Requests, and Requisitions) for items or services that could be vulnerable to S/CI issues shall be reviewed by W&FM Quality Assurance personnel to assure that appropriate QA clauses have been included to prevent S/CI from arriving on the Hanford Site.

The QA procurement clauses that focus on S/CI are:

- B70 - Supplier Furnished Items
- B73 - Control of Graded Fasteners
- B76 - Procurement of Potentially Suspect or Counterfeit Items

Training Requirements

Personnel responsible for evaluating the presence of S/CI shall have received appropriate training. Facility/Program managers are responsible to ensure that key facility personnel receive S/CI training. Employees who should be considered for this training are:

- Operations Managers and Supervisors

- Engineers and their supervisors (facility/ project, component, design, maintenance, new construction, or modifications)
- System Engineers
- Quality Assurance Engineers and Inspectors
- Planners and Schedulers
- Project Engineers and Managers
- Procurement Specialists and Material Coordinators
- Facility Maintenance Supervisors
- P-Card holders
- Crafts, such as fitters, welders, mechanics, carpenters, machinists, electricians, and equipment operators
- Construction Managers

Reporting

Discovery of S/CI shall be reported to the applicable W&FM Quality Assurance representative and documented on nonconformance reports in accordance with PRC-PRO-QA-298, *Nonconforming Items*. Additionally, discoveries of S/CI shall be reported as required by PRC-PRO-QA-301, *Control of Suspect/Counterfeit and Defective Items*, and PRC-PRO-EM-060, *Reporting Occurrences and Processing Operations Information*.

Disposition

Suspect/counterfeit items shall be determined to be as acceptable for "use as is" and left in place, or be 'rejected' and replaced, based on an engineering evaluation as part of a nonconformance report (NCR) disposition. Items left in place must be identified or marked for future reference. The method of identification/marking shall be described in the NCR disposition.

Engineering dispositions shall be based on a graded approach to provide reasonable assurance that all S/CI safety issues are addressed and resolved in accordance with significance, complexity, application, and ALARA criteria.

Organizations responsible for facilities or equipment that could potentially contain S/CI shall perform a minimum of one assessment of S/CI Plan implementation annually.

Appendix G

100K Project

Quality Assurance Project Plan

100K Project Introduction

The 100K Project has committed to implement an effective quality assurance (QA) program that is in compliance with the applicable U.S. Department of Energy (DOE) and Federal regulatory requirements. The governing documents of the 100K Project QA Program are 10 CFR 830 Sub Part A, *Quality Assurance Requirements*, and DOE O 414.1C, *Quality Assurance*, as interpreted by PRC-MP-QA-599, *CH2M Hill Plateau Remediation Company (CHPRC) Quality Assurance Program (QAP)* and *Hanford Federal Facility Agreement and Consent Order* Sections 6.5 and 7.8, *Quality Assurance* . The Quality Assurance Project Plans (QAPjP) are contained within the site Sampling Analysis Plans (SAP) and meet the requirements of EPA QA/R-5, EPA *Requirements for Quality Assurance Project Plans*. Additional governing documents include: 10 CFR 72, Subpart G, *Quality Assurance*; and 10 CFR 71, Subpart H, *Quality Assurance*. DOE/RW-0333P, *Office of Civilian Radioactive Waste Management, Quality Assurance Requirements and Description,* (OCRWM QARD) requirements are governed by QAPP-OCRWM-001 and implemented by governing approved documents identified in QA-OCRWM-1, OCRWM *QARD Requirements Matrix Spent Nuclear Fuels Project*.

The 100K Project implements the requirements of the governing documents through the CHPRC implementing procedures, 100K Project procedures, or a combination of both. As a minimum, personnel shall be appropriately trained to the procedures they will be working with prior to the start of the work effort. Management shall determine the method, type, and amount of training required for the specific job. The level of documentation necessary to verify worker training shall be identified in applicable 100K Project procedures. No work subject to the requirements of the governing documents shall be started prior to the necessary development, review, approval, and issuance of the appropriate work documents or procedures to control the work. Procedures and work documents used to perform work under the 100K Project shall be controlled and used at the work location. If work cannot be completed as directed in the existing procedures, the work shall be stopped. Work shall not resume until appropriate procedure modifications, reflecting the correct work practices, are approved and issued.

When implementing procedures are not available or adequate through the CHPRC document control system, the 100K Project shall develop and maintain procedures to comply with the applicable requirements of 10 CFR 71, Subpart H, and 10 CFR 72, Subpart G. All assigned work that is subject to the controls of 10 CFR 71, Subpart H, or 10 CFR 72, Subpart G, shall also comply with 10 CFR 830 Sub Part A or DOE Order 414.1C, as appropriate.

The requirements of 10 CFR 830 Sub Part A and DOE Order O 414.1C shall be adhered to by the 100K Project through the implementation of the CHPRC QAP.

The 100K Project QA Program is based on achievement of quality as a line responsibility, where each performer is accountable for the quality of the work assigned. Line management is responsible for the effectiveness of quality for the 100K Project.

G1. Scope

This Appendix defines QA program requirements that shall be implemented for 100K Project activities and subprojects. Facilities and subprojects currently include K Basins, Canister Storage Building (CSB), Cold Vacuum Drying Facility (CVD), and storage subprojects, along with Operations and Maintenance. The activities that this Quality Assurance Project Plan (QAPjP) appendix affects include the design, procurement, construction, testing, operation, and maintenance of the 100K Project facilities and subprojects. For activities associated with site cleanup (e.g., sampling and analytical services, including field and laboratory tests protocols) the *Hanford Analytical Services Quality Assurance Requirements*

Document (HASQARD), DOE/RL-96-68 shall be applied. The purpose of this QAPjP is to identify the controls necessary to achieve the missions of the 100K Project in a safe, consistent, and reliable manner. This QAPjP is founded on the QAP, which is based on 10 CFR 830 Sub Part A, Quality Assurance Requirements, and DOE Order 414.1C, Quality Assurance. Occupational Radiation Protection requirements are governed by Title 10, Code of Federal Regulations, Part 835 and implemented in accordance with CHPRC-00073, *Radiation Control Manual.*

G2. QAPjP Performance and Use

This QAPjP is the programmatic control used to apply the applicable quality assurance requirements for the 100KProject activities and subprojects. This QAPjP shall be used to comply with the requirements of the CHPRC QAP and for the additional requirements to meet 10 CFR 71, Subpart H, and 10 CFR 72, Subpart G. The QAPjP consists primarily of four main articles and an attachment. Each of these parts shall be used collectively, or in part, to implement the applicable standards required for the work performed.

1) Article 1 of the QAPjP relates to the 100K Project organization structure and responsibilities.

2) Article 2 of the QAPjP identifies quality management processes from the ten basic sections of the QAP (also as identified in 10 CFR 830 Sub Part A and DOE O 414.1C), which are the QA requirements applied to all aspects of the 100K Project.

3) The enforcement applicability of 10 CFR 830 Sub Part A shall be applied to those safety related structures, systems, or components (SSCs) associated with the 100K Project nuclear facilities identified in HNF-SD-GN-TI-502.

4) Article 3 of the QAPjP addresses DOE/RW-0333P requirements

5) Article 4 of the QAPjP identifies the references used for the development of this QAPjP. These references are the governing documents that mandate requirements for the 100K Project and other documents for the preparation of the QAPjP.

C2.1 Article 1 - Organization and Functional Responsibilities (Refer to Section 1 of the EQAPP)

The 100K Project organization structure, interfaces, and responsibilities are identified in the 100K Project Execution Plan (PEP).

C2.2 Article 2 - Quality Management Processes (Refer to Section 1 of the EQAPP)

G2.2.1 Section 1 - Program

QA programmatic requirements are established for the 100K Project to implement the requirements in PRC-MP-QA-599, *CHPRC Quality Assurance Program (QAP).* Additionally, this QAPjP meets the Basic Requirements of American Society of Mechanical Engineers (ASME) NQA-1 2008, *Quality Assurance Requirements for Nuclear Facility Applications*, as required by WAC 246-247, Radioactive Air Emissions. This QAPjP, along with the implementing procedures provides for the implementation of 10 CFR 71, Subpart H, and 10 CFR 72, Subpart G.

G2.2.1.1 Implementing Requirements

Implementing requirements are found in the CHPRC QAP, including Attachment 2, and this EQAPP.

G2.2.1.2 QA Requirements Flow down

QA requirements are imposed on the 100K Project by the QAP. QA requirements shall be passed down to sub tier contractors through applicable procurement documents, in accordance with approved procedures.

G2.2.1.3 Policy and Planning

100K Project managers at all levels are responsible to plan, organize, and provide the support necessary to apply the QA program described in this EQAPP to their activities and products. Senior management shall establish written management policies for their areas of responsibilities.

G2.2.1.4 Integrated Safety Management System

PRC-MP-QA-599, this EQAPP, and procedures, in conjunction with the PRC-MP-MS-003, Integrated Environment, Safety, and Health Management System Description, shall serve to provide requirements bases for, and implementing ISMS core functions.

NOTE: An implementation table for 10 CFR 830 Sub Part A and ISMS Crosswalk, is in attachment 2 of the PRC-MP-QA-599, QAP.

G2.2.1.5 Organization, Responsibilities, and Interfaces

100K Project organization, responsibility, and interface requirements are addressed in Article 1 of this QAPjP. The following attributes apply as they relate to QA management, or the approved delegated position or organization: The QA management position shall be responsible for verifying the proper establishment and execution of the QA program; the organization or position making delegations shall retain overall responsibility for the delegated work; the controlling documents shall describe the internal and external organizational interfaces, organizational structures, requirements, and responsibilities for the assigned scope of work. This scope of work shall also identify the responsibilities and authorities of those line organizations and management positions responsible for achieving and maintaining quality. The QA management position shall be at the same or higher level as the highest line manager directly responsible for performing work subject to the QAP. QA management shall have the organizational freedom to effectively communicate with other senior management positions. QA management shall be responsible for the interpretation and approval of QA program requirements specific to the 100K Project. QA management shall be responsible for identifying quality problems, initiating, recommending, or providing solutions to quality problems, and verifying solutions to quality problems. QA management shall have the authority to stop work when significant conditions adverse to quality warrant such actions (PRC-MP-QA-599). The responsibility for maintaining quality shall be by those who have been assigned the responsibility for performing work. Quality achievement shall be verified by persons or organizations not directly responsible for performing or managing the work.

G2.2.1.6 Readiness Review

Readiness reviews (RR) are a structured method for determining compliance with applicable requirements and that an activity is ready to proceed to another phase. Responsibilities and requirements for readiness for the 100K Project facilities or subprojects are identified in PRC-PRO-OP-055, Startup Readiness

G2.2.1.7 Stop Work Authority

100K Projects personnel have the authority to stop work. Line managers shall ensure that activities are performed in a safe, environmentally sound manner and in compliance with quality, safety, and environmental requirements. The performing organization's responsibilities shall include the authority to stop and/or correct work whenever continuation could result in unsafe acts, a danger to the environment, or

violation of approved work requirements. When 100K Project representatives observe unsafe or incorrect work during monitoring, surveillance, or audit of participant's work activities, the 100K Project representative has the authority and responsibility to stop work. Stop work actions shall be reported immediately to project management.

G2.2.1.8 Graded Application of CHPRC and 100K Project QA Program

For SSCs and activities important to safety or environmental protection, the 100K Project graded approach is applied using applicable safety basis documents, safety equipment lists, and environmental permits as identified in Attachment G1, "Safety Analysis Documentation and Environmental Protection Grading of Technical and QA Requirements." As a minimum, QA requirements shall be invoked for safety class and safety significant SSCs and activities and on those specific systems providing emission controls and emissions monitoring. The scope and degree of rigor in the application of the requirements shall be commensurate with the item or activities importance to safety and environmental protection. QA requirements may also be invoked on GS/SSCs and activities based on their importance to 100K project goals and objectives. The process for applying QA requirements to GS/SSCs and activities is defined in PRC-PRO-QA-259, *Graded Approach.*

G2.2.1.9 Implementing Responsibilities

The 100K Project shall implement the requirements of this EQAPP and this appendix,, as mandated by the CHPRC QAP. Specific QA requirements shall be passed down to suppliers in procurement documents.

G2.2.2 Section 2 - Personnel Training and Qualification (Refer to Section 3 of the EQAPP)

This section describes the requirements and responsibilities established by the 100K Project to ensure that personnel are properly trained and qualified for their assigned tasks. The 100K Project training and qualification program shall meet the requirements of the CHPRC QAP, Section 2, "Personnel Training and Qualifications," and the EQAPP, Section 3, and this appendix. When necessary, additional training will be provided for any additional requirements specified by f 10 CFR 71, Subpart H, or 10 CFR 72, Subpart G.

G2.2.2.1 Implementing Requirements

The 100K Project shall require personnel training and qualification in accordance with the procedures identified in PRC-MP-QA-599, *QAP*, Attachment 2. These procedures identify the applicable training, indoctrination, qualification, and certification requirements for applicable job functions. PRC-MP-QA-599, *QAP*, Attachment 2 identifies the procedures to meet, 10 CFR 71, Subpart H, and 10 CFR 72, Subpart G, requirements.

G2.2.2.2 Implementing Responsibilities

The 100K Projects are responsible for implementing the requirements of Section 2 of the Quality Assurance Requirements Document (QARD), and any additional training requirements for QARD SSC and activities identified in DOE/RW-0333P, 10 CFR 71, Subpart H, and/or 10 CFR 72, Subpart G.

G2.2.3 Section 3 - Quality Improvement (Refer to Section 10 of the EQAPP)

This section describes the requirements and responsibilities established by the 100K Project to ensure that quality affecting problems are detected and/or prevented, and to ensure continuous quality improvement in activities and products. The management systems established for the 100K Projects include problem investigation, screening, evaluation, reporting, and resolution; nonconformance identification, control, and tracking; corrective action process; and trending.

Quality improvement processes established and implemented by the 100K Project comply with the requirements of the CHPRC QAP, Section 3, "Quality Improvement" and applicable requirements of 10 CFR 71, Subpart H and 10 CFR 72, Subpart G. Quality improvement-related procedures for the 100K Projects are identified inPRC-MP-QA-599, QAP, Attachment 2.

G2.2.3.1 Implementing Requirements

Refer to the CHPRC QAP and this EQAPP.

1. Deficiency Identification

Formal and informal assessments (e.g., surveillances, management assessments, worker assessments) are used to identify and document a wide range of problems, screen and evaluate these problems for potential unreviewed safety questions, Price Anderson Amendment Act (PAAA) violations, perform problem resolution, and implement problem closure.

2. Nonconformance Control

Nonconforming items are controlled based on approved CHPRC Nonconformance Control procedures. Nonconformance status shall be tracked to closure in accordance with CHPRC Procedures, as identified in PRC-MP-QA-599, *QAP*, Attachment 2.

3. Corrective Action Process

Problems identified shall be managed under the CHPRC Corrective Action Management process as outlined in PRC-PRO-QA-052, *Issues Management*.

4. Feedback and Improvement

Performance Indicators shall be developed and used to identify trends utilizing 100K Project-specific performance data (e.g., surveillances, management assessments, nonconformance reports). In addition to trend analysis, data shall be analyzed for such things as contributing causes, risk values, lessons learned, noteworthy practices/strengths, to identify other potential opportunities for improvement. PRC-MP-QA-599, *QAP*, Attachment 2 identifies the performance indicator and trend analysis implementing procedure.

G2.2.3.2 Implementing Responsibilities

The 100K Project implement the deficiency identification, nonconformance reporting, and the corrective action process based on 100K Project and CHPRC procedures, as applicable. Input for tracking and trending purposes shall be in accordance with CHPRC Procedures.

G2.2.4 Section 4 - Documents and RECORDS (Refer to Section 5 of the EQAPP)

100K Project processes for controlling documents and records shall comply with the CHPRC QAP, Section 4, "Documents and Records" and additional requirements as specified in 10 CFR 71, Subpart H, or 10 CFR 72, Subpart G.

G2.2.4.1 Implementing Requirements

100K Project documents and records shall be specified, identified, prepared, reviewed, approved, maintained, revised, authenticated, controlled and final disposition specified. Procedures implementing, 10 CFR 71, Subpart H, or 10 CFR 72, Subpart G, requirements are identified in. PRC-MP-QA-599, *QAP*, Attachment 2

G2.2.4.2 Implementing Responsibilities

The 100K Project shall establish and maintain appropriate implementing procedures for document control and records management consistent with CHPRC requirements.

G2.2.5 Section 5 - Work Processes (Refer to Section 8 of the EQAPP)

The 100K Project procedures shall implement the requirements of The CHPRC QAP, Section 5, and this EQAPP, Section 8, "Work Processes" and applicable work process requirements of 10 CFR 71, Subpart H, and 10 CFR 72, Subpart G. The applicable elements specified therein are included in procedures identified in PRC-MP-QA-599, *QAP*, Attachment 2.

G2.2.5.1 Implementing Requirements

1. Work Process Documents

Work process documentation shall be prepared in appropriate detail and controlled based on 100K Project requirements. Approvals of such documents shall be in accordance with approved CHPRC and 100K Project procedural requirements. Administrative controls shall be in place to ensure that the workers have ready access to the work process documents. Completed work shall be documented and the appropriate records maintained.

2. Special Processes

All special processes, such as welding, brazing, heat treating, and non-destructive examinations (NDE) are performed In accordance with CHPRC and 100K procedure requirements.

3. Identification and Control of Items

The 100K Project implements CHPRC requirements for the identification and control of items in accordance with the procedures listed in PRC-MP-QA-599, *QAP*, Attachment 2.

4. Handling, Shipping, and Storing

CHPRC and 100K Project procedures address the methods of control for handling, shipping, and storing of material. These procedures are addressed in PRC-MP-QA-599, *QAP*, Attachment 2

5. Process Monitoring or Data Collection Instruments

Procedures identified in PRC-MP-QA-599, *QAP*, Attachment 2are used to control, calibrate, and maintain process monitoring and/or data collection instruments

6. Control of Computer Hardware and Software (Refer to Section 6 of the EQAPP)

Computer hardware and software used in safety related applications important to environmental, safety, health and/or quality activities shall be controlled. Computer software controls shall be based on procedures identified in. PRC-MP-QA-599, *QAP*, Attachment 2

G2.2.5.2 Implementing Responsibilities

100K Project managers are responsible to ensure work process controls are in accordance with approved procedures. 100K Project personnel are responsible for the quality of their work and for working to established procedures.

G2.2.6 Section 6 – Design (Refer to Section 8, Work Processes in the EQAPP)

The 100K Project design processes shall comply with the requirements of the CHPRC QAP, Section 6, "Design" and, as applicable, the design requirements of 10 CFR 71, Subpart

H, and 10 CFR 72, Subpart G. Design processes that shall be controlled include design inputs, design process and interfaces, design verification, and design changes. Procedures applicable to the design process are identified in PRC-MP-QA-599, *QAP*, Attachment 2. 1.0 Implementing Requirements

The design shall be defined, controlled, and verified. Applicable design inputs are specified on a timely basis and correctly translated into design documents. Design interfaces are identified and controlled. Design adequacy is verified by persons other than those who designed the item.

G2.2.6.1 Design Input

Design inputs include such information as design bases, codes and standards, functional and operational requirements for the 100K Project, conceptual design criteria, and regulatory requirements.

G2.2.6.2 Design Process

The applicable quality standards are specified as design input, and their adequate application verified through reviews. Changes that are made from the quality standards are reviewed and approved before effecting the change documentation. The final design is related to design input in sufficient documented detail to permit design verification, and to ensure that it identifies the assemblies or components that are part of the design. The design shall be sufficiently documented such that design verification can be accomplished by a technically qualified person.. Computer software used during the design process will be validated. The validation status shall be identified and documented prior to use. Additional elements of the design process are specified in the CHPRC QAP.

G2.2.6.3 Design Verification

The adequacy of design products shall be verified and 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.

G2.2.6.4 Design Change Control

Change to final designs, nonconforming items dispositioned use-as-is or repair, and field changes shall be controlled and subject to verification measures commensurate with the original design.

G2.2.6.5 Design Documentation and Records

Design documentation and records, which provide evidence that the design and the verification process were accomplished in accordance with the requirements, are collected, maintained, and stored in accordance with approved procedures as listed in PRC-MP-QA-599, *QAP*, Attachment 2.

G2.2.6.6 Implementing Responsibilities

The 100K Project may procure the necessary design services, including software development services, in accordance with the PRC-MP-QA-599, *QAP*, Attachment 2, procurement procedures. Applicable quality-affecting requirements shall be passed down in procurement documents to the vendor or subcontractor performing the design or software development service. Design processes performed by the 100K Project shall comply with the applicable procedures identified in. PRC-MP-QA-599, *QAP*, Attachment 2

G2.2.7 Section 7 – Procurement (Refer to Section 4 of the EQAPP)

The 100K Project procurement processes shall comply with the requirements of the CHPRC QAP, Section 7, and the EQAPP, Section 4, "Procurement" and, as applicable, 10 CFR 71, Subpart H, and 10 CFR 72, Subpart G. The applicable elements specified therein are included in procedures identified in PRC-MP-QA-599, *QAP*, Attachment 2. Basic areas affecting procurement include procurement planning, procurement document content, supplier evaluation and selection, supplier performance monitoring, items and services acceptance, commercial grade items (CGI), acceptance methods, procurement document control, including supplier-generated documents.

G2.2.7.1 Implementing Requirements

1. Procurement activities shall be planned and documented at the earliest practical time to provide appropriate interfaces ensuring compatibility and uniformity to the procurement process.
2. Procurement documents shall include or reference, as applicable, design bases, inspection/test and acceptance criteria, applicable QA requirements, identification of document and record submittals, notification of rights of access, or other requirements necessary to assure product quality.
3. Changes to procurement documents are subject to the same degree of control as the original documents. Procurement documents shall be reviewed and approved in accordance with approved procedures as listed in. PRC-MP-QA-599, *QAP*, Attachment 2
4. Proposals shall be evaluated by individuals or organizations that have the necessary expertise to make decisions for technical considerations, QA requirements, personnel, and supplier past performance. The evaluation will include a determination of the extent of conformance to procurement documents.
5. The selection of suppliers is based on evaluation of their capability to provide items and services in accordance with the requirements of the procurement documents. Supplier performance shall be monitored ensure continued acceptability.
6. NCRs for procured items or services shall be processed in accordance with CHPRC procedures in PRC-PRO-QA-298, *Nonconforming Items*
7. When required by code, regulation, or contract requirement, methods used to accept items and services and documentary evidence that items conform to procurement documents shall be available before installation or use.
8. Critical characteristics of CGIs used in Safety Class or Safety Significant applications shall be identified by the design authority. The design authority shall also identify the CGI acceptance method.
9. Supplier-generated documents are controlled, handled, and approved in accordance with the methods established in the procurement document, CHPRC QAP, the EQAPP, and the 100K Project requirements.

G2.2.7.2 Implementing Responsibilities

The 100K Project shall be responsible for using applicable procurement-related procedures identified in. PRC-MP-QA-599, QAP, Attachment 2 CHPRC policies and procedures shall be used as the basis for all planned procurements, and have been prepared to comply with the requirements of the CHPRC QAP and this EQAPP, . The procedures in PRC-MP-QA-599, *QAP*, Attachment 2 also implement the requirements of 10 CFR 71, Subpart H, and 10 CFR 72, Subpart G.

G2.2.8 Section 8 - Inspection and Acceptance Testing

The 100K Project shall implement the requirements of QAP, Section 8, "Inspection and Acceptance Testing" and, as applicable, the inspection and testing requirements of 10 CFR 71, Subpart H, and 10 CFR 72, Subpart G. The applicable elements specified therein are included in procedures identified in PRC-MP-QA-599, *QAP*, Attachment 2.

G2.2.8.1 Implementing Requirements

1. Inspection and test planning, testing, recording, status, and use of calibrated equipment shall be complied with in accordance with CHPRC and 100K Project approved procedures.
2. Verification tests, hardware integration tests, and in-use tests shall be controlled, planned, performed, and documented.
3. Inspection of items under construction or otherwise in-process shall be performed as necessary to verify quality. If in-process inspection of items is impossible or disadvantageous, indirect control by monitoring of process methods, equipment, and personnel shall be provided. Both inspection and process monitoring shall be provided when control is inadequate without both.
4. Calibration shall be performed using certified equipment of known relationship to a nationally recognized standard or to a documented calibration basis. Calibration standards should have greater accuracy than the equipment or standards that are being calibrated.
5. The method and frequency of measuring and test equipment (M&TE) calibration shall be based on the equipment or instrument type, stability characteristics, required accuracy, intended use, or other applicable conditions. The M&TE shall be handled and stored to provide protection and maintain accuracy.

G2.2.8.2 Implementing Responsibilities

100K Project personnel shall perform acceptance inspection and testing in accordance with approved procedures as listed in PRC-MP-QA-599, *QAP*, Attachment 2, using controlled and calibrated M&TE, as required. Where subcontractors perform acceptance inspection and testing, the 100K Project shall ensure compliance with the requirements of this section.

G2.2.9 Section 9 - Management Assessment (Refer to Section 9 of the EQAPP)

Management assessment requirements are identified in Section 9, of the CHPRC QAP and also in Section 9 of the EQAPP.

G2.2.9.1 Implementing Requirements

Requirements for management assessments and associated corrective actions are implemented through the applicable CHPRC procedures and 100K Project procedures identified in PRC-MP-QA-599, *QAP*, Attachment 2.

G2.2.9.2 Implementing Responsibilities

100K Project managers at all levels are responsible to schedule, plan, and perform management assessments in accordance with PRC-PRO-QA-246 Managers shall ensure that corrective action, when required, is in compliance with the procedures identified in the attachments and PRC-PRO-QA-052, *Issues Management*.

G2.2.10 Section 10 - Independent Assessment (Refer to Section 9 of the EQAPP)

Independent assessment requirements are identified in Section 10, of the CHPRC QAP, and Section 9 of the EQAPP. The 100K Project shall cooperate with independent assessment personnel in planning, preparing, and performing assessments. 100K Project personnel shall perform surveillances in accordance with PRC-PRO-QA-9769, *Surveillance Process.*

G2.2.10.1 Implementing Requirements

The Independent Assessment personnel plan and conduct independent assessments in accordance with specific procedures.

G2.2.10.2 Implementing Responsibilities

100K Project managers shall ensure that corrective action, when required, is in compliance with the applicable procedures identified in PRC-MP-QA-599, *QAP*, Attachment 2.

C2.3 Article 3 - DOE/RW-0333P Requirements

The Quality Assurance Requirements Document (QARD) is implemented on the 100K Project in accordance with QAPP-OCRWM-001 "Quality Assurance Program Plan for Implementation of the OCRWM QARD for the Spent Nuclear Fuel Project." Implementing procedures are identified in QA-OCRWM-1 "OCRWM QARD Requirements Matrix." The QARD affected SSCs and activities are identified in Table 3-1, "SSCs and Activities Requiring Application of the QARD," located in HNF SD SNF RPT 007, Application of the Office of Civilian Radioactive Waste Management Quality Assurance Requirements to the Hanford Spent Nuclear Fuel Project.

C2.4 Article 4 – Environmental Data Acquisition and Management

Environmental data is that data that which is required to support decision making with respect to achieving cleanup levels, characterizing waste, and the characterization of routine releases to the environment. The 100K Project prepares data quality objectives (DQO) and Sampling Analysis Plans (SAP) for the acquisition of this data and its subsequent management consistent with Guidance for the Data Quality Objectives Process, EPA/600/R-96/055 (QA/G-4) 2000 as revised and EPA Requirements for Quality Assurance Project Plans, EPA/240/B-01/003 (EPA QA/R-5) March 2001 as revised.

C2.5 Article 5 - References

American Society of Mechanical Engineers (ASME) NQA-1 2008, Quality Assurance Requirements for Nuclear Facility Applications

Title 10, Code of Federal Regulations, Part 71, 2001, Packaging and Transportation of Radioactive Materials.

Title 10, Code of Federal Regulations, Part 72, 2001, Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High Level Radioactive Waste.

Title 10, Code of Federal Regulations, Part 830.122, 2001, Quality Assurance Requirements.

DOE, 1999, Quality Assurance, DOE O 414.1C, U.S. Department of Energy, Washington, D.C.

Integrated Environment, Safety, and Health Management System (ISMS), PRC-MP-MS-003, CH2M Hill Plateau Remediation Company. Richland, Washington

CH2M Hill Plateau Remediation Company. Richland, Washington Quality Assurance Program, PRC-MP-QA-599.

DOE/RL-96-68, Hanford Analytical Services Quality Assurance Requirements Document (HASQARD), U.S Department of Energy, Richland, Washington.

Washington Administrative Code WAC 246-247, Radioactive Air Emissions. Washington State Department of Health, Olympia Washington.

Attachment G1

Safety Analysis Documentation and Environmental Protection and Grading of Technical and QA Requirements

The Safety Equipment List (SEL), safety analysis report (SAR), or safety analysis report for packaging (SARP) shall identify SSCs which are important to the safety function (critical) in the facility or subproject. The hazard analysis and accident scenarios in the safety basis documents (e.g., SARs, SARPs, etc.) help identify critical SSCs that must function in order to prevent or mitigate these events. These critical SSCs are then identified on the applicable SELs using the safety classification system found in PRC-PRO-NS-8317, *Safety Basis Implementation and Maintenance*, and PRC-PRO-NS-700, *Safety Basis Development*. Critical characteristics are identified by the cognizant design organization when they identify those design attributes of each SSC identified as necessary to preserve the safety support functions. They also ensure critical characteristics are included in the SEL by the identification of safety SSCs and their designations. Additionally, the SEL shall include the safety function of the safety SSCs; the SSC design and operational attributes necessary for the reliable performance of the identified safety functions; and configuration identifiers including system or structure, equipment or component name and number, part number, engineering drawing, and change status. The cognizant design organization applies design criteria to the design, operation, and maintenance of safety SSCs including recommended codes and standards. QA requirements shall be applied as necessary using PRC-PRO-QA-259, *Graded Approach*, to assure the SSCs can perform their safety function.

SSCs that are not "critical SSCs" as described above but are important to the monitoring and control of emissions to those facilities with a potential-to-emit of greater than 0.1 mrem/yr are described in environmental permitting documentation. These systems shall be designed and maintained as safety significant.

1.0 K Basins Facilities

1.1 HNF-SD-WM-SAR-062, latest revision, "K Basin Safety Analysis Report"

1.2 HNF-SD-SNF-SEL-001, latest revision, "Safety Equipment List of K Basins."

2.0 Canister Storage Building

2.1 HNF-3553, Annex "A", latest revision, "Canister Storage Building (CSB) Final Safety Analysis Report".

2.2 HNF-780, Radioactive Air Emissions Notice of Construction Canister Storage Building , Building 212H.

3.0 Cold Vacuum Drying Facility

3.1 HNF-3553, Annex "B", latest revision, "Cold Vacuum Drying Facility Final Safety Analysis Report.

3.2 HNF-SD-SNF-SEL-002, latest revision, "Spent Nuclear Fuel Project Cold Vacuum Drying Facility."

4.0 Interim Storage Area (ISA)

4.1 HNF-3553, Annex D, Volume 5, Revision 0, Final Safety Analysis Report, 200 Area Interim Storage Area

4.1 SNF-5047, Revision 0, Technical Safety Requirements 200 Area Interim Storage Area

4.2 HNF-3553, Volume 1, Rev. 0-B, Spent Nuclear Fuel Project Final Safety Analysis Report

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Appendix H

National Pollutant Discharge Elimination System Quality Assurance Project Plan

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H1 Purpose

CH2M HILL Plateau Remediation Company (CHPRC) is required to have in place a Quality Assurance Project Plan (QAPjP) as a condition of the National Pollutant Discharge Elimination System (NPDES) Permit No. WA-002591-7 (The Permit). This QAPjP is for Outfall 004 and 004B and provides a clear and complete plan for the collection and analysis of effluent and receiving water samples in support of the Permit and includes project organization and quality objectives.

H2 Background

The U.S. Environmental Protection Agency (EPA), Region 10 issued a NPDES permit to CHPRC (the permittee) authorizing the discharge of pollutants to Outfalls 004 and 004B to the Columbia River in accordance with effluent limitations, monitoring requirements and other conditions set forth in the Permit. The Permit authorizes the discharge of only those pollutants resulting from facility processes, waste streams, and operations that have been clearly identified in the permit application process.

The requirements of 10 Code of Federal Regulations (CFR) 830 Subpart A and U.S. Department of Energy (DOE) Order 414.1C shall be adhered to by the 100K area NPDES activities through the implementation of PRC-MP-QA-599, *CHPRC Quality Assurance Program (QAP).*

This QA document is based on achievement of quality as a line responsibility, where each performer is accountable for the quality of the work assigned. Line management is responsible for the effectiveness of quality for the NPDES activities.

H3 Scope/Project Description

This Appendix defines QA program requirements that shall be implemented for NPDES activities at the 100K Area.

CHPRC shall limit and monitor discharge as specified in Tables 1 and 2 from 100K Area, Outfall 004 and 004B, to the Columbia River at the following location:

Outfall	Receiving Water	Latitude	Longitude
004	Columbia River	46° 39' 16"	N 119° 36.2"

The activities that this QAPjP affect include the sampling, monitoring and reporting of the NPDES activities. For sampling and analytical services, including field and laboratory tests protocols the applicable sections of DOE/RL-96-68, *Hanford Analytical Services Quality Assurance Requirements Document* (HASQARD), shall be applied. The purpose of this QAPjP is to identify the controls necessary to achieve the missions of the NPDES activities in a safe, consistent, and reliable manner. This document is founded on the QAP, which is based on 10 CFR 830 Subpart A, *Quality Assurance Requirements*, and DOE Order 414.1C, *Quality Assurance* and written in accordance with EPA QA/R-5.

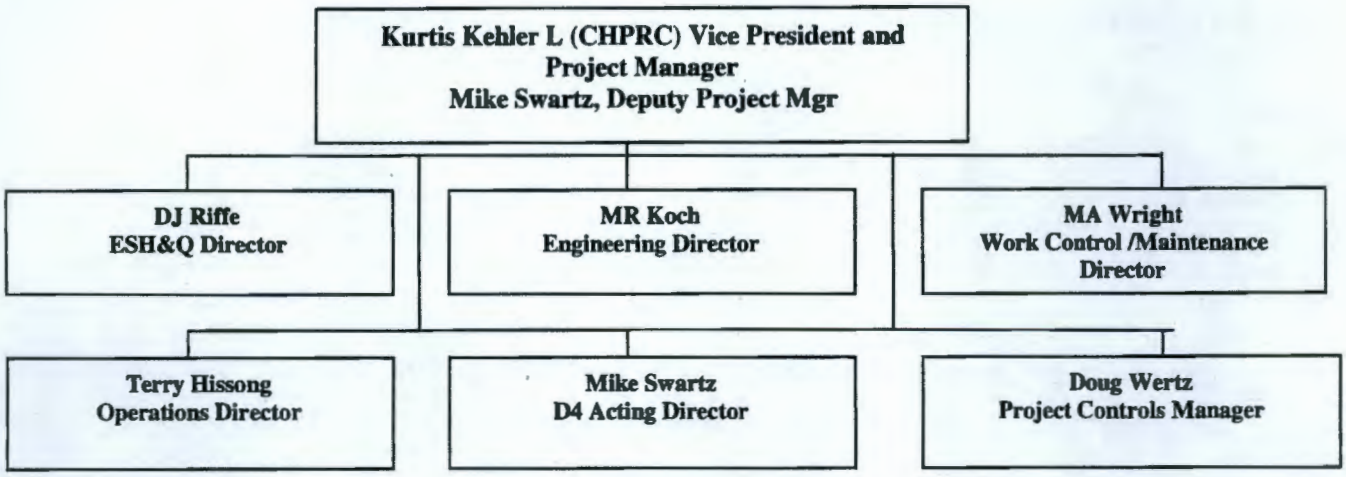
H4 Project /Management and Organization (Refer to Section 1 of the EQAPP)

The 100K Area organization, structure, interfaces, levels of authority and functional responsibilities are defined in the CHPRC QAP and in the programmatic Section 1 of this EQAPP.

The CHPRC Environmental QA Manager is independent of the NPDES activities. The CHPRC 100-K Project managers are responsible to plan, organize, and provide the support necessary to apply the QA program described in this EQAPP to their activities and products.

QA programmatic requirements are established for NPDES activities to implement the requirements in PRC-MP-QA-599, including Attachment 2, and this EQAPP.

100K Area NPDES Project Organization Chart



H4.1 Integrated Safety Management System

PRC-MP-QA-599, this EQAPP, and procedures, in conjunction with the PRC-MP-MS-003, *Integrated Environment, Safety, and Health Management System Description*, shall serve to provide requirements bases for, and implementing ISMS core functions.

H4.2 Graded Application of CHPRC QA Program

For Structures, Systems and Components (SSC) and activities important to safety or environmental protection, the graded approach is applied using applicable safety basis documents, safety equipment lists, and environmental permits. At a minimum, QA requirements shall be invoked for Quality Class 1 and 2 SSCs and activities as defined in PRC-MP-QA-599, *QAP*, and on those specific systems providing emission controls and emissions monitoring. The scope and degree of rigor in the application of the requirements shall be commensurate with the item or activities importance to safety and environmental protection. QA requirements may also be invoked on Enhanced Commercial SSCs and activities based on their importance to 100K project goals and objectives. The process for applying QA requirements to enhanced commercial/SSCs and activities is defined in PRC-PRO-QA-259, *Graded Approach*.

The EQA organization is responsible for maintaining this document, including revising when a substantive change is warranted. Revisions shall be approved by the same personnel approving the initial document. This appendix shall be reviewed annually as part of the EQAPP

H5 Quality Objectives and Criteria for Measurement Data

CHPRC shall limit and monitor discharges from Outfall 004 as specified in Table H1 and Outfall 004B as specified in Table H2.

Table H1. Effluent Limitations and Monitoring Requirements Area 100K Water Treatment Plant Outfall 004

Parameter	Monthly Avg.	Daily Max	Sampling Frequency	Type of Sampling
Flow - MGD	---	---	continuous	recording
Temperature	---	80	weekly	grab
Total Residual Chlorine mg/L	0.08	0.1	once per quarter	grab
pH	6.0-9.0		monthly	grab
Gross Alpha (pCi/l)	---		Twice per month	grab
Gross Beta (pCi/l)	---		Twice per month	grab
Cesium 137 (pCi/l)	---		Twice per month	grab

Table H2. Limitations and Monitoring Requirements Area 100K Filter Plant Backwash Water Outfall 004B

Parameter	Monthly Avg. mg/l	Daily Max mg/l	Sampling Frequency	Type of Sampling
Flow - MGD	---	---	each discharge	total
Total Suspended Solids	30	45	weekly	grab

1. CHPRC shall report within 24 hours any violation of the maximum daily limits for any pollutant. Violations of all other effluent limits are to be reported at the time that discharge monitoring reports are submitted.
2. CHPRC shall not discharge any floating solids or visible foam, or oily wastes that produce a sheen on the surface of the receiving water. Aesthetic values shall not be impaired by the presence of materials or their effects, excluding those of natural origin, which offend the senses of sight, smell, touch, or taste.
3. The pH shall not be less than 6.0 standard units (s.u.) nor greater than 9.0 standard units (s.u.).
4. CHPRC shall collect effluent samples from the effluent stream after the last treatment unit prior to discharge into the receiving waters except for Outfall 004B. The Filter Plant Backwash Water, Outfall 004B, shall be sampled prior to combining with any other flow.
5. Grab samples for chlorine and pH analysis from the 1908k structure shall be undiluted by quench water.
6. Grab sampling at Outfall 004B for TSS shall be at least 30 minutes after the start of drawdown.
7. For all effluent monitoring, CHPRC shall use methods that can achieve a minimum level (ML) less than the effluent limitation.
8. For purposes of reporting on the DMR for a single sample, if a value is less than the method detection limit (MDL), CHPRC shall report "less than {numeric value of the MDL}" and if a value is less than the ML, CHPRC shall report "less than {numeric value of the ML}."

9. For purposes of calculating monthly averages, zero may be assigned for values less than the MDL, the {numeric value of the MDL} may be assigned for values between the MDL and the ML. If the average value is less than the MDL, CHPRC shall report "less than {numeric value of the MDL}" and if the average value is less than the ML, CHPRC shall report "less than {numeric value of the ML}." If a value is equal to or greater than the ML, CHPRC shall report and use the actual value. The resulting average value shall be compared to the compliance level, the ML, in assessing compliance

H6 Personnel Training and Qualification (Refer to Section 3 of this EQAPP)

This section describes the requirements and responsibilities established by the 100K Project to ensure that personnel are properly trained and qualified for their assigned tasks. The 100K Project training and qualification program shall meet the requirements of the CHPRC QAP, Section 2, "Personnel Training and Qualifications," and the EQAPP, Section 3, and this appendix. When necessary, additional training shall be provided for any additional requirements.

The Project shall require personnel training and qualification in accordance with the procedures identified in PRC-MP-QA-599, *QAP*, Attachment 2. These procedures identify the applicable training, indoctrination, qualification, and certification requirements for applicable job functions.

H7 Documents and Records (Refer to Section 5 of the EQAPP)

The 100K Area processes for controlling documents and records shall comply with the CHPRC QAP, Section 5, "Documents and Records". Implementing Requirements

100K Area Project documents and records shall be specified, identified, prepared, reviewed, approved, maintained, revised, authenticated, controlled and final disposition specified. Procedures implementing requirements are identified in. PRC-MP-QA-599, *QAP*, Attachment 2.

H7.1 Work Process Documents

Work process documentation shall be prepared in appropriate detail and controlled based on NPDES activity requirements. Approvals of such documents shall be in accordance with approved CHPRC and 100K Project procedural requirements. Administrative controls shall be in place to ensure that the workers have ready access to the work process documents. Completed work shall be documented and the appropriate records maintained.

H7.2 Sampling Requirements

<u>Representative Sampling (Routine and Non-Routine Discharges)</u>

Samples and measurements shall be representative of the volume and nature of the monitored discharge.

In order to ensure that the effluent limits are not violated at times other than when routine samples are taken, CHPRC shall collect additional samples at the appropriate outfall whenever any discharge occurs that may reasonably be expected to cause or contribute to a violation that is unlikely to be detected by a routine sample.

H7.3 Monitoring Procedures

Monitoring and sample analyses shall be conducted according to test procedures approved under 40 CFR 136, unless other test procedures have been specified or approved by EPA as an alternate test procedure under 40 CFR 136.5.

H7.4 Additional Monitoring

If CHPRC monitors any pollutant more frequently than required using test procedures approved under 40 CFR 136, CHPRC shall include the results of this monitoring in the calculation and reporting of the data submitted in the DMR.

H8 Sampling Process Design (Experimental Design) and Sampling Methods

Sampling process design and sampling methods of effluent streams is prescribed in the NPDES permit. This consists of:

- Weekly grab samples from the 1908-K discharge structure for temperature. A continuous in-situ temperature sensor and recorder will satisfy this requirement.
- Quarterly grab samples from the 1908-K discharge structure for total residual chlorine.
- Monthly grab samples from the 1908-K discharge structure for pH.
- Twice per month grab samples from the 1908-K discharge structure for gross alpha, gross beta, and Cesium 137.
- Weekly (and if not discharging at least upon each discharge) grab samples from the 183 KE Sedimentation Basin No. 5 for total suspended solids at least 30 minutes after the start of drawdown.

H8.1 Package and Transport Samples

The 1-gallon sample container shall be labeled with the pre-printed label located in the E&N sample logbook.

All sample information (pH, temperature, date, time etc.) shall be recorded in E&N Sample Logbook for the 1908K composite sample.

Samples shall be transported to the Waste Sampling and Characterization Facility (WSCF) sample receiving station, located in 200 West Area and custody of the samples shall be transferred to WSCF at that time.

H9 Sample Handling and Custody

All sample analyses are performed in the field with the exception of the TSS and radiological analyses. Samples for these analyses will be shipped to a laboratory on the Hanford site using in place chain of custody protocols.

If a limit and/or control is not in compliance, then management shall be notified immediately.

A sample shall be taken with each basin discharge.

Draining the 183 KE holdup basin to the river shall be limited such that the effluent from dropping water level shall not entrain any settled solids on the basin floor (Process Standard [PS] 400)

A sample of the backwash water shall be taken 30 minutes after opening the drain valve to the river. This is an NPDES and PS 400 requirement.

All sample information shall be recorded in the E & N (Environmental and NPDES) sample Logbook for 183 KE Filter Plant Backwash Basin discharge.

Samples shall be refrigerated and maintained at 4 degrees Celsius.

The original COC form shall accompany sample(s) during transport.

H10 Analytical Methods

Analyses for total residual chlorine shall be performed in accordance with Standard Method 4500-Cl G.

Analyses for pH shall be performed in accordance with Standard Method 4500-H+B.

Analyses for total suspended solids shall be performed in accordance with Standard Method 2540D.

Analyses for total alpha and beta shall be performed in accordance with Standard Method 900.0.

H11 Quality Control

No duplicate samples or split samples is required. Laboratory analyses shall follow method quality control practices consistent with 40CFR136 as well as periodic EPA quality control checks will be performed upon receipt of unknown samples from EPA for analyses.

H12 Instrument/Equipment Testing, Inspection and Maintenance

Instrument/equipment testing, inspection, and maintenance shall be performed consistent with the specific method requirements.

H13 Instrument/Equipment Calibration and Frequency

Instrument/equipment calibrations and frequencies shall be performed consistent with the specific method requirements.

Procedures identified in PRC-MP-QA-599, *QAP*, Attachment 2shall be used to control, calibrate, and maintain process monitoring and/or data collection instruments

100K Project managers are responsible to ensure work process controls are in accordance with approved procedures. Personnel involved in NPDES activities are responsible for the quality of their work and for working to established procedures.

Calibration checks of the portable chlorine measuring equipment shall be in accordance with 100K Procedures SP-43-003E and SP-43-016. These calibrations shall be performed every 180 days.

H14 Inspection/Acceptance of Supplies and Consumables

The 100K Project procurement processes shall comply with the requirements of the CHPRC *QAP*, Section 7, and this EQAPP, Section 4, "Procurement". The applicable elements specified therein are included in procedures identified in PRC-MP-QA-599, *QAP*, Attachment 2. Basic areas affecting procurement include procurement planning, procurement document content, supplier evaluation and selection, supplier performance monitoring, items and services acceptance, commercial grade items (CGI), acceptance methods, procurement document control, including supplier-generated documents.

Receipt inspection of supplies and consumables is performed as part of the procurement receipt inspection process to verify that the items procured have met the specified acceptance requirements.

Special Tools, Equipment and Materials Required:

- HACH DR/820 Colorimeter
- HACH CN-66 or Pocket Colorimeter
- 10 mL sample cells
- DPD Free Chlorine Reagent pillows (approximately 15-20 pillows per day shall be required)
- DPD Total Chlorine Reagent pillows
- 1-gallon poly bottle (narrow mouth)
- 1000 ml poly bottle
- 125 ml poly bottle.

H15 Assessments and Oversight (Refer to Section 9 of the EQAPP)

Stop Work Authority

100K Project personnel have the authority to stop work. Line managers shall ensure that activities are performed in a safe, environmentally sound manner and in compliance with quality, safety, and environmental requirements. The performing organization's responsibilities shall include the authority to stop and/or correct work whenever continuation could result in unsafe acts, a danger to the environment, or violation of approved work requirements. When 100K Project representatives observe unsafe or incorrect work during monitoring, surveillance, or audit of work activities, the 100K Project representative has the authority and responsibility to stop work. Stop work actions shall be reported immediately to project management.

H16 Quality Improvement (Refer to Section 10 of the EQAPP)

This section describes the requirements and responsibilities established by the 100K Area Project to ensure that quality affecting problems are detected and/or prevented, and to ensure continuous quality improvement. The management systems established for the NPDES activities include problem investigation, screening, evaluation, reporting, and resolution; nonconformance identification, control, and tracking; corrective action process; and trending.

Quality improvement processes established and implemented by the 100K Project comply with the requirements of the CHPRC QAP, Section 3, "Quality Improvement". Quality improvement-related procedures are identified inPRC-MP-QA-599, *QAP*, Attachment 2.

1. Deficiency Identification

Formal and informal assessments (e.g., surveillances, management assessments, worker assessments) are used to identify and document a wide range of problems, screen and evaluate these problems for potential unreviewed safety questions, Price Anderson Amendment Act (PAAA) violations, perform problem resolution, and implement problem closure.

2. Nonconformance Control

Nonconforming items are controlled based on approved CHPRC Nonconformance Control procedures. Nonconformance status shall be tracked to closure in accordance with CHPRC Procedures, as identified in PRC-MP-QA-599, *QAP*, Attachment 2.

3. Other Noncompliance Reporting

CHPRC shall report all instances of noncompliance, not required to be reported within 24 hours, at the time that monitoring reports are submitted. The reports shall contain the following information:

a. a description of the noncompliance and its cause;
b. the period of noncompliance, including exact dates and times;
c. the estimated time noncompliance is expected to continue if it has not been corrected;
d. steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

4. Duty to Mitigate

CHPRC shall take all reasonable steps to minimize or prevent any discharge in violation of The Permit that has a reasonable likelihood of adversely affecting human health or the environment.

5. Corrective Action Process

Problems identified shall be managed under the CHPRC Corrective Action Management process as outlined in PRC-PRO-QA-052, *Issues Management.*

6. Feedback and Improvement

Performance Indicators shall be developed and used to identify trends utilizing NPDES activity specific performance data (e.g., surveillances, management assessments, nonconformance reports). In addition to trend analysis, data shall be analyzed for such things as contributing causes, risk values, lessons learned, noteworthy practices/strengths, to identify other potential opportunities for improvement. Attachment 2 of the PRC-MP-QA-599, *QAP*, identifies the CHPRC performance indicator and trend analysis implementing procedure.

The 100K Area Project implement the deficiency identification, nonconformance reporting, and the corrective action process based on CHPRC procedures, as applicable. Input for tracking and trending purposes shall be in accordance with CHPRC Procedures.

H17 Management Assessment (Refer to Section 9 of the EQAPP)

Management assessment requirements are identified in Section 9, of the CHPRC QAP and also in Section 9 of the EQAPP.

Requirements for management assessments and associated corrective actions are implemented through the applicable CHPRC procedures identified in PRC-MP-QA-599, *QAP*, Attachment 2.

100K Project managers at all levels are responsible to schedule, plan, and perform management assessments in accordance with PRC-PRO-QA-246. Managers shall ensure that corrective action, when required, is in compliance with the procedures identified in the attachments and PRC-PRO-QA-052, *Issues Management.*

H18 Independent Assessment (Refer to Section 9 of the EQAPP)

Independent assessment requirements are identified in Section 10, of the CHPRC QAP, and Section 9 of the EQAPP. NPDES activities personnel shall cooperate with independent assessment personnel in planning, preparing, and performing assessments. 100K Project personnel involved in NPDES activities shall perform surveillances in accordance with PRC-PRO-QA-9769, *Surveillance Process.*

H19 Reporting of Monitoring Results

CHPRC shall summarize monitoring results each month on the Discharge Monitoring Report (DMR) form (EPA No. 3320-1) or equivalent. CHPRC shall submit reports monthly, postmarked by the 25th day of the following month. Quarterly monitoring shall be submitted with the monthly reports. CHPRC shall sign and certify all DMRs, and all other reports. CHPRC shall submit the legible originals of these documents to the Director, Office of Compliance and Enforcement at the following addresses:

US EPA Region 10, Suite 900
Attn: ICIS Data Entry Team
1200 Sixth Avenue, OCE-130
Seattle, Washington 98101-3140

The Director of the Office of Compliance and Enforcement may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the NPDES Compliance Hotline in Seattle, Washington, by telephone, (206) 553-1846. Reports shall be submitted to the same address listed above.

Upon request by EPA, CHPRC shall submit results of any other sampling, regardless of the test method used.

H19.1 Twenty-four Hour Notice of Noncompliance Reporting

1. CHPRC shall report the following occurrences of noncompliance by telephone (206-553-1846) within 24 hours from the time CHPRC becomes aware of the circumstances;
   a. Any noncompliance that may endanger health or the environment;
   b. Any unanticipated bypass that exceeds any effluent limitation in the permit (See Permit, Part IV.F., "Bypass of Treatment Facilities");
   c. Any upset that exceeds any effluent limitation (See Permit, Part IV.G., "Upset Conditions"); or
   d. Any violation of a maximum daily discharge limitation for any of the pollutants listed in the permit.
2. CHPRC shall provide a written submission within five days of the awareness of any event required to be reported under subpart 1 of The Permit. The written submission shall contain:
   a. A description of the noncompliance and its cause;
   b. The period of noncompliance, including exact dates and times;
   c. The estimated time noncompliance is expected to continue if it has not been corrected; and
   d. Steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

H20 Data Review, Verification, and Validation (Refer to Sections 2 and 8 of the EQAPP)

Sample analyses are reviewed by Operations and the ECO to determine consistency with past measurements, adverse trends, measurement errors, accuracy, etc.

H21 Verification and Validation Methods (Refer to Sections 2 and 8 of the EQAPP)

H22 Reconciliation with User Requirements (Refer to Sections 9 and 10 of the EQAPP)

The management systems established for the NPDES activities include problem investigation, screening, evaluation, reporting, and resolution; nonconformance identification, control, and tracking; corrective action process; and trending.

Quality improvement processes established and implemented by the 100K Project comply with the requirements of the CHPRC QAP, Section 3, "Quality Improvement". Quality improvement-related procedures are identified inPRC-MP-QA-599, *QAP*, Attachment 2.

Appendix I

CHPRC Quality Assurance Project Plan for Radioactive Air Emissions Measurement

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I-1 Management of Air Emissions Measurement

The individual CH2M HILL Plateau Remediation Company (CHPRC) project offices, with support from the environmental and quality assurance (QA) organizations within the CHPRC are responsible for conducting all air emissions measurement and related quality assurance and maintenance activities associated with air emissions sample collection, sample handling, and chain-of-custody. The organizations implementing the measurement program are described in the PRC-MP-QA-599, *Quality Assurance Program*. Figure 1 of that document provides the overall organization of the CHPRC. CHPRC responsibility for chain-of-custody extends through transport of the required samples to the analytical laboratory managed by the Mission Support Alliance (MSA) contractor under contract with the U.S. Department of Energy (DOE), Richland Operations Office (RL). When custody of the air emissions samples is taken by the laboratory, the MSA's Effluent and Near Facility Monitoring program assumes responsibility for laboratory analysis of the samples, and management of the resulting data, providing applicable quality assurance for the analysis process and associated estimates of emissions for annual reporting of emissions (HNF-23333, latest revision, *Fluor Hanford Environmental Quality Assurance Program Plan*). The CHPRC project offices and environmental support organizations mentioned previously participate in the verification and validation of the sample data as part of final approval before reporting. This objective of this QAPjP is to describe the elements of monitoring and reporting radioactive air emissions from stacks and vents (referred to only as stacks in the balance of this document) and from fugitive or diffuse sources which will ensure data collected is of sufficient quality to assure permit compliance.

I-1.1 CHPRC Projects

CHPRC projects are responsible for collecting stack emission samples, associated sampling information, and stack flow rate measurements at facilities they manage. Stack samples are submitted to the MSA-managed WSCF for analysis, and the flow rate measurements are provided to MSA Environmental Integration (EI) with that group also responsible for reviewing various information and reports cited in this Quality Assurance Project Plan (QAPjP) and retaining required records. CHPRC stack emission monitoring activities, such as sample collection, are addressed in this CHPRC QAPjP and procedures.

I-1.2 Environmental Compliance Officers

Environmental compliance officers (ECOs) or their delegates have responsibility for project environmental compliance, and technical and engineering aspects are delegated to project engineers. ECOs or their delegates review the stack flow data from measurements performed by V&B personnel. ECOs are responsible for monitoring stack emissions data for their facilities and assisting in evaluating concerns over elevated emissions, which might require notification to regulators as well as corrective actions. They also review the DOS document or MSA internal statement of work issued annually by MSA EI that lists laboratory analytical services and sampling schedules. As changes in operating conditions and/or source terms at facilities occur, ECOs may, in consultation and with approval of CHPRC technical and project engineering, direct the addition or deletion of radionuclides identified for sampling and analysis.

I-1.3 Health Physics Personnel

CHPRC Health physics personnel perform the sampling of radionuclide air emissions under the technical direction of ECO or their delegates. The Automated Bar Coding of All Samples at Hanford 2 (ABCASH 2, or more commonly, ABCASH) computer program affords users automated data acquisition and tracking of air filter sampling information. Collection, tracking, and handling requirements for

effluent samples are in PRC-PRO-EP-15334, *Effluent and Environmental Monitoring for Radionuclide Airborne Emissions*. CHPRC projects maintain procedures for sample collection and the sample tracking system used by the health physics organizations. Sampling activities are performed in accordance with stack monitoring and sampling requirements of 40 CFR 61, Appendix B, Method 114. In accordance with their own procedures, CHPRC projects collect and send the radioactive air emission samples to the MSA-managed WSCF.

I-1.4 Ventilation and Balance

CHPRC Ventilation & Balance (V&B) personnel measure stack flow rates and are responsible for ensuring that stack flow measurement equipment is adequate and appropriately calibrated in accordance with PRC-PRO-EN-8323, *Management of HEPA Filter Systems*. V&B is responsible to ensure that Pitot tubes used for measuring stack flows are either calibrated to a National Bureau of Standards (NBS)-traceable standard or are designed and constructed in accordance with Method 2 specifications of 40 CFR 60, Appendix A, to ensure appropriate coefficients are applied when calculating stack flow. Generally, Pitot tubes that are used on the Hanford Site are Dwyer 160 series, manufactured to an American Society of Mechanical Engineers (ASME) design that meets American National Standards Institute (ANSI)/Air Movement and Control Association (AMCA) 210-99 [ANSI/ American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) 51-1999] codes and comply with 40 CFR 60 Appendix A Method 2 construction specifications. Dwyer 160-series Pitot tubes have baseline coefficients of 1.0 for standard Pitot tubes and 0.84 for type S Pitot tubes. Measurements are made on a periodic schedule established by the facilities.

I-1.5 MSA Environmental Integration

The Environmental Integration (EI) group within the MSA manages the radioactive air emissions sample analysis and compliance reporting for facilities managed by CHPRC and other prime contractors to RL and DOE, Office of River Protection (ORP). Responsibilities include managing radioactive air emissions data, advising on engineering and regulatory matters, and submitting required reports to EPA, WDOH, and DOE. EI is also responsible for assuring the required quality assurance related to the sample analysis and reporting aspects.

The MSA's EI group works with the CHPRC points of contact to address any concerns over known or suspected elevated emissions from normal or unplanned operations. To ensure an appropriate and prompt response to such situations, the CHPRC projects, with assistance from CHPRC Environmental Protection, relies on their subject matter experts and internal procedures such as PRC-PRO-EP-15333, *Environmental Protection Processes* and PRC-PRO-EP-15334.

The CHPRC Environmental Quality Assurance group is also responsible for independent assessments of the CHPRC radioactive air emissions monitoring program by adherence to CHPRC-00189.

I-2 Radioactive Air Emissions Data Generation and Acquisition

CHPRC projects operate and maintain required air monitoring equipment at CHPRC facilities, as well as transport air samples using chain-of-custody to the analytical laboratory. CHPRC supports the verification and validation of sample data and input to the required reporting and certification, for annual reporting of emissions to EPA, WDOH, and DOE RL. These actions are carried out by implementing the requirements listed in the internal procedure on effluent and environmental monitoring, PRC-PRO-EP-15334, for radioactive air emissions measurement and sampling systems. Additionally, sufficient facility-specific information is provided to allow identification of sample analytes of interest, required minimum

detectable quantities, and to assure performance of required compliance assessments of radioactive air emissions sampling and measurement equipment and records.

The CHPRC projects and environmental protection support group address concerns over known or suspected elevated emissions from normal or unplanned operations. To ensure an appropriate and prompt response to such situations, CHPRC relies on subject matter experts and internal procedures such as PRC-PRO-EP-15333 and PRC-PRO-EP-15334. If the concerns involve sample analysis or resulting data, the MSA EI group coordinates with the affected CHPRC facility to ensure appropriate and prompt response.

The MSA analytical laboratory conducts the sample analyses, sample data compilation, internal reporting, and overall sample and data quality assurance.

MSA's EI group validates the radioactive air emissions laboratory sample analyses, compiling stack flow rate data, performing as-needed final calculations, validation and verification of the laboratory data and calculations, and preparing required reports for CHPRC and the Hanford Site. For CHPRC, the MSA EI group coordinates sample schedules and identifies the analytical laboratory technical requirements for radioactive air sample analyses, including identifying specific radionuclides to be analyzed and limits of analytical detection. The CHPRC cooperates with the MSA to assist with field sample data and laboratory data results validation and verification. The MSA portion of the activities are performed in accordance with HNF-PRO-15334 and EPMR desk instruction EP-DI-605 (http://www7.rl.gov/rapidweb/ENVPRO/docs/136/docs/di-605.pdf). The CHPRC portion for the activities are performed in accordance with the PRC-PRO-EP-15334 and this QAPjP.

I-2.1 Radioactive Air Emissions Measurement Program

The CHPRC is responsible for implementing the requirements listed in its internal procedure on effluent and environmental monitoring, PRC-PRO-EP-15334 for radioactive air emissions monitoring and sampling systems. Additional CHPRC responsibilities include providing the MSA with laboratory analysis needs for each emissions sample, including analytes of interest and required minimum detectable quantities. The CHPRC is responsible for conducting the required compliance assessments of radioactive air emissions sampling and monitoring equipment and records.

Responsibilities assigned for sampling, analysis, data compilation, reporting, and oversight are described in the following subsections, as required by Method 114 §4.1.

Sampling collection and stack monitoring procedures are described in Method 114 Section 2, *Stack Monitoring and Sample Collection Methods.*

The following is a list of major stacks managed by CHPRC and the documents that describe the monitoring methods for them relative to requirements in Method 114 §4:

Active Major Stacks	Compliance Document
105-KW Air Sparger	AIR 98-307, EPA 1998, FH-0005889
291-A-1 (PUREX)	Attachment I-2
291-T-1 (T Plant)	Attachment I-3; AIR 07-306 (NOC 711)
291-Z-1 (PFP)	Attachment I-4, AIR 06-1020 (NOC 655)
296-B-1 (B Plant)	Attachment I-5, AIR 06-1010 (NOC 645)
296-B-10 (WESF)	Attachment I-6, AIR 06-1014 (NOC 649)

Active Major Stacks	Compliance Document
296-H-212 (CSB)	AIR 06-1017 (NOC 652)
296-K-142 (CVDF)	AIR 06-1009 (NOC 643)
296-P-31 (209-E)	AIR 07-1205
296-W-4 (WRAP)	AIR 07-308 (NOC 638)
296-Z-7 (PFP)	AIR 06-1020 (NOC 655)

I-2.2 Radioactive Air Emissions Monitoring Data Management

MSA's Effluent and Near Facility Monitoring program (ENFM) has responsibility for validating radioactive air emissions laboratory sample analyses, compiling stack flow rate data, performing as-needed final calculations, validation and verification of the laboratory data and calculations, and preparing required reports for CHPRC and the Hanford Site. For CHPRC the MSA ENFM coordinates sample schedules and identifies the analytical laboratory technical requirements for radioactive air sample analyses, including identifying specific radionuclides to be analyzed and limits of analytical detection. The CHPRC cooperates with the MSA ENFM to assist with field sample data and laboratory data results validation and verification. The MSA portion of the activities are performed in accordance with HNF-PRO-15334 and EPMR desk instruction EP-DI-605 (http://www7.rl.gov/rapidweb/ENVPRO/docs/136/docs/di-605.pdf). The CHPRC portion for the activities are performed in accordance with the PRC-PRO-EP-15334 and this QAPjP.

The MSA ENFM has responsibility for compiling site-wide radioactive air emissions sampling and stack flow data for regulatory reports. Additional responsibilities include verifying sample analysis parameters received from laboratories and providing sampling schedules. The MSA ENFM assigns electronic data processing (EDP) codes (also known as location codes) for tracking samples and in support of CHPRC sampling activities, identifies the laboratory analyses to be performed. In addition, MSA ENFM provides data quality objectives (DQOs) for sampling and analysis activities in accordance with EPA 2006, *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA QA/G-4), as reflected in the annual Waste Sampling and Characterization Facility (WSCF) description-of-services (DOS) document, HNF-EP-0835. The CHPRC participates in verification and validation of the laboratory analysis data, assisting with correction/explanation of any sample errors or anomalies identified.

The MSA manages the WSCF performance of radiochemical analyses, pursuant to an annual statement of work, on sample media collected from stacks managed by the CHPRC. Specific radionuclides to be analyzed are determined with the assistance of the ECOs and facility or project stack engineers. Laboratory responsibilities include the incorporation of the laboratory analytical data into existing laboratory data files for timely retrieval by the MSA EI group and CHPRC ECOs and facility management and support staff. The WSCF has a QA plan and analytical procedures that meet the requirements of Method 114.

I-2.2.1 Reporting of Airborne Releases

Radioactive air emissions data are used to support the reporting of releases of airborne radioactivity from the Hanford Site and the corresponding dose to the maximally exposed member of the public. This reporting is conducted annually in accordance with 40 Code of Federal Regulations (CFR) 61 Subpart H and Washington Administrative Code (WAC) 246-247, "Radiation Protection - Air Emissions", as well as the DOE Order 5400.5, *Radiation Protection of the Public and the Environment*. Collection, compilation,

calculation, verification, and validation of radioactive air emissions data are the primary steps in a process by which samples are collected from selected stacks and ambient air locations, analyzed in a laboratory to detect amounts of specified radioactive materials, and the results validated and documented in the reports. Quantified data on releases from ongoing activities through the use of structured data collection and trending are provided to management via annual emission and environmental reports.

The MSA contractor has primary responsibility for preparing all reports of point-source radioactive air emissions data for submission to U.S. Environmental Protection Agency (EPA), Washington State Department of Health (WDOH), and RL.

The activities specific to radioactive air emissions measurements and reporting include the following:

- Completion and recording of laboratory analyses performed to detect the presence of radioactive materials on particulate filter media, charcoal cartridge filters, silver-zeolite cartridges, sodium hydroxide media, and silica gel or Drierite[1] ($CaSO_4$) cartridges
- Compilation of laboratory analyses data, reflecting measured stack flow data or maximum stack flow rates to derive releases of radioactivity and average concentrations of radioactivity in sampled emissions
- Calculation of quantities of radionuclides released and average concentrations for a calendar year for a specific discharge point or a specific area on the Hanford Site
- Validation of acquired data
- Preparation and release of reports identified above.

I-2.2.2 Waste Sampling and Characterization Facility

WSCF personnel perform radiochemical analyses, pursuant to an annual statement of work (HNF-EP-0835-15, *Statement of Work for Services Provided by the Waste Sampling and Characterization Facility for the Effluent and Environmental Monitoring Program During Calendar Year 2009*), on sample media collected from stacks managed by CHPRC as well as other site contractors. Specific radionuclides to be analyzed are determined by MSA EI with the assistance of the ECOs and facility or project stack engineers. Laboratory responsibilities include the incorporation of the laboratory analytical data into existing laboratory data files for timely electronic transmission to MSA EI to support annual reporting. WSCF has a QA plan and analytical procedures that meet the requirements of Method 114.

I-2.2.3 Pacific Northwest National Laboratory

Pacific Northwest National Laboratory (PNNL) has been designated by RL to perform dose modeling for the Hanford Site, including dose modeling of stacks operated by CHPRC. PNNL derives effective dose equivalents using an EPA approved dose model (i.e., CAP88 PC). Dose modeling results supplied by PNNL are included in the annual Radionuclide Air Emission Report for the Hanford Site (e.g., DOE/RL-2008-03, *Radionuclide Air Emissions Report for the Hanford Site, Calendar Year 2007*) prepared for EPA, WDOH, and DOE, and in the annual Hanford Site Environmental Report prepared by PNNL for DOE (e.g., PNNL-15892, *Hanford Site Environmental Surveillance Data Report for Calendar Year 2005*).

MSA and PNNL also maintain DOE/RL-2007-53, *Methods for Calculating Doses to Demonstrate Compliance with Air Pathway Radiation Dose Standards at the Hanford Site*, which describes the

[1] Drierite is a trade name for for anhydrous calcium sulfate manufactured by Drierite Co., Xenia, OH

methods and procedures used annually for determining the Hanford Site maximally exposed individual (MEI) for DOE Hanford Site dose standard compliance. It also serves somewhat as a history of the sources and development of Hanford Site methods.

I-3 Assessment and Oversight

In addition to the federal and state documents referenced above, this quality assurance project plan (QAPjP) also conforms to the requirements in the latest revisions of PRC-MP-QA-599, *Quality Assurance Program*, and CHPRC-00189, *CH2M HILL Plateau Remediation Company Environmental Quality Assurance Program Plan* (EQAPP). Where appropriate, this QAPjP applies to monitoring and reporting of radioactive air emissions from both major and minor stacks managed by CHPRC, as well as fugitive and diffuse sources. The implementing procedures, plans, and instructions are appropriate for the control of radioactive air emissions data, as required by Method 114 and applicable DOE Orders.

Distribution and control of this QAPjP are in compliance with PRC-PRO-IRM-8310, *Document Control Processes*. This QAPjP is reviewed and updated annually or whenever significant changes are made to the program. A reduced set of quality actions has been imposed on minor stacks — i.e., reduced compared to quality actions required for major stacks — via Section 4.0 of "The Department of Energy Hanford Site Radioactive Air Emissions License, #FF-01." Those actions are intended to assure and confirm the quality of periodic measurements of emissions from minor point source emission units that use sample extraction as the approved form of periodic confirmatory measurement. Such measurements are required to confirm that emissions from such sources have remained low. Those reduced quality actions are summarized in the following:

- Implementation of quality checks supporting the periodic confirmatory measurements. These checks shall assure that the emissions measurements are sufficient to verify low emissions.
- Stack flow measurements shall be conducted annually.
- An annual calibration will be performed on the existing sample flow meter or an annual function check will be performed if the flow meter is replaced by either a rotameter or a magnahelic gauge.
- Effluent samples shall be collected on standard (i.e., very high efficiency particulate air) sample filters.
- Laboratory sample analysis will meet the requirements of 40 CFR 61, Appendix B, Method 114(3).
- The following items shall be documented in a National Emission Standards for Hazardous Air Pollutants (NESHAP) quality assurance project plan or other documents:
  - The sample collection and analysis procedures used (refer to facility-specific procedures and HNF-EP-0835-15)
  - The quality control (QC) program for evaluating and tracking the quality of the periodic confirmatory measurement data against preset criteria (refer to HNF-EP-0528-8). The QC program should include, where applicable, a system of replicates, spiked samples, split samples, blanks and control charts. The number and frequency of such QC checks shall be identified (refer to HNF-EP-0528-8 and HNF-EP-0835-15).
  - The sample tracking system to provide positive identification of samples and data through all phases of the sample collection, analysis, and reporting system (refer to Section I-3). Sample handling and preservation procedures to maintain the integrity of the samples during collection,

storage, and analysis (refer to Section I-3; PRC-PRO-EP-15334; HNF-PRO-15334, *Effluent and Environmental Monitoring*; HNF-EP-0835-15; and Automated Bar Coding of All Samples at Hanford (ABCASH)).

CHPRC is responsible for collecting stack emission samples, associated sampling information, and stack flow rate measurements at facilities it manages. Stack samples are submitted to WSCF for analysis, and the flow rate measurements are provided to MSA EI. CHPRC also is responsible for reviewing various information and reports cited in this QAPjP and retaining required records.

Item	Task	Performed by MSA EI with Review/Concurrence by CHPRC	Performed by CHPRC
1	Provide analytical criteria and detection limits for radioanalysis	X	
2	Annual documenting of WSCF analytical services, which includes sampling and analytical requirements and sampling schedules2	X	
3	Collect samples of radioactive air emissions from stacks and record information on sample envelope data and/or into ABCASH via handheld barcode scanners2		X
4	Analyze samples	X	
5	Audit laboratory QA/QC	X	
6	Prepare radioactive air emissions sampling and monitoring data compilation and reporting procedures	X	
7	Verify measured stack flow data from V&B and transmit to MSA EI for annual reporting		X
8	Verify sample analyses	X	
9	Compile sampling results, flow data, and data on duration of operation into annual releases in curie quantities and annual average concentrations	X	
10	Prepare annual emissions and releases reports	X	
11	Compute annual effective dose equivalent to maximally exposed member of the public from Hanford Site radioactive emissions	X	
12	Conduct programmatic audits of emissions data handling	X	X
13	Conduct compliance assessments on radiological air sampling and monitoring systems		X

I-3.1 NESHAP Quality Assurance Requirements

The QA sub-elements of 40 CFR 61, Subpart H, Appendix B, Method 114, §4.0 are addressed as follows:

- §4.1 The organizational structure, functional responsibilities, levels of authority, and lines of communication for all activities related to the emissions monitoring program shall be identified and documented: refer to Section I-1 of this document.

- §4.2 Administrative controls shall be prescribed to ensure prompt response in the event that emission levels increase due to unplanned operations: refer to Sections I-1.1.2, I-2, and I-4 of this document.
- §4.3 The sample collection and analysis procedures used in measuring the emissions shall be described: refer to list of documents in Section I-2.1 of this document and the Attachments.
- §4.4 The objectives of the QA program shall be documented and shall state the required precision, accuracy, and completeness of the emission measurement data including a description of the procedures used to assess these parameters: refer also to Sections I-3 and I-4 of this document, and HNF-EP-0835.
- §4.5 A QC program shall be established to evaluate and track the quality of the emissions measurement data against preset criteria. The program should include where applicable a system of replicates, spiked samples, split samples, blanks, and control charts. The number and frequency of such QC checks shall be identified: refer to HNF-EP-0835.
- §4.6 A sample tracking system shall be established to provide for positive identification of samples and data through all phases of the sample collection, analysis, and reporting system. Sample handling and preservation procedures shall be established to maintain the integrity of samples during collection, storage, and transport: refer to PRC-PRO-EP-15334, Section I-3of this document, and ABCASH.
- §4.7 Regular maintenance, calibration, and field checks shall be performed for each sampling system in use by satisfying the requirements found in Table 2—Maintenance, Calibration, and Field Check Requirements: refer to Attachments I-1 through I-11, other documents listed in Section I-2 of this document, PRC-PRO-EP-15334, and facility-specific procedures.
- §4.8 Periodic internal and external audits shall be performed to monitor compliance with the QA program. These audits shall be performed in accordance with written procedures and conducted by personnel who do not have responsibility for performing any of the operations being audited: refer to Section I-3 of this document and to PRC-PRO-QA-9662,*Independent Assessment Process*
- §4.9 A corrective action program shall be established including criteria for when corrective action is needed, what corrective actions will be taken and who is responsible for taking the corrective action: refer to Section I-3of this document, and to PRC-PRO-QA-052, *Issues Management*.
- §4.10 Periodic reports to responsible management shall be prepared on the performance of the emissions measurements program. These reports should include assessment of the quality of the data, results of audits, and description of corrective actions: refer to Section I-3 of this document.
- §4.11 The QA program should be documented in a quality assurance project plan (QAPjP) that should address each of the above requirements: refer to the purpose of this document.

I-3.2 Organizations Responsible for QA

QA oversight of the radioactive air emissions monitoring responsibilities carried out by CHPRC is performed by the CHPRC Environment Quality Assurance (EQA) organization. On a periodic basis, the CHPRC EQA group conducts internal and external audits of the radioactive air emissions monitoring activities of the CHPRC program. Those assessments are performed in accordance with PRC-PRO-QA-9662, *Independent Assessment Process*.

The CHPRC EQA group is responsible for the following CHPRC radioactive air emissions QA oversight activities:

- Scheduling and conducting QA surveillances of air emissions activities in accordance with PRC-PRO-QA-9769.
- Reviewing documents to assure data quality and QA objectives are met
- Verifying resolution of nonconforming items
- Reviewing sample system design, operation, sample collection, and sample chain-of-custody
- Verifying use of qualified analytical laboratories for sample analysis
- Serving as interpretative authority for environmental QA requirements
- Assessing and evaluating the effectiveness of implementation of this QAPjP
- Serving as the focal point for EQA-related issues
- Approval of this QAPjP
- Other environmental documentation related to quality and environmental activities.

The MSA is responsible for the following:

- Reviewing and approving sample analysis and reporting activities as applied to WSCF laboratory -- implementing contractual and regulatory QA requirements
- Reviewing and approving WSCF procedures specific to radioactive air emissions sample chain-of-custody, sample analysis, and data and records management
- Scheduling and conducting QA surveillances of air emissions activities for the WSCF laboratory analysis of air emission stack samples.

I-3.2.1 MSA, Environmental Integration

The EI group within the MSA manages the radioactive air emissions sample analysis and compliance reporting for facilities managed by CHPRC, and other prime contractors to RL and ORP. Responsibilities include managing radioactive air emissions data, advising on engineering and regulatory matters, and submitting required reports to EPA, WDOH, and DOE. EI is also responsible for ensuring the required quality assurance related to the sample analysis and reporting aspects.

The MSA's EI group works with the CHPRC points of contact to address any concerns over known or suspected elevated emissions from normal or unplanned operations. To ensure an appropriate and prompt response to such situations, the CHPRC projects, with assistance from CHPRC Environmental Protection, relies on their subject matter experts and internal procedures such as PRC-PRO-EP-15333 and PRC-PRO-EP-15334.

The CHPRC EQA group is also responsible for independent assessments of the CHPRC radioactive air emissions monitoring program by adherence to CHPRC-00189.

I-3.2.2 CHPRC Environmental Compliance Officers

ECOs or their delegates have responsibility for project environmental compliance, and technical and engineering aspects are delegated to project engineers. ECOs or their delegates review the stack flow data

from measurements performed by V&B personnel. ECOs are responsible for monitoring stack emissions data for their facilities and assisting in evaluating concerns over elevated emissions, which might require notification to regulators as well as corrective actions. They also review the DOS document or MSA internal statement of work issued annually by MSA EI that lists laboratory analytical services and sampling schedules. As changes in operating conditions and/or source terms at facilities occur, ECOs may, in consultation and with approval of CHPRC technical and project engineering, direct the addition or deletion of radionuclides identified for sampling and analysis.

I-4 Data Verification and Validation

MSA EI, in consultation with CHPRC ECOs and subject matter experts (SMEs), verifies and validates effluent and environmental data for reporting and decision-making. The data is verified by ensuring that the quantity and type of samples collected and analyses performed are adequate to meet regulatory, sampling, and analytical requirements. The data is also validated by ensuring that it is of the type and quality suitable for the intended use.

Verification and validation of effluent and environmental sampling and analysis data are important quality assurance objective (QAO) activities that are performed by qualified laboratory, facility, and environmental support personnel. When properly done, these two comprehensive QAO activities increase the probability of acquiring quality data having a high degree of accuracy (see WAC 246-247-075(13)). The following definitions of validation and verification are from EPA 2001 (*EPA Requirements for Quality Assurance Project Plans,* EPA QA/R-5):

Validation: Confirmation by examination and provision of objective evidence that particular requirements for a specified use are fulfilled. In design and development, validation concerns the process of examining a product or result to determine conformance to user needs. To supplement this is another definition of data validation, from EPA 2002, *Guidance on Environmental Data Verification and Data Validation,* (EPA QA/G-8): It is an analyte-specific and sample-specific process that extends the evaluation of data beyond method, procedural, or contractual compliance (i.e., data verification) to determine the analytical quality of a specific data set.

Verification: Confirmation by examination and provision of objective evidence that specified requirements have been fulfilled. In design and development, verification concerns the process of examining a result of a given activity to determine conformance to the stated requirements for that activity. To supplement this is another definition of data verification, from EPA QA/G-8: It is the process of evaluating the completeness, correctness, and conformance/compliance of a specific data set against method, procedural, and/or contractual requirements.

To varying degrees, all parties involved in the sampling, analysis, and reporting program perform verification and validation on samples, effluent flow measurements, and resulting analytical data, which are the central elements of the entire program. For example, field sample collectors follow procedures and sampling schedules to assure samples are properly handled, exchanged on time, and, if possible, of nominal volume; technical support specialists measure effluent flow rates. MSA analytical laboratory personnel adhere to analytical procedures in accordance with national standards and the laboratory QAPP; and MSA EI personnel evaluate the sample data for completeness and for representativeness to expected as well as historical and regulatory values before approving them to be of adequate quality and sufficiently verified and validated for their intended use, which is usually to comply with federal and state reporting requirements. With regard to stack emissions data, for instance, the data evaluations include comparing those data against laboratory minimum detectable concentrations (MDCs) (2.0E–15 μCi/L for gross alpha and 1.9E–14 μCi/L for gross beta), concentration guides (e.g., DOE Derived Concentration Guides [DCGs] and Table 2 Appendix E of 40 CFR 61), and multi-year concentration trends of each stack

(typically in the range of 5.0E–14 μCi/L to 5.1E–16 μCi/L for gross alpha, and 8.3E–14 μCi/L and 2.0E-16 μCi/L for gross beta [these ranges vary within approximately a factor of 10 according to the facility source terms]). Part of these evaluations is to keep in view the relative position stack concentrations have to MDCs, DCGs, and Table 2 concentrations.

Those stack concentrations, and respective yearly releases, are also roughly projected to a potential annual radiological dose to an MEI member of the public, which is then compared with the MEI dose limit of 10 mrem/yr.

To borrow further from EPA QA/G-8: "Data verification is primarily an evaluation of performance against pre-determined (and often generic) requirements given in a document such as an analytical method procedure or a contract. Data validation, on the other hand, focuses on particular data needs for a project, as stated in a project-specific document such as a Quality Assurance (QA) Project Plan. Furthermore, data verification and data validation are typically sequential steps performed by different parties." and "[d]ata validation begins with the outputs from data verification. The definitions and approaches described in this guidance are not intended to be prescriptive or necessarily to be applied rigidly across all programs, organizations, and circumstances."

Laboratories analyze effluent and environmental samples; technical support and facility groups measure effluent flows, collect samples, and record operating and sampling information. These organizations supply EPMR with all pertinent operating, sampling, and analytical data needed to perform effluent and environmental compliance calculations, evaluations, and reports.

The facility support personnel, laboratory personnel, and EPMR generally follow these types of steps during the verification phase of data review:

- Confirming the quantity of sample meets requirements, which includes sampling periods, sample volume, and number of samples (i.e., completeness)
- Confirming an appropriate sampling medium was used to collect the sample
- Confirming the sample analyses performed meet requirements and are appropriate to the sample medium
- Confirming that chain-of-custody and physical integrity of the samples were acceptably maintained
- Confirming that sample data are handled properly and available within time constraints.

MSA Laboratory personnel and MSA EI personnel in consultation with CHPRC ECOs and environmental support SMEs generally follow some or all of these types of steps during the validation phase of data review:

- Identifying values acquired under significant deviations from standard operating procedures and possibly correcting or removing them
- Identifying and correcting mistakes and errors during data transfer
- Identifying periods during which baselines or calibrations deviated from tolerable limits, and then identifying, denoting, correcting, or removing data acquired during those periods
- Checking the internal consistency of simultaneous measurements, making corrections when possible, and denoting when corrections are not possible
- Checking outlying values to determine whether a measurement process error was responsible

- Checking consistency of measurements with expectations.

Once these verification and validation steps have been completed, the data may still exhibit indications of a statistically significant anomalous event or the appearance of a measurement error that has not been satisfactorily explained. At this point, the data evaluator traces the path of the measurement to establish whether a measurement error is involved. If that explanation is reasonably eliminated, the data may be used as indicative of a real event.

The data management activities further include ABCASH data downloading and effluent flow data entry into the MSA-managed Environmental Reporting System (ERS), release and flow calculations, and data formatting for reports. Most laboratory analytical data are formatted for direct electronic downloading from ABCASH into ERS, but some data, such as flow measurements, currently are not and must be loaded using separately created text files. MSA EI staff who verify and validate effluent and environmental data are experienced with the mathematical methods described in this document and with commonly used units of measure.

The majority of the data calculations are performed within ABCASH and ERS. ABCASH calculates sample concentrations in μCi/mL by dividing the amount of radioactivity (in either μCi or pCi) per sample by the volume of sampled emissions. ERS performs calculations by multiplying laboratory analytical data (i.e., concentrations in μCi/mL) by stack emission or liquid effluent volumes to yield total releases of analytes, usually in Ci. These calculations also render average concentrations of analytes, weighted over the selected time range of reporting. These data are presented in ERS generated release reports. Individual sample and flow data, including actual sampling periods, are presented in ERS-generated trend reports. The resulting release and trend data are verified and validated through:

- Evaluation by cognizant MSA EI staff members and CHPRC ECOs and support SMEs who compare the data for reasonableness against historical data of generally the past five years, or more years if indicated; this evaluation is an ongoing process throughout each calendar year as effluent data for that year accumulate in ABCASH and ERS

- Periodic evaluation throughout the calendar year by MSA EI staff members and CHPRC ECOs and support SMEs and qualified representatives of facilities that generated the air emissions

- Further in-depth evaluation by MSA EI staff and qualified CHPRC facility representatives during the yearly review cycle required before annual reports of air emission and liquid effluent data are published

- An ERS anomaly program that identifies data lying outside preset control ranges based on compliance levels and degree of increase, or decrease, of release in relation to historical trends; if suspect data are identified, they and any identified underlying causes are investigated until determined to be genuine, erroneous, or perpetually suspect (i.e., no definitive explanation found). Suspect data are corrected to the fullest extent possible. For cases in which no complete resolution can be further developed, prudently applied scientific judgment is the only recourse for disposing questionable data.

  Dispositions may include the primary option of retaining and reporting the data as is or keeping the data in the databases but not reporting them. Not reporting questionable data should be supported by adequate scientific reasoning, such as a "measured" radionuclide having too short a half-life to reasonably exist in measurable amounts in the emissions of a particular source term. The potential impact of questionable data to the dose standard for the Hanford Site is also considered when disposing questionable data. If, for instance, based upon historical measurements, the ostensible

presence of a short-lived radionuclide in a sample result were not expected and its dose impact were inconsequential, the inclination would generally be to not report that value.

Sampling and analysis of radionuclide air emissions are performed in accordance with the schedule in the DOS document. The resulting sampling and analytical data are available in ABCASH for the vast majority of stacks. MSA EI effluent engineers, and CHPRC scientists and health physicists throughout each year evaluate those analytical results. Normally this evaluation, a key part of the verification and validation process, is done in concert with cognizant CHPRC facility personnel who participate in the evaluation by reviewing periodic data packages compiled by MSA EI. The data are evaluated for consistency with historically expected concentrations for each emission source; sufficient sampling times and/or volumes; anomalies in timer, totalizer, rotameter, and/or vacuum gauge readings; and laboratory analytical uncertainties, being mindful of contractually stipulated MDCs. Eventually, after the data are validated within ABCASH, they are transferred to ERS, which has a built-in anomaly detection program. This program identifies potential statistical discrepancies in the data, usually involving sampling time overlaps and concentrations that may be two- to three-sigma higher than historical averages.

Essential to verifying and validating emissions data is reviewing basic and typical sampling parameter information associated with nearly every sample. That information is as follows:

Date On	Date sample filter installed in record sampler (should match date off of previous sample collected)
Time On	Time sample filter installed in recorded sampler (typically should be within 30 minutes of the time off of the previous sample)
Date Off	Date sample filter collected
Time Off	Time sample filter removed from record sampler
Timer hours	Total hours sample collected (value taken from the timer may differ from actual elapsed sampling time, in which case, the timer value is normally less)
Vacuum On	Measure of suction pressure through stack sampling system with filter installed
Vacuum Off	Measure of suction pressure through stack sampling system just prior to filter removal
Rotameter On	Measure of flow rate through sampling line with filter installed; flow rate is typically at or near 2 cfm or as appropriate for the particular stack sampling system for near-isokinetic collection of stack particulate emission sample
Rotameter Off	Measure of flow rate through sampling line with filter removed

MSA EI personnel in consultation with CHPRC ECOs and SMEs perform the following when anomalies are noted between the data received from WSCF and the sampling information:

- When dates or times are missing, contact the point-of-contact at the facility from which the emission originated and request documented information on the sample in question from the respective sample logbook. If the date on or time on is not available, enter the date off and time off of the sample from the previous week. If date off or time off is missing, enter the date on and time on from the sample of the following week.
- When no rotameter readings are recorded, ABCASH defaults to 2 cfm, which is the typical flow rate for the majority of Hanford Site stack samplers.

- When no vacuum readings are recorded, ABCASH defaults to 1 in. Hg as the assumed value.
- Document all corrections in ABCASH to maintain audit trail.

Appendix I

Attachments

40 CFR 61, Appendix B, Method 114, Section 4 Compliance Demonstrations

The following is the list of major stacks managed by CHPRC and the Appendices describing the monitoring methods for them relative to requirements in Method 114 §4:

Attachment	Stack
I-1	105-KW Air Sparger
I-2	291-A-1 (PUREX) Stack
I-3	291-T-1 (T Plant)
I-4	291-Z-1 (Plutonium Finishing Plant)
I-5	296-B-1 (B Plant)
I-6	296-B-10 (Waste Encapsulation and Storage Facility)
I-7	296-H-212 (Canister Storage Building)
I-8	296-K-142 (Cold Vacuum Drying Facility)
I-9	296-P-31 (209-E)
I-10	296-W-4 (Waste Receiving and Processing Facility)
I-11	296-Z-7 (Plutonium Finishing Plant)

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Attachment I-1
105-KW Air Sparger

Compliance Document Contents:

1. Letter AIR 98-307 (IDMS Accession #DA03908661)
2. Letter EPA 1998 (IDMS Accession #D8195755)
3. Letter FH-0005889 (IDMS Accession #D8467852)

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Attachment I-2

291-A-1 (PUREX) Stack

Method 114 Comparison for 291-A-1 Stack

In this appendix, a requirement-by-requirement recitation and response is given, which describes the state of compliance of the 291-A-1 Stack at the Plutonium-Uranium Extraction (PUREX) Plant with the radionuclide emission requirements defined in Method 114. Requirements from Method 114 are directly quoted by section number. Responses that detail the state of compliance appear in italics text immediately following the requirements.

I-2-1.0 Purpose and Background

This method provides the requirements for:

- Stack monitoring and sample collection methods appropriate for radionuclides
- Radiochemical methods that are used to determine the amounts of radionuclides collected by the stack sampling
- QA methods that are conducted in conjunction with these measurements.

These methods are appropriate for emissions for stationary sources. A list of references is provided.

Many different types of facilities release radionuclides into air. These radionuclides differ in the chemical and physical forms, half-lives, and type of radiation emitted. The appropriate combination of sample extraction, collection, and analysis for an individual radionuclide is dependent upon many interrelated factors including the mixture of other radionuclides present. Because of this wide range of conditions, no single method for monitoring or sample collection and analysis of a radionuclide is applicable to all types of facilities. Therefore, a series of methods based on "principles of measurement" is described for monitoring and sample collection and analysis that are applicable to the measurement of radionuclides found in effluent streams at stationary sources. This approach provides the user with the flexibility to choose the most appropriate combination of monitoring and sample collection and analysis methods that are applicable to the effluent stream to be measured.

Response: No response required

I-2-2.0 Stack Monitoring and Sample Collection Methods

Monitoring and sample collection methods are described based on "principles of monitoring and sample collection" that are applicable to the measurement of radionuclides from effluent streams at stationary sources. Radionuclides of most elements will be in the particulate form in these effluent streams and can be readily collected using suitable filter media. Radionuclides of hydrogen, oxygen, carbon, nitrogen, the noble gases, and in some circumstances iodine, will be in the gaseous form. Radionuclides of these elements will require either the use of an in-line or off-line monitor to directly measure the radionuclides, or suitable sorbers, condensers, or bubblers to collect the radionuclides.

Response: No response required

I-2-2.1 Radionuclides as Particulates

The extracted effluent stream is passed through a filter to remove the particulates. The filter must have a high efficiency for removal of sub-micron particles. The guidance in ANSI N13.1-1999 (§6.6.2 Filter media) shall be followed in using filter media to collect particulates (incorporated by reference—see 40 CFR 61 Subpart H §61.18).

Response: Particles from sampled stack emissions are collected on a 47 mm-diameter Versapor 3000 filter, an acrylic copolymer membrane supported by a non-woven polyester or nylon fabric. This filter is rated in ANSI/HPS N13.1–1999, Table D.1 to be from 99.7 to >99.99 percent efficient for particles in the range of 0.035 to 1μm.

I-2-2.2 Radionuclides as Gases

The following sections provide guidance for radionuclides as gases.

I-2-2.2.1 Tritium (H-3)

Tritium in the form of water vapor is collected from the extracted effluent sample by sorption, condensation, or dissolution techniques. Appropriate collectors may include silica gel, molecular sieves, and ethylene glycol or water bubblers.

Tritium in the gaseous form may be measured directly in the sample stream using Method B-1, collected as a gas sample, or may be oxidized to tritiated water using a metal catalyst and collected as described above.

Response: Irradiated fuel has not been introduced into PUREX for several years. No dissolutions have been performed since late 1989. Gaseous sampling systems have shown that the levels of tritium have fallen to levels at or below analytical detection limits, which are also well below environmental release and monitoring limits. Consequently, sampling for tritium is no longer required or performed.

I-2-2.2.2 Iodine

Iodine is collected from an extracted sample by sorption or dissolution techniques. Appropriate collectors may include charcoal, impregnated charcoal, metal zeolite, and caustic solutions.

Response: Irradiated fuel has not been introduced into PUREX for several years. No dissolutions have been performed since late 1989. Iodine-131 has decayed to essentially zero, leaving only the longer-lived 129I. Despite the low activity and low dose potential of 129I, sampling and analysis for iodine (using silver-zeolite cartridges) continues, since 129I emissions remain the largest contributor of actual emissions doses from the 291-A-1 stack, and the results have value in tracking offsite radionuclides emitted from Hanford Site stacks. Iodine sampling at the 291-A-1 stack is not required by 40 CFR 61 or WAC 246-247.

I-2-2.2.3 Argon, Krypton, and Xenon

Radionuclides of these elements are either measured directly by an in-line or off-line monitor, or are collected from the extracted sample by low-temperature sorption techniques. Appropriate sorbers may include charcoal or metal zeolite.

Response: Irradiated fuel has not been introduced into PUREX for several years. No dissolutions have been performed since late 1989. Sampling for these gaseous radionuclides is no longer required or performed. The release of other radioactive gases decreased even more rapidly than for these nuclides. No 40 CFR 61 requirement exists to sample for these gaseous radionuclides.

I-2-2.2.4 Oxygen, Carbon, Nitrogen, and Radon

Radionuclides of these elements are measured directly using an in line or off line monitor. Radionuclides of carbon in the form of CO2 may be collected by dissolution in caustic solutions.

Response: Irradiated fuel has not been introduced into PUREX for several years. No dissolutions have been performed since late 1989. Gaseous sampling systems have shown that the levels of 14C have fallen to levels at or below analytical detection limits, which are also well below environmental release and monitoring limits. Consequently, sampling for this radionuclide is no longer required or performed.

I-2-2.3 Definition of Terms

Response: No response required

I-2-3.0 Radionuclide Analysis Methods

Response: Analysis methods are included as in HNF-SD-CP-QAPP-017, Rev. 9, ***Waste Sampling and Characterization Facility Quality Assurance Program Plan*** *which has been evaluated by WSCF personnel.*

I-2-4.0 Quality Assurance Methods

Each facility required to measure their radionuclide emissions shall conduct a QA program in conjunction with the radionuclide emission measurements. This program shall assure that the emission measurements are representative and are of known precision and accuracy, and shall include administrative controls to assure prompt response when emission measurements indicate unexpectedly large emissions. The program shall consist of a system of policies, organizational responsibilities, written procedures, data quality specifications, audits, corrective actions, and reports. This QA program shall include the program elements that follow.

I-2-4.1 The organizational structure, functional responsibilities, levels of authority, and lines of communications for all activities related to the emissions measurement program shall be identified and documented.

Response: Refer to §2.5 in the main body of this document.

I-2-4.2 Administrative controls shall be prescribed to ensure prompt response in the event that emission levels increase due to unplanned operations.

Response: The facility is shut down and processing has ceased; therefore, unplanned operations resulting in increased emissions are unlikely. Administrative controls are in place for trending emissions data in accordance with procedure PRC-PRO-EP-15333, §5.14, and notification in accordance with procedure PRC-PRO-EP-15333, §5.56.

I-2-4.3 The sample collection and analysis procedures used in measuring the emissions shall be described, including where applicable:

I-2-4.3.1 Identification of sampling sites and number of sampling points, including the rationale for site selections.

Response: Only one sampling site is currently being used for obtaining samples from the PUREX 291-A-1 stack. The elevation of the active sampling site is 22.6 m (74 ft) above grade. The location was chosen to assure a well-mixed, fully developed flow, in compliance with the criteria of ANSI-N13.1-1969 (§4.2.1.2: "The sampling point should be a minimum of five diameters downstream from abrupt changes in flow

direction or prominent transitions") and of 40 CFR 60, Appendix A, Method 1 (§11.1.1: "Sampling and/or velocity measurements are performed at a site located at least eight stack or duct diameters downstream and two diameters upstream from any flow disturbance such as a bend, expansion, or contraction in the stack, or from a visible flame. If necessary, an alternative location may be selected at a position at least two stack or duct diameters downstream and a half diameter upstream from any flow disturbance").

The 291-A-1 stack is 2.1 m (7 ft) in diameter, based on the dimension of a steel liner inside the concrete stack. The last major disturbance in the air flow is at the connection of the underground effluent tunnel to the stack where the air is redirected up the stack. This transition is at grade level; therefore, the sampling site is more than 10 times the diameter downstream from the last major disturbance.

The 291-A-1 stack is 61 m (200 ft) high, or more than 28 times the diameter above grade. The active sampling site is therefore approximately 18 diameters from the top of the stack.

The continuous sampling involves particulate collection on a record filter (EDP code A006), and iodine gas collection on a silver-zeolite cartridge (EDP code A007). To ensure representative particulate sampling, the sample is withdrawn from the stack via a Kurz six-nozzle multipoint probe. The number and position of nozzles were designed to comply with ANSI N13.1-1969 to provide representative sampling of stack emissions.

I-2-4.3.2 A description of the sampling probe and representativeness of the samples.

Response: To ensure representative particulate sampling, the sample probe is located, designed, and operated in accordance with ANSI N13.1-1969. The probe is located over five diameters downstream from abrupt changes in accordance with ANSI N13.1-1969, §4.2.1.2. The Kurz probe (identified as SSP-V18-2) has six nozzles, located at centers of equal annular areas, in accordance with ANSI N13.1-1969 Appendix A3. The sample is withdrawn continuously from the stack at near-isokinetic flow rate in accordance with ANSI N13.1-1969, §4.2.2.3. The probe and sample line are made entirely of stainless steel. The probe design and operation comply with the required standards for representative sampling of stack emissions.

I-2-4.3.3 A description of any continuous monitoring system used to measure emissions, including the sensitivity of the system, calibration procedures, and frequency of calibration.

Response: This requirement is not applicable. Compliance is demonstrated by the continuous sampling of emissions (see next section).

I-2-4.3.4 A description of the sample collection systems for each radionuclide measured, including frequency of collection, calibration procedures, and frequency of calibration.

Response: Sample air is withdrawn continuously from the stack effluent stream by the probe as described in §4.3.2 above.

The sample is collected in two stages. The first stage is a record filter (EDP code A006) for particulate collection. The second is a silver-zeolite cartridge (EDP code A007) for iodine gas collection. The particulate filter and silver zeolite cartridge are exchanged routinely and analyzed at the WSCF Laboratory. The frequency of collection and the specific radionuclides analyzed are identified in HNF-EP-0835, which is updated annually to reflect changes. Sample collectors are not amenable to calibration; however, sample flow rate measurement instruments are calibrated as discussed in §4.3.6 below.

I-2-4.3.5 A description of the WSCF laboratory analysis procedures used for each radionuclide measured including frequency of analysis calibration procedures and frequency of calibration.

Response: See §4.3.5 of Appendix A and §4.7 below.

I-2-4.3.6 A description of the sample flow rate measurement systems or procedures, including calibration procedures and frequency of calibration.

Response: The sample flow rate measurement system consists of a rotameter and vacuum gauge. The sampling systems are inspected routinely and flow rate adjusted by a manual flow control valve to maintain a constant flow. Calibrations are performed annually in accordance with PRC-PRO-EP-15333, PRC-PRO-MN-490, and with Table A1 of §A4.7 below.

I-2-4.3.7 A description of the effluent flow rate measurement procedures, including frequency of measurements, calibration procedures, and frequency of calibration.

Response: The stack flow is relatively constant, so the emissions flow rate is measured annually by traverses with a standard Pitot tube in the rectangular duct upstream of the base of the stack using a variant of the Pitot traverse method described in 40 CFR 60 Appendix A Method 2. This variant Pitot traverse procedure was approved by EPA (EPA 9501426) because it was used in certifying the stack flow meter to 40 CFR 52 Appendix E). Flow measurement Pitot traverses are performed by V&B personnel. Calibration of V&B equipment is discussed in §2.0 of the main text.

I-2-4.4 The objectives of the QA program shall be documented and shall state the required precision, accuracy, and completeness of the emission measurement data, including a description of the procedures used to assess these parameters. Accuracy is the degree of agreement of a measurement with a true or known value. Precision is a measure of the agreement among individual measurements of the same parameters under similar conditions. Completeness is a measure of the amount of data obtained compared to the amount expected under normal conditions.

Response: Refer to §§2.4 and 2.5 of the main body of this document, Appendix A, and HNF-EP-0835.

I-2-4.5 A QC program shall be established to evaluate and track the quality of the emissions measurement data against preset criteria. The program should include, where applicable, a system of replicates, spiked samples, split samples, blanks, and control charts. The number and frequency of such QC checks shall be identified.

Response: Laboratory requirements are presented in Appendix A.

I-2-4.6 A sample tracking system shall be established to provide for positive identification of samples and data through all phases of the sample collection, analysis, and reporting system. Sample handling and preservation procedures shall be established to maintain the integrity of samples during collection, storage, and analysis.

Response: Refer to the main body and Appendix A of this document, PRC-PRO-EP-15334, HNF-EP-0835, and ABCASH.

I-2-4.7 Regular maintenance, calibrations, and field checks shall be performed for each sampling system in use by satisfying the requirements found in Table A1, Maintenance, Calibration, and Field Check Requirements.

Response: Refer to Table A1, PRC-PRO-EP-15334, and to facility-specific procedures.

I-2-4.8 Periodic internal and external audits shall be performed to monitor compliance with the QA program. These audits shall be performed in accordance with written procedures and conducted by personnel who do not have responsibility for performing any of the operations being audited.

Response: Refer to §§2.5.3 and 2.5.3.1 in the main body of this document and to PRC-PRO-QA-9769.

I-2-4.9 A corrective action program shall be established including criteria for when corrective action is needed, what corrective action will be taken, and who is responsible for taking the corrective action.

Response: Refer to PRC-PRO-QA-052.

I-2-4.10 Periodic reports to responsible management shall be prepared on the performance of the emissions measurements program. These reports should include assessment of the quality of the data, results of audits, and descriptions of corrective actions.

Response: Refer to §§2.5.3 and 2.5.3.1 in the main body of this document.

Table I-2-1. Maintenance, Calibration, and Field Check Requirements

Sampling system components	Frequency of activity
Cleaning of thermal anemometer	As required by application
Inspect Pitot tubes for contaminant deposits	At least annually
Inspect Pitot tube systems for leaks	At least annually
Inspect sharp-edged nozzles for damage	At least annually or after maintenance that could cause damage
Check nozzles for alignment, presence of deposits, or other potentially degrading factors	Annually
Check transport lines of HEPA-filtered applications to determine if cleaning is required	Annually
Clean transport lines	Visible deposits for HEPA-filtered applications; surface density of 1 g/cm2 for other applications
Inspect or test the sample system for leaks	At least annually
Check mass flow meters of sampling systems with a secondary or transfer standard	At least quarterly
Check sampling flow rate through critical flow venturis	At the start of each sampling period
Inspect rotameters of sampling systems for presence of foreign matter	At the start of each sampling period
Check response of stack flow rate systems	At least quarterly
Calibration of flow meters of sampling systems	At least annually
Calibration of effluent flow measurement devices	At least annually
Calibration of timing devices	At least annually

I-2-4.11 The QA program should be documented in a QAPjp that should address each of the above requirements.

Response: Refer to this document as a whole.

Attachment I-3

291-T-1 (T Plant)

Compliance Document Contents:

Letter AIR 07-306 (IDMS Accession #DA06434703)

Method 114 Comparison for Stack 291-T-1

In this appendix, a requirement-by-requirement recitation and response is given, which describes the state of compliance of the 291 T 1 stack at the T Plant Complex with the radionuclide emission requirements defined in Method 114. Requirements from Method 114 are directly quoted by section number. Responses that detail the state of compliance appear in italics text immediately following the requirements.

I-3-1.0 Purpose and Background

This method provides the requirements for:

- Stack monitoring and sample collection methods appropriate for radionuclides
- Radiochemical methods that are used to determine the amounts of radionuclides collected by the stack sampling
- QA methods that are conducted in conjunction with these measurements.

These methods are appropriate for emissions for stationary sources. A list of references is provided.

Many different types of facilities release radionuclides into air. These radionuclides differ in the chemical and physical forms, half-lives, and type of radiation emitted. The appropriate combination of sample extraction, collection, and analysis for an individual radionuclide is dependent upon many interrelated factors including the mixture of other radionuclides present. Because of this wide range of conditions, no single method for monitoring or sample collection and analysis of a radionuclide is applicable to all types of facilities. Therefore, a series of methods based on "principles of measurement" is described for monitoring and sample collection and analysis that are applicable to the measurement of radionuclides found in effluent streams at stationary sources. This approach provides the user with the flexibility to choose the most appropriate combination of monitoring and sample collection and analysis methods that are applicable to the effluent stream to be measured.

Response: No response required

I-3-2.0 Stack Monitoring and Sample Collection Methods

Monitoring and sample collection methods are described based on "principles of monitoring and sample collection" that are applicable to the measurement of radionuclides from effluent streams at stationary sources. Radionuclides of most elements will be in the particulate form in these effluent streams and can be readily collected using suitable filter media. Radionuclides of hydrogen, oxygen, carbon, nitrogen, the noble gases, and in some circumstances iodine, will be in the gaseous form. Radionuclides of these elements will require either the use of an in-line or off-line monitor to directly measure the radionuclides, or suitable sorbers, condensers, or bubblers to collect the radionuclides.

Response: No response required

I-3-2.1 Radionuclides as Particulates

The extracted effluent stream is passed through filter media to remove the particulates. The filter must have a high efficiency for removal of sub-micron particles. The guidance in ANSI N13.1-1999 (§6.6.2 Filter media) shall be followed in using filter media to collect particulates (incorporated by reference—see 10 CFR 61 Subpart H §18).

Response: Particles from sampled stack emissions are collected on a 47 mm-diameter Versapor 3000 filter, an acrylic copolymer membrane supported by a non-woven polyester or nylon fabric. This filter is rated in Table D.1 of ANSI/HPS N13.1–1999 to be from 99.7 to >99.99 percent efficient for particles in the range of 0.035 to 1 µm. The sample filter is exchanged biweekly for gross alpha and gross beta analysis and the filters composited quarterly for analysis of specified particulate radionuclides.

I-3-2.2 Radionuclides as Gases

Response: There is no requirement to perform gaseous radionuclide sampling because T Plant is no longer processing radioactive materials that might cause gaseous radionuclide emissions.

I-3-2.3 Definition of Terms

Response: No response required

I-3-3.0 Radionuclide Analysis Methods

Response: Analysis methods are identified in Appendix A, written mainly by WSCF personnel.

I-3-4.0 Quality Assurance Methods

Each facility required to measure their radionuclide emissions shall conduct a QA program in conjunction with the radionuclide emission measurements. This program shall assure that the emission measurements are representative, are of known precisian and accuracy, and include administrative controls to assure prompt response when emission measurements indicate unexpectedly large emissions. The program shall consist of a system of policies, organizational responsibilities, written procedures, data quality specifications, audits, corrective actions, and reports. This QA program shall include the program elements that follow.

I-3-4.1 The organizational structure functional responsibilities, levels of authority, and lines of communications for all activities related to the emissions measurement program shall be identified and documented.

Response: Responsibilities for radioactive air emissions sampling activities are described in the main text of this document.

I-3-4.2 Administrative controls shall be prescribed to ensure prompt response in the event that emission levels increase due to unplanned operations.

Response: Refer to §§2.5.3.1, 2.5.3.4, and 5.4 of this document. Administrative controls are also in place for trending emissions data in accordance with procedure PRC-PRO-EP-15333, §5.14, and notification in accordance with procedure PRC-PRO-EP-15333, §5.56.

I-3-4.3 The sample collection and analysis procedures used in measuring the emissions shall be described, including, where applicable:

I-3-4.3.1 Identification of sampling sites and number of sampling points, including the rationale for site selections.

Response: Hanford Site drawings H-2-93415 and BPF-70174 show stack dimensions and sampling site location. As shown, the stack is constructed with reinforced concrete and has an acid-proof brick lining. The stack is 200 ft high with an inside base diameter of 7 ft. The stack tapers to an inside diameter of 5 ft at the top. The sample site is located at the 50-foot level of the stack. The sampling site is located 40 ft downstream (or more than six average duct diameters) from the last disturbance, and 150 ft (or 25 average duct diameters) from the point of release. The stack has one isokinetic probe with ten sample nozzles. This location meets the criteria specified in 40 CFR 60 Appendix A Method l.

I-3-4.3.2 A description of sampling probes and representativeness of the samples.

Response: The probe and sample assembly, as shown on site drawing H-2-93415, consists of a single sample probe with ten sample nozzles. The inside diameter of each nozzle is 0.37 in. and each covers 3.3 ft^2 of area. Although a velocity distribution is not known, the flow can be shown to be turbulent.

The stack diameter, as shown on drawing BPF-70174, shows an average stack diameter of 6 ft. Drawing H-2-93414 gives the stack flow velocity as 808.7 fpm. Given this and the information provided in ANSI N13.1-1969, it can be shown that the Reynolds number (Re) exceeds 2100, the point at which flow is assumed to be turbulent.

$$Re = \frac{(diam)(vel)(density)}{(viscosity)} = \frac{(183\ cm)(410.8 cm/s)(0.0012\ g/cm^3)}{(0.00018\ g/cm-s)} = 5.0E{+}05$$

As stated in ANSI N13.1-1969, §A3.3.2, "as the flow becomes more turbulent, the velocity becomes more nearly uniform across the duct." Based on this guidance, the probe array is regarded as capable of isokinetic sampling.

I-3-4.3.3 A description of any continuous monitoring systems used to measure emissions, including the sensitivity of the system, calibration procedures, and frequency of calibration.

Response: This requirement is not applicable. Compliance is demonstrated by the continuous sampling of emissions (see next section).

I-3-4.3.4 A description of the sample collection systems for each radionuclide measured including frequency of collection, calibration procedures, and frequency of calibration.

Response: Sample air is withdrawn continuously from the stack emissions stream by the probe as described in §4.3.2 above. This air flows through the sample line, and particulate radionuclides are collected on a sample filter. The sample filters are exchanged routinely and analyzed at the WSCF Laboratory. The frequency of collection and the specific radionuclides analyzed are identified in HNF-EP-0835, which is updated annually to reflect changes. Sample collectors are not amenable to calibration; however, sample flow rate measurement instruments are calibrated as discussed in §4.3.6 below.

I-3-4.3.5 A description of the laboratory analysis procedures used for each radionuclide measured, including frequency of analysis, calibration procedures, and frequency of calibration

Response: See §4.3.5 of Appendix A.

I-3-4.3.6 A description of the sample flow rate measurement systems or procedures, including calibration procedures and frequency of calibration.

Response: The sample flow rate measurement system consists of a flow meter that accounts for the total flow volume and instantaneous flow rate. The sampling systems are inspected routinely and flow rate adjusted by a manual flow control valve to maintain a constant flow. Calibrations are performed annually in accordance with PRC-PRO-EP-15333, PRC-PRO-MN-490, and Table B1 of §4.7 below.

I-3-4.3.7 A description of the effluent flow rate measurement procedures, including frequency of measurements, calibration procedures, and frequency of calibration.

Response: An alternative method has been approved by EPA and WDOH (EPA Letter 0401888 and AIR 03-601).

I-3-4.4 The objectives of the QA program shall be documented and shall state the required precision, accuracy, and completeness of the emission measurement data, including a description of the procedures used to assess these parameters. Accuracy is the degree of agreement of a measurement with a true or known value. Precision is a measure of the agreement among individual measurements at the same parameters under similar conditions. Completeness is a measure of the amount of data obtained compared to the amount expected under normal conditions.

Response: Refer to §§2.4 and 2.5 of the main body, to Appendix A of this document, and to HNF-EP-0835.

I-3-4.5 A QC program shall be established to evaluate and track the quality of the emissions measurement data against preset criteria. The program should include, where applicable, a system of replicates, spiked samples, split samples, blanks, and control charts. The number and frequency of such QC checks shall be identified.

Response: Laboratory requirements are presented in Appendix A.

I-3-4.6 A sample tracking system shall be established to provide for positive identification of samples and data through all phases of the sample collection, analysis, and reporting system. Sample handling and preservation procedures shall be established to maintain the integrity of samples during collection, storage, and analysis.

Response: Refer to Appendix A, PRC-PRO-EP-15334, HNF-EP-0835, and ABCASH.

I-3-4.7 Regular maintenance, calibrations, and field checks shall be performed for each sampling system in use by satisfying the requirements found in Table B1, Maintenance, Calibration, and Field Check Requirements.

Response: Refer to Table B1, PRC-PRO-EP-15334, and facility-specific procedures.

Table I-3-1. Maintenance, Calibration, and Field Check Requirements

Sampling system components	Frequency of activity
Cleaning of thermal anemometer	As required by application
Inspect Pitot tubes for contaminant deposits	At least annually
Inspect Pitot tube systems for leaks	At least annually
Inspect sharp-edged nozzles for damage	At least annually or after maintenance that could cause damage
Check nozzles for alignment, presence of deposits, or other potentially degrading factors	Annually

Table I-3-1. Maintenance, Calibration, and Field Check Requirements

Sampling system components	Frequency of activity
Check transport lines of HEPA-filtered applications to determine if cleaning is required	Annually
Clean transport lines	Visible deposits for HEPA-filtered applications; surface density of 1 g/cm2 for other applications
Inspect or test the sample system for leaks	At least annually
Check mass flow meters of sampling systems with a secondary or transfer standard	At least quarterly
Check sampling flow rate through critical flow venturis	At the start of each sampling period
Inspect rotameters of sampling systems for presence of foreign matter	At the start of each sampling period
Check response of stack flow rate systems	At least quarterly
Calibration of flow meters of sampling systems	At least annually
Calibration of effluent flow measurement devices	At least annually
Calibration of timing devices	At least annually

I-3-4.8 Periodic internal and external audits shall be performed to monitor compliance with the QA program. These audits shall be performed in accordance with written procedures and conducted by personnel who do not have responsibility for performing any of the operations being audited.

Response: Refer to §§2.5.3 and 2.5.3.1 and to PRC-PRO-QA-9769.

I-3-4.9 A corrective action program shall be established including criteria for when corrective action is needed, what corrective action will be taken, and who is responsible for taking the corrective action.

Response: Refer to PRC-PRO-QA-052.

I-3-4.10 Periodic reports to responsible management shall be prepared on the performance of the emissions measurements program. These reports should include assessment of the quality of the data, results of audits, and descriptions of corrective actions.

Response: Refer to §§2.5.3 and 2.5.3.1 in the main body of this document.

I-3-4.11 The QA program should be documented in a QAPjP that should address each of the above requirements.

Response: Refer to this document as a whole.

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Attachment I-4

291-Z-1 (Plutonium Finishing Plant)

Compliance Document Contents:

Letter AIR 06-1020 (IDMS Accession #DA03882684)

Method 114 Comparison for the 291-Z-1 Stack

In this appendix, a requirement-by-requirement recitation and response is given, which describes the state of compliance of the 291 Z 1 stack at PFP with the radionuclide emission requirements defined in Method 114. Requirements from Method 114 are directly quoted by section number. Responses that detail the state of compliance appear in italics text immediately following the requirements.

I-4-1.0 Purpose and Background

This method provides the requirements for:

- Stack monitoring and sample collection methods appropriate for radionuclides
- Radiochemical methods that are used to determine the amounts of radionuclides collected by the stack sampling
- QA methods that are conducted in conjunction with these measurements.

These methods are appropriate for emissions for stationary sources. A list of references is provided.

Many different types of facilities release radionuclides into air. These radionuclides differ in the chemical and physical forms, half-lives, and type of radiation emitted. The appropriate combination of sample extraction, collection, and analysis for an individual radionuclide is dependent upon many interrelated factors, including the mixture of other radionuclides present. Because of this wide range of conditions, no single method for monitoring or sample collection and analysis of a radionuclide is applicable to all types of facilities. Therefore, a series of methods based on "principles of measurement" is described for monitoring and sample collection and analysis that are applicable to the measurement of radionuclides found in effluent streams at stationary sources. This approach provides the user with the flexibility to choose the most appropriate combination of monitoring and sample collection and analysis methods that are applicable to the effluent stream to be measured.

Response: No response required

I-4-2.0 Stack Monitoring and Sample Collection Methods

Monitoring and sample collection methods are described based on "principles of monitoring and sample collection" that are applicable to the measurement of radionuclides from effluent streams at stationary sources. Radionuclides of most elements will be in the particulate form in these effluent streams and can be readily collected using suitable filter media. Radionuclides of hydrogen, oxygen, carbon, nitrogen, the noble gases, and in some circumstances iodine, will be in the gaseous form. Radionuclides of these elements will require either the use of an in-line or off-line monitor to directly measure the radionuclides, or suitable sorbers, condensers, or bubblers to collect the radionuclides.

Response: No response required

I-4-2.1 Radionuclides as Particulates

The extracted effluent stream is passed through filter media to remove the particulates. The filter must have a high efficiency for removal of sub-micron particles. The guidance in ANSI N13.1-1999 (§6.6.2 Filter media) shall be followed in using filter media to collect particulates (incorporated by reference—see 10 CFR 61 Subpart H §18).

Response: Particles from sampled stack emissions are collected on a 47 mm-diameter Versapor 3000 filter, an acrylic copolymer membrane supported by a non-woven polyester or nylon fabric. This filter is rated in Table D.1 of ANSI/HPS N13.1–1999 to be from 99.7 to greater than 99.99 percent efficient for particles in the range of 0.035 to 1 μm.

I-4-2.2 Radionuclides as Gases

Response: The 291 Z 1 stack does not exhaust radionuclides in gaseous form; therefore, this section is not applicable.

I-4-2.3 Definition of Terms

Response: No response is required.

I-4-3.0 Radionuclide Analysis Methods

Response: The analysis methods have been evaluated by cognizant WSCF personnel and are included as Appendix A.

I-4-4.0 Quality Assurance Methods

Each facility required to measure their radionuclide emissions shall conduct a QA program in conjunction with the radionuclide emission measurements. This program shall assure that the emission measurements are representative, are of known precision and accuracy, and shall include administrative controls to assure prompt response when emission measurements indicate unexpectedly large emissions. The program shall consist of a system of policies, organizational responsibilities, written procedures, data quality specifications, audits, corrective actions, and reports. This quality assurance program shall include the program elements that follow.

I-4-4.1 The organizational structure, functional responsibilities, levels of authority, and lines of communications for all activities related to the emissions measurement program shall be identified and documented.

Response: Refer to §2.5 of this document.

I-4-4.2 Administrative controls shall be prescribed to ensure prompt response in the event that emission levels increase due to unplanned operations.

Response: Refer to §§2.5.3.1, 2.5.3.4, and 5.4 of this document. Administrative controls are also in place for trending emissions data in accordance with procedure PRC-PRO-EP-15333, §5.14, and notification in accordance with procedure PRC-PRO-EP-15333, §5.56.

I-4-4.3 The sample collection and analysis procedures used in measuring the emissions shall be described, including, where applicable:

I-4-4.3.1 Identification of sampling sites and number of sampling points, including the rationale for site selections.

Response: A continuous effluent sample is extracted from the 291 Z 1 stack by a single probe located at the 15 m (50 ft) level of the stack. The stack diameter at this location is 4.8 m (15.75 ft). The nearest flow disturbances are at the inlet and outlet of the stack, approximately three stack diameters downstream and nine stack diameters upstream from the sampling location. The 15 m (50 foot) sampling location was selected after extensive studies were performed. The presence of an existing penetration in the stack at this level was an important factor in sampling site location since this supplied PNNL an access point through which instrumentation could be inserted to study the effluent characteristics. The site proved to be acceptable for sampling. Replacement of the sampling probe, from a multi-nozzle probe to a single shrouded probe, was approved in an EPA letter dated March 14, 2002, and WDOH letter AIR 02-308, dated March 25, 2002. Further information on this subject are in these letters and documents:

- *EPA, dated July 19, 2004*
- *WDOH Conditions and Limitations (C&L) letters AIR 04-809 and AIR 04-809 Rev. 2, both dated August 17, 2004*
- *CERCLA RAWP [with air monitoring provisions] and Rev. 2 to this letter, dated December 17, 2004*
- *EPA letter approving alternate measurement, dated June 26, 2003*
- *WDOH final C&Ls AIR 03-1109, dated November 21, 2003*
- *WDOH final C&Ls, Rev. 3, AIR-04-202, dated February 6, 2004*
- *WDOH C&L letter, Revs. 0G and 0H, AIR 03-0104, dated January 10, 2003.*

This sampling location meets the alternative site location requirements of 40 CFR 60 Appendix A Method 1.

I-4-4.3.2 A description of sampling probes and representativeness of the samples.

Response: The sampling probe consists of a single shrouded nozzle on 1-1/4-in. schedule 40 pipe, composed entirely of 300-series stainless steel. The collection probe assembly is installed such that the shrouded nozzle is located within the center one-third of the stack cross-sectional area. The pipe between the stack wall and the shrouded nozzle has a minimum bend radius of eight inches. Sampled emissions pass through the probe to a 300-series stainless steel flow splitter, which routes the sampled emission to both the record and CAM samples.

The velocity distribution at the sampling site was measured before sampler construction. But as stated in ANSI N13.1, ". . . as the flow becomes more turbulent, the velocity becomes more nearly uniform across the duct." Therefore, velocity distribution is of lesser importance for the 291 Z 1 stack since the flow is highly turbulent (Reynolds number equals 2,000,000). The flow rate for the 291 Z 1 stack varies by only a few percent. The variation in 1988 was determined to be only three percent, and for 1991 a variation of 4.5 percent was observed. Results from additional testing in December 2001 were in agreement with and reconfirmed earlier data. Given these facts, the single shrouded sampling probe provides a representative sample.

I-4-4.3.3 A description of any continuous monitoring system used to measure emissions, including the sensitivity of the system, calibration procedures, and frequency of calibration.

Response: This requirement is not applicable because continuous monitoring is not used to demonstrate compliance for this emission unit. Compliance is demonstrated by the continuous sampling of emissions, subsequent analysis, and reporting of those sample data (see next section).

I-4-4.3.4 A description of the sample collection systems for each radionuclide measured, including frequency of collection, calibration procedures, and frequency of calibration.

Response: The sample collection probe extracts effluent from the stack at a flow rate of 1.9E-03 m^3/s (4 cfm). The sampler probe uses six nozzles for sampling the stack flow. A sample transport line extends approximately 1 m (3.3 ft) horizontally from the stack surface connection flange to the monitoring instruments located within an adjacent, elevated sample shack. The sample transport line is heated by a baseboard heater immediately below the line within the building to inhibit condensation of moisture and resultant sample flow retardation by maintaining the temperature above the dew point. The sample transport line was selected and installed to minimize particle loss attributed to gravity settling and turbulent impaction. The transport line length and tube transition severity of the sample transport line were minimized. The bend radii are 1.25 times the inside diameter of the collection tube. The sample stream passes through a flow splitter and is divided into two equal parts: the record sample loop and the CAM loop.

Particles from sampled stack emissions are collected on a 47 mm-diameter Versapor 3000 filter, an acrylic copolymer membrane supported by a non-woven nylon fabric. The manufacturer rates the efficiency of this medium at not less than 91 percent for a 0.3-μm aerosol. In 1991, the manufacturer tested 24 samples with a 0.3-μm dioctyl phthalate aerosol. The measured average efficiency was 95.8 percent and the standard deviation was 1.6 percent, which supports the rated efficiency. The efficiency of this filter is rated in ANSI/HPS N13.1–1999 to be from 98.1 to greater than 99 percent. The record sampler system provides a representation of the amount and concentrations of radioactive particulates being discharged. The record samples provide the basis for reporting the amount and concentration of radionuclides released to the environment. The filter media are exchanged biweekly and evaluated by laboratory analysis for gross alpha and gross beta activities. The filter media are composited for quarterly analysis of specific radionuclide concentrations.

I-4-4.3.5 A description of the laboratory analysis procedures used for each radionuclide measured, including frequency of analysis, calibration procedures, and frequency of calibration.

Response: For a description of the laboratory analysis procedures for these analytes, refer to Appendix A.

I-4-4.3.6 A description of the sample flow rate measurement systems or procedures, including calibration procedures and frequency of calibration.

Response: The sample flow rate is measured and regulated by instruments located downstream of the sample collection filter and CAM. The record sample loop passes in turn through an integrating flow meter (totalizer), a sight flow indicator (rotameter), a vacuum pressure indicator, a vacuum switch, a flow regulator, and a vacuum pump. The flow rate regulator is provided to maintain a constant flow rate through the collection filter assembly to compensate for filter loading effects. Audible and visible alarms signals indicating low vacuum pressure are provided remotely in the MICON Power Operations Station, room 714, which is staffed 24 hours per day. Components included in the annual calibration procedure(s) are the vacuum gauge, flow totalizer, rotameter, and vacuum switch.

One carbon vane vacuum pump is provided for the record sample system. Redundant vacuum systems are not furnished, but failure annunciation is provided and flow rates are checked periodically to demonstrate operability.

I-4-4.3.7 A description of the effluent flow rate measurement procedures, including frequency of measurements, calibration procedures, and frequency of calibration.

Response: To comply with the 40 CFR 61 Subpart H standards, volumetric flow rate for the 291 Z 1 stack conservatively is assumed to be 137 m^3/s (290,000 cfm). On May 11, 1995, the EPA granted approval to DOE RL for the use of this value in calculations involving this stack (EPA 1995).

On June 26, 1995, DOE/RL satisfied the only EPA approval condition by providing direction to use 137 m^3/s (290,000 cfm—DOE RL 1995). Finally, in a memorandum dated September 18, 1995, EPA Region 10 declared the 291 Z 1 stack compliant with the requirements of 40 CFR 61 Subpart H (95 PCA 914).

I-4-4.4 The objectives of the QA program shall be documented and shall state the required precision, accuracy, and completeness of the emission measurement data, including a description of the procedures used to assess these parameters. Accuracy is the degree of agreement of a measurement with a true or known value. Precision is a measure of the agreement among individual measurements of the same parameters under similar conditions. Completeness is a measure of the amount of data obtained compared to the amount expected under normal conditions.

Response: Refer to §§2.4, 2.5, and Appendix A of this document, and to HNF-EP-0835.

I-4-4.5 A QC program shall be established to evaluate and track the quality of the emissions measurement data against preset criteria. The program should include, where applicable, a system of replicates, spiked samples, split samples, blanks, and control charts. The number and frequency of such QC checks shall be identified.

Response: Refer to §2.4 and Appendix A of this document, and to HNF-EP-0835.

I-4-4.6 A sample tracking system shall be established to provide for positive identification of samples and data through all phases of the sample collection, analysis, and reporting system. Sample handling and preservation procedures shall be established to maintain the integrity of samples during collection, storage, and analysis.

Response: Refer to Appendix A, PRC-PRO-EP-15334, HNF-EP-0835, and ABCASH.

I-4-4.7 Regular maintenance, calibrations, and field checks shall be performed for each sampling system in use by satisfying the requirements found in Table C1, Maintenance, Calibration, and Field Check Requirements.

Response: Refer to Table C1, PRC-PRO-EP-15334, and PFP-specific procedures.

I-4-4.8 Periodic internal and external audits shall be performed to monitor compliance with the QA program. These audits shall be performed in accordance with written procedures and conducted by personnel who do not have responsibility for performing any of the operations being audited.

Response: Refer to §§2.5.3 and 2.5.3.1 of this document, and to PRC-PRO-QA-9769.

Table I-4-1. Maintenance, Calibration, and Field Check Requirements

Sampling system components	Frequency of activity
Cleaning of thermal anemometer	As required by application
Inspect Pitot tubes for contaminant deposits	At least annually
Inspect Pitot tube systems for leaks	At least annually
Inspect sharp-edged nozzles for damage	At least annually or after maintenance that could cause damage

Table I-4-1. Maintenance, Calibration, and Field Check Requirements

Sampling system components	Frequency of activity
Check nozzles for alignment, presence of deposits, or other potentially degrading factors	Annually
Check transport lines of HEPA-filtered applications to determine if cleaning is required	Annually
Clean transport lines	Visible deposits for HEPA-filtered applications; surface density of 1 g/cm2 for other applications
Inspect or test the sample system for leaks	At least annually
Check mass flow meters of sampling systems with a secondary or transfer standard	At least quarterly
Check sampling flow rate through critical flow venturis	At the start of each sampling period
Inspect rotameters of sampling systems for presence of foreign matter	At the start of each sampling period
Check response of stack flow rate systems	At least quarterly
Calibration of flow meters of sampling systems	At least annually
Calibration of effluent flow measurement devices	At least annually
Calibration of timing devices	At least annually

I-4-4.9 A corrective action program shall be established including criteria for when corrective action is needed, what corrective action will be taken, and who is responsible for taking the corrective action.

Response: Refer to PRC-PRO-QA-052.

I-4-4.10 Periodic reports to responsible management shall be prepared on the performance of the emissions measurements program. These reports should include assessment of the quality of the data, results of audits, and description of corrective actions.

Response: Refer to §§2.5.3 and 2.5.3.1 in the main body of this document.

I-4-4.11 The QA program should be documented in a QAPjP that should address each of the above requirements.

Response: Refer to this document as a whole.

Attachment I-5

291-B-1 (B Plant)

Compliance Document Contents:

Letter AIR 06-1010 (IDMS Accession #DA03877552)

Method 114 Comparison for the 296-B-1 Stack

In this appendix, a requirement-by-requirement recitation and response is given, which describes the state of compliance of the 296 B 1 stack at the B Plant complex with the radionuclide emission requirements defined in Method 114. Requirements from Method 114 are directly quoted by section number. Responses that detail the state of compliance appear in italics text immediately following the requirements.

I-5-1.0 Purpose and Background

This method provides the requirements for:

- Stack monitoring and sample collection methods appropriate for radionuclides
- Radiochemical methods that are used to determine the amounts of radionuclides collected by the stack sampling
- QA methods that are conducted in conjunction with these measurements.

These methods are appropriate for emissions for stationary sources. A list of references is provided.

Many different types of facilities release radionuclides into air. These radionuclides differ in the chemical and physical forms, half-lives, and type of radiation emitted. The appropriate combination of sample extraction, collection, and analysis for an individual radionuclide is dependent upon many interrelated factors including the mixture of other radionuclides present. Because of this wide range of conditions, no single method for monitoring or sample collection and analysis of a radionuclide is applicable to all types of facilities. Therefore, a series of methods based on "principles of measurement" is described for monitoring and sample collection and analysis that are applicable to the measurement of radionuclides found in effluent streams at stationary sources. This approach provides the user with the flexibility to choose the most appropriate combination of monitoring and sample collection and analysis methods that are applicable to the effluent stream to be measured.

Response: The B Plant facility and the original stack 291-B-1 were built in the 1940s, and the stack was used to support two missions: (1) the bismuth-phosphate plutonium/uranium recovery mission, and (2) the recovery of cesium and strontium from the fission product waste stream. When the stack was taken out of service in 1997, it was isolated from B Plant, along with associated filters and fans. The stack has been deregistered with the regulators and will not be addressed further in point-by-point evaluations. A new 296-B-1 stack was built to replace the 291-B-1 stack and began operation in 1998 when the deactivation of the facility was completed and placed in surveillance and maintenance status. The replacement system has its own fans, two banks of dual-stage HEPA filters, and a stack sampling system.

I-5-2.0 Stack Monitoring and Sample Collection Methods

Monitoring and sample collection methods are described based on "principles of monitoring and sample collection" that are applicable to the measurement of radionuclides from effluent streams at stationary sources. Radionuclides of most elements will be in the particulate form in these effluent streams and can be readily collected using suitable filter media. Radionuclides of hydrogen, oxygen, carbon, nitrogen, the noble gases, and in some circumstances iodine, will be in the gaseous form. Radionuclides of these elements will require either the use of an in-line or off-line monitor to directly measure the radionuclides, or suitable sorbers, condensers, or bubblers to collect the radionuclides.

Response: No response required.

I-5-2.1 Radionuclides as Particulates

The extracted effluent stream is passed through a filter to remove the particulates. The filter must have a high efficiency for removal of sub-micron particles. The guidance in ANSI N13.1-1999 (§6.6.2 Filter media) shall be followed in using filter media to collect particulates (incorporated by reference—see 10 CFR 61 Subpart H §18).

Response: Particles from sampled stack emissions are collected on a 47 mm-diameter Versapor 3000 filter, an acrylic copolymer membrane supported by a non-woven polyester or nylon fabric. This filter is rated in Table D.1 of ANSI/HPS N13.1–1999 to be from 99.7 to greater than 99.99 percent efficient for particles in the range of 0.035 to 1 μm.

I-5-2.2 Radionuclides as Gases

Response: There is no requirement to perform gaseous radionuclide sampling because the B Plant is no longer processing radioactive materials that might cause gaseous radionuclide emissions. Irradiated fuel is no longer being introduced into B Plant because its first primary mission was completed in the early 1950s. No dissolutions have been performed since late 1952, and the separation of cesium and strontium ended in 1984. Following the bismuth-phosphate and cesium-strontium missions, the facility was cleaned out and no processing performed. Consequently, there is no need for gaseous radionuclide sampling, and the 296 B 1 stack is not equipped for gaseous radionuclide sampling.

I-5-2.3 Definition of Terms

Response: No response required.

I-5-3.0 Radionuclide Analysis Methods

Response: Analysis methods are included as Appendix A, which has been evaluated by WSCF personnel.

I-5-4.0 Quality Assurance Methods

Each facility required to measure their radionuclide emissions shall conduct a QA program in conjunction with the radionuclide emission measurements. This program shall assure that the emission measurements are representative, are of known precision and accuracy, and shall include administrative controls to assure prompt response when emission measurements indicate unexpectedly large emissions. The program shall consist of a system of policies, organizational responsibilities, written procedures, data quality specifications, audits, corrective actions, and reports. This QA program shall include the program elements that follow.

I-5-4.1 The organizational structure, functional responsibilities, levels of authority, and lines of communications for all activities related to the emissions measurement program shall be identified and documented.

Response: Refer to §2.52.5 of this document.

I-5-4.2 Administrative controls shall be prescribed to ensure prompt response in the event that emission levels increase due to unplanned operations.

Response: The facility is shut down and processing has ceased; therefore, unplanned operations resulting in increased emissions are unlikely. Refer to §§2.5.3.1, 2.5.3.4, and 5.4 of this document. Administrative controls are also in place for trending emissions data in accordance with procedure PRC-PRO-EP-15333, §5.14, and notification in accordance with procedure PRC-PRO-EP-15333, §5.56.

I-5-4.3 The sample collection and analysis procedures used in measuring the emissions shall be described, including, where applicable:

I-5-4.3.1 Identification of sampling sites and number of sampling points, including the rationale for site selections.

Response: The stack is cylindrical and approximately 27 m (88.5 ft) tall. The sampling location is at an elevation of 13.1 m (43 ft). The sampling nozzle inlet is about 7.4 m (24.4 ft) above the top of the duct, which enters the stack at a 45° upward angle. The internal diameter of the stack is 31.25 in. The nozzle of the sampling probe is about 9.4 stack diameters from the inlet duct. The sampling location qualification criteria are described in PNNL-12017, "Airborne Effluent Monitoring System Certification for New B-Plant Ventilation Exhaust Stack," (PNNL 1998). The sampling probe (an Anderson Model RF-2-111) has a single shrouded nozzle. The sampling probe, tubing, and filter holder are all stainless-steel. The sampling system meets the criteria of 40 CFR 61, Subpart H, and the requirements of HPS/ANSI N13.1-1999. The 296-B-1 stack sampling location is identified by EDP code B001.

I-5-4.3.2 A description of the sampling probe and representativeness of the samples.

Response: Particles in emissions from the 296-B-l stack are continuously withdrawn with a single-point shrouded probe at a location in the stack emission stream where contaminants are of a uniform distribution. The sampling equipment meets the ANSI/HPS N13.1–1999 standard. Sampling location criteria, sampling nozzle, and sampling tube are described in PNNL-12017. The EPA had approved the DOE alternative-method petition that allowed the use of a sampling probe with a single shrouded nozzle in applications that previously required a probe with several isokinetic nozzles. This single-point sampling-extraction approach is applicable when the potential contaminants in the emission stream are of uniform concentration at the sampling location (PNNL-12017).

I-5-4.3.3 A description of any continuous monitoring system used to measure emissions, including the sensitivity of the system, calibration procedures, and frequency of calibration.

Response: This requirement is not applicable. Compliance is demonstrated by the continuous sampling of emissions (see §4.3.4 below).

I-5-4.3.4 A description of the sample collection systems for each radionuclide measured, including frequency of collection, calibration procedures, and frequency of calibration.

Response: Sample air is withdrawn continuously from the stack emissions stream by the probe as described in §4.3.2 above. This air flows through the sample line, and particulate radionuclides are collected on a sample filter. The sample filters are exchanged routinely and analyzed at the WSCF

laboratory. The frequency of collection and the specific radionuclides analyzed are identified in HNF-EP-0835, which is updated annually. Sample collectors are not calibrated; however, sample flow rate measurement instruments are calibrated as discussed in §4.3.6 below.

I-5-4.3.5 A description of the laboratory analysis procedures used for each radionuclide measured, including frequency of analysis, calibration procedures, and frequency of calibration.

Response: See §4.3.5 of Appendix A.

I-5-4.3.6 A description of the sample flow rate measurement systems or procedures, including calibration procedures and frequency of calibration.

Response: The sample flow rate measurement system consists of a rotameter and vacuum gauge. The sampling systems are inspected routinely and the flow rate is adjusted by a manual flow control valve to maintain a constant flow. Calibrations are performed annually in accordance with PRC-PRO-EP-15333 and PRC-PRO-MN-490.

I-5-4.3.7 A description of the effluent flow rate measurement procedures, including frequency of measurements, calibration procedures, and frequency of calibration.

Response: The stack flow is relatively constant, so the flow rate is measured annually in accordance with 40 CFR 61.93. The flow is measured by standard Pitot traverses in accordance with 40 CFR 60 Appendix A Method 2. The traverse ports are tangential and located on the horizontal 30-in. duct between the HEPA filters and the exhaust fans. Traverse points are located at centers of equal area annuli. Flow measurement Pitot traverses are performed by V&B personnel. Calibration of V&B equipment is discussed in §2.0 of the main text.

I-5-4.4 The objectives of the QA program shall be documented and shall state the required precision, accuracy, and completeness of the emission measurement data, including a description of the procedures used to assess these parameters. Accuracy is the degree of agreement of a measurement with a true or known value. Precision is a measure of the agreement among individual measurements of the same parameters under similar conditions. Completeness is a measure of the amount of data obtained compared to the amount expected under normal conditions.

Response: Refer to §§2.4, 2.5, and Appendix A of this document, and to HNF-EP-0835.

I-5-4.5 A QC program shall be established to evaluate and track the quality of the emissions measurement data against preset criteria. The program should include, where applicable, a system of replicates, spiked samples, split samples, blanks, and control charts. The number and frequency of such QC checks shall be identified.

Response: Laboratory requirements are presented in Appendix A.

I-5-4.6 A sample tracking system shall be established to provide for positive identification of samples and data through all phases of the sample collection, analysis, and reporting system. Sample handling and preservation procedures shall be established to maintain the integrity of samples during collection, storage, and analysis.

Response: Refer to Appendix A, PRC-PRO-EP-15334, HNF-EP-0835, and ABCASH.

I-5-4.7 Regular maintenance, calibrations, and field checks shall be performed for each sampling system in use by satisfying the requirements found in Table D1, Maintenance, Calibration, and Field Check Requirements.

Response: Refer to Table D1, PRC-PRO-EP-15334, and B Plant-specific procedures.

Table I-5-1. Maintenance, Calibration, and Field Check Requirements

Sampling system components	Frequency of activity
Cleaning of thermal anemometer	As required by application
Inspect Pitot tubes for contaminant deposits	At least annually
Inspect Pitot tube systems for leaks	At least annually
Inspect sharp-edged nozzles for damage	At least annually or after maintenance that could cause damage
Check nozzles for alignment, presence of deposits, or other potentially degrading factors	Annually
Check transport lines of HEPA-filtered applications to determine if cleaning is required	Annually
Clean transport lines	Visible deposits for HEPA-filtered applications; surface density of 1 g/cm2 for other applications
Inspect or test the sample system for leaks	At least annually
Check mass flow meters of sampling systems with a secondary or transfer standard	At least quarterly
Check sampling flow rate through critical flow venturis	At the start of each sampling period
Inspect rotameters of sampling systems for presence of foreign matter	At the start of each sampling period
Check response of stack flow rate systems	At least quarterly
Calibration of flow meters of sampling systems	At least annually
Calibration of effluent flow measurement devices	At least annually
Calibration of timing devices	At least annually

I-5-4.8 Periodic internal and external audits shall be performed to monitor compliance with the QA program. These audits shall be performed in accordance with written procedures and conducted by personnel who do not have responsibility for performing any of the operations being audited.

Response: Refer to §§2.5.3 and 2.5.3.1 of this document and to PRC-PRO-QA-9769.

I-5-4.9 A corrective action program shall be established, including criteria for when corrective action is needed, what corrective action will be taken, and who is responsible for taking the corrective action.

Response: Refer to PRC-PRO-QA-052.

I-5-4.10 Periodic reports to responsible management shall be prepared on the performance of the emissions measurements program. These reports should include assessment of the quality of the data, results of audits, and description of corrective actions.

Response: Refer to §§2.5.3 and 2.5.3.1 in the main body of this document.

I-5-4.11 The QA program should be documented in a QAPjP that should address each of the above requirements.

Response: Refer to this document as a whole.

Attachment I-6

296-B-10 (Waste Encapsulation & Storage Facility)

Compliance Document Contents:

Letter AIR 06-1014 (IDMS Accession #DA03882573)

Method 114 Comparison for the 296-B-10 Stack

In this appendix, a requirement-by-requirement recitation and response is given, which describes the state of compliance of the 296 B 10 stack at WESF with the radionuclide emission requirements defined in Method 114. Requirements from Method 114 are directly quoted by section number. Responses that detail the state of compliance appear in italics text immediately following the requirements.

I-6-1.0 Purpose and Background

This method provides the requirements for:

- Stack monitoring and sample collection methods appropriate for radionuclides
- Radiochemical methods that are used to determine the amounts of radionuclides collected by the stack sampling
- QA methods that are conducted in conjunction with these measurements.
- These methods are appropriate for emissions from stationary sources. A list of references is provided.

Many different types of facilities release radionuclides into air. These radionuclides differ in the chemical and physical forms, half-lives, and type of radiation emitted. The appropriate combination of sample extraction, collection, and analysis for an individual radionuclide is dependent upon many interrelated factors including the mixture of other radionuclides present. Because of this wide range of conditions, no single method for monitoring or sample collection and analysis of a radionuclide is applicable to all types of facilities. Therefore, a series of methods based on "principles of measurement" is described for monitoring and sample collection and analysis that are applicable to the measurement of radionuclides found in effluent streams at stationary sources. This approach provides the user with the flexibility to choose the most appropriate combination of monitoring and sample collection and analysis methods that are applicable to the effluent stream to be measured.

Response: No response is required.

I-6-2.0 Stack Monitoring and Sample Collection Methods

Monitoring and sample collection methods are described based on "principles of monitoring and sample collection" that are applicable to the measurement of radionuclides from effluent streams at stationary sources. Radionuclides of most elements will be in the particulate form in these effluent streams and can be readily collected using suitable filter media. Radionuclides of hydrogen, oxygen, carbon, nitrogen, the noble gases, and in some circumstances iodine, will be in the gaseous form. Radionuclides of these elements will require either the use of an in-line or off-line monitor to directly measure the radionuclides, or suitable sorbers, condensers, or bubblers to collect the radionuclides.

Response: No response required.

I-6-2.1 Radionuclides as Particulates

The extracted effluent stream is passed through a filter to remove the particulates. The filter must have a high efficiency for removal of sub-micron particles. The guidance in ANSI N13.1-1999 (§6.6.2 Filter media) shall be followed in using filter media to collect particulates (incorporated by reference—see 40 CFR 61 Subpart H §61.18).

Response: Particles from sampled stack emissions are collected on a 47 mm-diameter Versapor 3000 filter, an acrylic copolymer membrane supported by a non-woven polyester or nylon fabric. This filter is rated in Table D.1 of ANSI/HPS N13.1–1999 to be from 99.7 to greater than 99.99 percent efficient for particles in the range of 0.035 to 1 µm.

I-6-2.2 Radionuclides as Gases.

Response: The 296 B 10 stack does not exhaust radionuclide gases; therefore, this section is not applicable.

I-6-2.3 Definition of Terms

Response: No response is required.

I-6-3.0 Radionuclide Analysis Methods

Response: The analysis methods have been evaluated by cognizant WSCF personnel and are included as Appendix A.

I-6-4.0 Quality Assurance Methods

Each facility required to measure their radionuclide emissions shall conduct a QA program in conjunction with the radionuclide emission measurements. This program shall assure that the emission measurements are representative, are of known precision and accuracy, and shall include administrative controls to assure prompt response when emission measurements indicate unexpectedly large emissions. The program shall consist of a system of policies, organizational responsibilities, written procedures, data quality specifications, audits, corrective actions, and reports. This QA program shall include the program elements that follow.

I-6-4.1 The organizational structure, functional responsibilities, levels of authority, and lines of communications for all activities related to the emissions measurement program shall be identified and documented.

Response: Refer to §2.5 of this document.

I-6-4.2 Administrative controls shall be prescribed to ensure prompt response in the event that emission levels increase due to unplanned operations.

Response: Refer to §§2.5.3.1, 2.5.3.4, and 5.4 of this document. Administrative controls are also in place for trending emissions data in accordance with procedure PRC-PRO-EP-15333, §5.14, and notification in accordance with procedure PRC-PRO-EP-15333, §5.56.

I-6-4.3 The sample collection and analysis procedures used in measuring the emissions shall be described, including the following elements where applicable.

I-6-4.3.1 Identification of sampling sites and number of sampling points, including the rationale for site selections.

Response: The 296 B 10 stack has an inside diameter of 1.1 m (42 in.) and the probe location is approximately 17.4 m (57 ft) from the base. There are five nozzles supplying the record sampler. ANSI N13.1 1969 §A3.2 recommends a minimum of five nozzles on a stack that has the diameter of the 296 B 10 stack.

The procedure in 40 CFR 60 Appendix A Method 1 requires sampling to be performed at least eight stack diameters downstream and two diameters upstream of any flow disturbances. Eight stack diameters correspond to 8.5 m (28 ft,) and two stack diameters correspond to 2.1m (7 ft). The 296 B 10 stack complies with this criterion.

I-6-4.3.2 A description of sampling probes and representativeness of the samples.

Response: The sampling probe consists of five nozzles. The five nozzle inlets are 0.38 in. in diameter. The stack flow is fully turbulent (Reynolds number approximately 7.4E+03) and, as stated in §A.3.3.2 of ANSI N13.1 1969, "... as the flow becomes more turbulent, the velocity becomes more nearly uniform across the duct."

I-6-4.3.3 A description of any continuous monitoring systems used to measure emissions, including the sensitivity of the system, calibration procedures, and frequency of calibration.

Response: This requirement is not applicable because monitoring is not used to demonstrate compliance for this emission unit.

I-6-4.3.4 A description of the sample collection systems for each radionuclide measured, including frequency of collection, calibration procedures, and frequency of calibration.

Response: Particles from sampled stack emissions are collected on a 47 mm-diameter Versapor 3000 filter, an acrylic copolymer membrane supported by a non-woven nylon fabric. The manufacturer rates the efficiency of this medium at not less than 91 percent for a 0.3-μm aerosol. In 1991, the manufacturer tested 24 samples with a 0.3-μm dioctyl phthalate aerosol. The measured average efficiency was 95.8 percent and the standard deviation was 1.6 percent, which supports the rated efficiency. The efficiency of this filter is rated in ANSI/HPS N13.1–1999 to be from 98.1 to greater than 99 percent.

This filter is a membrane filter that collects 0.3 □m particles with a collection efficiency of 95.8 percent. The sampler runs continuously to ensure a representative sample, and record samples are exchanged monthly for analysis.

I-6-4.3.5 A description of the laboratory analysis procedures used for each radionuclide measured, including frequency of analysis, calibration procedures, and frequency of calibration.

Response: The analytes of interest for the 296 B 10 stack are identified in HNF-EP-0835. For a description of the laboratory analysis procedures for these analytes, refer to Appendix A.

I-6-4.3.6 A description of the sample flow rate measurement systems or procedures, including calibration procedures and frequency of calibration.

Response: Two vacuum pumps draw air through the sample transport lines at 1.9E 03 m^3/s (4 cfm), while the record sampler operates at 9.4E-04 m^3/s (2.0 cfm). The sample transport line drops with almost a 90° bend from the 17.4 m (57 ft) level on the stack to the sample cabinet located at the base of the stack. The sample transport line is heat-traced and insulated to inhibit condensation. The sample transport lines were installed with a minimum number of bends.

The sample passes through a 47 mm-diameter Versapor 3000 filter paper in the record sampler. The filter paper is changed monthly and evaluated for gross alpha and gross beta activity. The samples are analyzed monthly to provide isotopic radionuclide concentrations. The record sampler results provide the basis for reporting the amount and concentrations of radionuclides released to the environment. These reports are forwarded to all appropriate organizations and agencies. Downstream of the filter, the sampled air passes through a flow meter, a flow totalizer, a flow regulator, and a vacuum pump. In the event of a low flow in the record sampler line, a local alarm and a remote alarm are activated.

I-6-4.3.7 A description of the effluent flow rate measurement procedures, including frequency of measurements, calibration procedures, and frequency of calibration.

Response: The flow rate is measured annually. Because of physical constraints of the K 1 system, the flow in the K-1 duct cannot be measured per 40 CFR 60 Appendix A Methods 1, 1A, 2, and 2C. The maximum exhaust flow capacity of 24,390 cfm is used instead.

I-6-4.4 The objectives of the QA program shall be documented and shall state the required precision, accuracy, and completeness of the emission measurement data, including a description of the procedures used to assess these parameters. Accuracy is the degree of agreement of a measurement with a true or known value. Precision is a measure of the agreement among individual measurements of the same parameters under similar conditions. Completeness is a measure of the amount of data obtained compared to the amount expected under normal conditions.

Response: Refer to §§2.4, 2.5, and Appendix A of this document, and to HNF-EP-0835.

I-6-4.5 A QC program shall be established to evaluate and track the quality of the emissions measurement data against preset criteria. The program should include, where applicable, a system of replicates, spiked samples, split samples, blanks, and control charts. The number and frequency of such QC checks shall be identified.

Response: Refer to §2.4 and Appendix A of this document, and to HNF-EP-0835.

I-6-4.6 A sample tracking system shall be established to provide for positive identification of samples and data through all phases of the sample collection, analysis, and reporting system. Sample handling and preservation procedures shall be established to maintain the integrity of samples during collection, storage, and analysis.

Response: Refer to Appendix A, PRC-PRO-EP-15334, HNF-EP-0835, and ABCASH.

I-6-4.7 Regular maintenance, calibrations, and field checks shall be performed for each sampling system in use by satisfying the requirements found in Table E1, Maintenance, Calibration, and Field Check Requirements.

Response: Refer to Table E1, PRC-PRO-EP-15334, and WESF-specific procedures.

Table I-6-1. Maintenance, Calibration, and Field Check Requirements

Sampling system components	Frequency of activity
Cleaning of thermal anemometer	As required by application
Inspect Pitot tubes for contaminant deposits	At least annually
Inspect Pitot tube systems for leaks	At least annually
Inspect sharp-edged nozzles for damage	At least annually or after maintenance that could cause

Table I-6-1. Maintenance, Calibration, and Field Check Requirements

Sampling system components	Frequency of activity
	damage
Check nozzles for alignment, presence of deposits, or other potentially degrading factors	Annually
Check transport lines of HEPA-filtered applications to determine if cleaning is required	Annually
Clean transport lines	Visible deposits for HEPA-filtered applications; surface density of 1 g/cm2 for other applications
Inspect or test the sample system for leaks	At least annually
Check mass flow meters of sampling systems with a secondary or transfer standard	At least quarterly
Check sampling flow rate through critical flow venturis	At the start of each sampling period
Inspect rotameters of sampling systems for presence of foreign matter	At the start of each sampling period
Check response of stack flow rate systems	At least quarterly
Calibration of flow meters of sampling systems	At least annually
Calibration of effluent flow measurement devices	At least annually
Calibration of timing devices	At least annually

I-6-4.8 Periodic internal and external audits shall be performed to monitor compliance with the QA program. These audits shall be performed in accordance with written procedures and conducted by personnel who do not have responsibility for performing any of the operations being audited.

Response: Refer to §§2.5.3 and 2.5.3.1 of this document and to PRC-PRO-QA-9769.

I-6-4.9 A corrective action program shall be established, including criteria for when corrective action is needed, what corrective action will be taken, and who is responsible for taking the corrective action.

Response: Refer to PRC-PRO-QA-052.

I-6-4.10 Periodic reports to responsible management shall be prepared on the performance of the emissions measurements program. These reports should include assessment of the quality of the data, results of audits, and description of corrective actions.

Response: Refer to §§2.5.3 and 2.5.3.1 in the main body of this document.

I-6-4.11 The QA program should be documented in a QAPjP that should address each of the above requirements.

Response: Refer to this document as a whole.

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Attachment I-7

296-H-212 (Canister Storage Building)

Compliance Document Contents:

Letter AIR 06-1017 (IDMS Accession #DA03882597)

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Attachment I-8

296-K-142 (Cold Vacuum Drying Facility)

Compliance Document Contents:

Letter AIR 06-1009 (IDMS Accession #DA03877484)

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Attachment I-9
296-P-31 (209-E Facility)

Compliance Document Contents:

Letter AIR 07-1205 (IDMS Accession #0811210329)

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Attachment I-10

296-W-4 (Waste Receiving and Packaging Facility)

Compliance Document Contents:

Letter AIR 07-308 (IDMS Accession #DA06345058)

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Attachment I-11

296-Z-7 (Plutonium Finishing Plant)

Compliance Document Contents:

Letter AIR 07-308 (IDMS Accession #DA06345058)

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Appendix J

CHPRC
Environmental Management System
Assessment Process

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J1 Introduction

Internal assessments of the CH2MHill Plateau Remediation Company (CHPRC) Environmental Management System (EMS) are conducted at planned intervals to determine whether the EMS conforms to planned arrangements for environmental management including the requirements of International Standard Order (ISO) 14001:2004, *Environmental Management Systems Requirements*, ISO 19011, *Guidelines for Quality and/or Environmental Management Systems Auditing*, and DOE Order 450.1A, Contractor Requirements Document (CRD) *Environmental Protection Program* (CRD O 450.1A) and has been properly implemented and is maintained.

The CHPRC assessment program shall be planned, established, implemented and maintained by the Environmental Program and Strategic Planning (EP&SP) Organization, taking into consideration the environmental importance of the operation(s) concerned and the results of previous audits.

At least every three years, the EMS must be validated through a formal audit by a qualified party outside the control or scope of the EMS, and the declaration of conformance to CRD O 450.1A renewed as appropriate.

J2 Purpose, Scope, and Applicability

J2.1 Purpose

The purpose of this document is to establish the requirements for the CHPRC EMS audit program to determine whether the EMS conforms to ISO 14001:2004 and CRD O 450.1A, Contract is effective, and has been properly implemented, maintained, and continually improved, where necessary. Attachment A, the Assessment Matrix, documents the correlation between ISO 14001 and CRD O 450.1A.

J2.2 Scope and Applicability

This document applies to the CHPRC EMS and the activities/operations covered by the EMS.

Note 1: The term "assessment" is understood to be "independent assessments" which are used synonymously with audits in this document.

Note 2: Terms specific to this document are defined in ISO 14001 and ISO 19011.

J3 Scope of EMS Audit

Internal EMS audits assess projects, operations and facilities within the scope of the EMS program to determine conformance to the requirements of ISO-14001. The scope of each audit will be elements of ISO 14001 and CRD O 450.1A, determined by the EQA manager at the beginning of each fiscal year.

J4 Implementation

This document is effective upon publication.

J5 Frequency of EMS Internal Audit

Internal EMS audits shall be scheduled on the basis of need as reflected by the importance of activities or the results of previous audits, but not less than tri-annually, in order to verify that the system is implemented and functioning as expected. An individual audit may be limited to a sampling of EMS elements or areas and can be both random and/or focused on certain activities based on their importance

and/or results of previous audits. All elements of the EMS program will be audited every three years. The EQA manager will decide on the strategy to be pursued in the audit at the beginning of each fiscal year.

J6 Auditor Evaluation

J6.1 Auditors

The evaluation of auditors shall be in accordance with Table 1 below and shall occur at the following different stages:

- The initial evaluation of persons who wish to become auditors;
- The evaluation of the auditors
- The continual evaluation of auditor performance to identify needs for maintenance and improvement of knowledge and skills.

In accordance with ISO 19011, section 7.2, auditors shall demonstrate competence based on the following personal attributes:

- Ethical, i.e., fair, truthful, sincere, honest and discreet
- Open-minded, i.e., willing to consider alternative ideas or points of view
- Diplomatic, i.e., tactful in dealing with people
- Observant, i.e., actively aware of physical surroundings and activities
- Perceptive, i.e., instinctively aware of and able to understand situations
- Versatile, i.e., adjusts readily to different situations
- Tenacious, i.e., persistent, focused on achieving objectives
- Decisive, i.e., reaches timely conclusions based on logical reasoning and analysis
- Self-reliant, i.e., acts and functions independently while interacting effectively with others.

Section 7.3 of ISO 19011 states auditors should also have the ability to apply the knowledge and skills in the following areas:

a. Audit principles, procedure and techniques. An auditor should be able to:

- To apply audit principles, procedures and techniques,
- To plan and organize the work effectively,
- To conduct the audit within the agreed time schedule,
- To prioritize and focus on matters of significance,
- To collect information through effective interviewing, listening, observing and reviewing documents, records and data,
- To understand the appropriateness and consequences of using sampling techniques for auditing,
- To verify the accuracy of collected information,

- To confirm the sufficiency and appropriateness of audit evidence to support audit findings and conclusions,
- To assess those factors that can affect the reliability of the audit findings and conclusions,
- To use work documents to record audit activities,
- To prepare audit reports,
- To maintain the confidentiality and security of information, and
- To communicate effectively, either through personal linguistic skills or through an interpreter.

b. Management system and reference documents: to enable the auditor to comprehend the scope of the audit and apply audit criteria. Knowledge and skills in this area should cover

- The application of management systems to different organizations,
- Interaction between the components of the management system,
- Quality or environmental management system standards, applicable procedures or other management system documents used as audit criteria,
- Recognizing differences between and priority of the reference documents,
- Application of the reference documents to different audit situations, and
- Information systems and technology for, authorization, security, distribution and control of documents, data and records

c. Organizational situations: to enable the auditor to comprehend the organization's operational context.

Knowledge and skills in this area should cover

- Organizational size, structure, functions and relationships,
- General business processes and related terminology, and
- Cultural and social customs of the auditee.

d. Applicable laws, regulations and other requirements relevant to the discipline: to enable the auditor to work within, and be aware of, the requirements that applies to the organization being audited. Knowledge and skills in this area should cover

- Local, regional and national codes, laws and regulations,
- Contracts and agreements,
- International treaties and conventions, and
- Other requirements to which the organization subscribes.

EMS auditors should have knowledge and skills in the following areas:

a. Environmental management methods and techniques: to enable the auditor to examine environmental management systems and to generate appropriate audit findings and conclusions. Knowledge and skills in this area should cover

- Environmental terminology,

- Environmental management principles and their application, and
- Environmental management tools (such as environmental aspect/impact evaluation, life cycle assessment
- Environmental performance evaluation, etc.).

b. Environmental science and technology: to enable the auditor to comprehend the fundamental relationships between human activities and the environment. Knowledge and skills in this area should cover:

- The impact of human activities on the environment,
- Interaction of ecosystems,
- Environmental media (e.g. air, water, land)
- Management of natural resources (e.g. fossil fuels, water, flora and fauna), and
- General methods of environmental protection.

c. Technical and environmental aspects of operations: to enable the auditor to comprehend the interaction of the auditee's activities, products, services and operations with the environment. Knowledge and skills in this area should cover

- Sector-specific terminology,
- Environmental aspects and impacts,
- Methods for evaluating the significance of environmental aspects,
- Critical characteristics of operational processes, products and services,
- Monitoring and measurement techniques, and
- Technologies for the prevention of pollution.

Auditors should have the education, work experience, auditor training and audit experience listed in Table 1 below and their work experience should be in a technical, managerial or professional position involving the exercise of judgment, problem solving, and communication with other managerial or professional personnel, peers, customers and/or other interested parties.

Part of the work experience should be in a position where the activities undertaken contribute to the development of knowledge and skills in the environmental management field.

Note: A qualified RABQSA Environmental Lead Auditor with current certifications and objective evidence to support maintenance of their proficiency may be qualified to lead a CHPRC EMS audit based on concurrence by the EQA manager.

J6.2 Lead Auditors

Lead auditors should have the qualifications shown in Table 1 and should have additional knowledge and skills in audit leadership to facilitate the efficient and effective conduct of the audit. A lead auditor should be able:

- To plan the audit and make effective use of resources during the audit,
- To represent the audit team in communications with the audit client and auditee,
- To organize and direct audit team members,
- To provide direction and guidance to auditors-in-training,

- To lead the audit team to reach the audit conclusions,
- To prevent and resolve conflicts, and
- To prepare and complete the audit report.

This additional experience should have been gained while acting in the role of lead auditor under the direction and guidance of another auditor who is competent as a lead auditor.

J6.3 Maintenance and Improvement of Competence Continual Professional Development

Continual professional development is concerned with the maintenance and improvement of knowledge, skills and personal attributes. This can be achieved through means such as additional work experience, training, private study, coaching, attendance at meetings, seminars and conferences or other relevant activities. Auditors should demonstrate their continual professional development. The continual professional development activities should take into account changes in the needs of the individual and the organization, the practice of auditing, standards and other requirements.

Auditors should maintain and demonstrate their auditing ability through regular participation in audits of quality and/or environmental management systems.

Table 1. Auditor and Lead Auditor Qualification Criteria

Parameter	Auditor	Lead Auditor
Education	Bachelors Degree	Bachelors Degree
Total Work Experience	5 years	5 years
Work Experience in Quality or Environmental Management Field	2 years	2 years
Auditor Training	ISO 14001 EMS Lead Auditor Training	ISO 14001 EMS Lead Auditor Training
Audit Experience	Four complete audits for a total of at least 20 days of audit experience as an auditor-in-training under the direction and guidance of an auditor competent as a lead auditor	Three complete audits for a total of at least 15 days of audit experience acting in the role of a lead auditor under the direction and guidance of an auditor competent as a lead auditor The audits should be completed within the last two consecutive years

J7 Process

Actionee	Action
EQA Manager	Schedules the internal EMS audit. Although ISO 14001:2004 does not specify an audit frequency, the schedule is based on the environmental importance of the activity and the results of previous audits. At a minimum, each of the EMS elements will be audited internally every 3 years. Every three years, an external independent audit shall be conducted in accordance with DOE O 450.1A. The assessment schedules shall be reviewed periodically and modified as new information on the facility or organization is obtained that changes the estimated complexity or available resources. Some considerations in scheduling include:

Actionee	Action
	• Previous assessment results and their dispositions • Independent information (e.g. experiences from other DOE contractors, peer organizations, and regulatory organizations) • Changes in responsibilities, resources, or management.
EQA Manager	Responsible for planning the EMS audits. The determination of criteria to be assessed and the degree to which ISMS/EMS core functions/core elements are demonstrated within each work level depends upon the consequence and likelihood of failure or risk of the work activity and or the scope of the specific assessment. Programs, systems, and processes that contribute a higher risk to quality, safety, and mission accomplishment are assessed with greater rigor or frequency. Assessment criteria are tailored during the planning phase of an assessment in order to embrace the vision set forth for each assessment and answer the question, "What do we want to accomplish?"
Qualification of Auditor	
Prospective Lead Auditor	Provide the following to the EQA Manager: • Certification records • Records of previous audit/assessment participation • Record of successfully completed ISO 14001 training • Resume.
EQA Manager	• Verifies EMS Auditors and Lead auditors are qualified and impartial. • Reviews the prospective lead's training and experience, determines if any additional training is required and if not: • Completes form # A-6005-401 EMS Lead Auditor Qualification/Certification Record. This form documents the requirements for an EMS Lead Auditor and is shown in Attachment B. • Approves qualification/certification by signing and dating the EMS Lead Auditor Qualification/Certification form # A-6005-401 when complete. • Verifies this form has been completed, signed, dated and current. • Verifies this form is maintained as a record in accordance with PRC-PRO-IRM-10588, Records Management Processes. • Ensures all the EMS auditors are qualified in accordance with section 4.0 of this document and is impartial. • Approve all assessors and Lead assessors. This approval will be documented by signature on the Assessment Plan which includes the names of the audit team. • Verify other team members have a strong technical background in the elements they will be auditing. Note: To ensure impartiality, the lead auditor and audit team members shall not be responsible for developing or implementing the activity being audited. • Annually evaluates the EMS Lead Auditor's proficiency by verifying regular and active participation in the EMS assessment program that contribute to the development of their knowledge and skills described in Section 4.2 of this document
Lead Auditor	Prior to the audit, the lead auditor notifies the respective operations being assessed of the upcoming audit.
Lead Auditor	Develops the EMS Audit/Assessment Plan which may include: • Assessment Criteria – checklists or lines of inquiry; significant issues from previous occurrences, assessments or nonconformaties; performance measures; and best management practices; Include Reference documents • Audit Scope including organization to be audited • Assessment Team - members and respective qualifications or technical expertise; • Assessment Strategy – e.g., interviews, document reviews, surveillances, verification testing;

Actionee	Action
	• Schedule - dates and coordination activities with affected staff (opening/closing meetings, debriefings, interview schedules) and dates when draft and final reports will be provided to the VP EP&SP and the EQA Manager. **Note:** If the audit is being used to verify the effectiveness of previous corrective/preventive actions, the audit plan should state this explicitly. Sends the audit plan to the organization being audited before the audit activities begin. Any objections by the auditee should be resolved and a revised audit plan written, if applicable, before continuing the audit.
	Conducting an EMS Assessment
Lead Auditor	• Conduct an entrance meeting with the assessment team and appropriate management and staff of the assessed organization to discuss the assessment scope, determine the status of work to be assessed, and meet counterparts. • Document the assessment scope, individuals in attendance, and the meeting date.
Lead Auditor/Assessment Team	Review documents related to the EMS and the elements/activities that are the subject of the audit before and during the assessment to gain an understanding of the organizations activities before the assessment. Examples of documents that can be reviewed include: • previous EMS internal and external audit reports, • environmental policy, • significant environmental aspects list, • training records, • communication records, • operational procedures and records, • contractor documents that specify environmental requirements, • nonconformance and corrective and preventive action records, • effluent and emission monitoring records, • performance measure records and data; and • other EMS documents relevant to the elements that are within the scope of the audit, such as objectives and targets, management review documentation, etc.
Lead Auditor/Assessment Team	Conduct the audit by performing the following tasks, as applicable: • Evaluates procedures, EMS program implementation, previous EMS assessment results, and corrective and preventive actions taken; obtains objective evidence, including staff interviews, records, or direct observation of facility operations or functional processes. Includes titles of documents or records that provide objective evidence of conformance on audit checklist or in audit report; • Evaluates applicability and implementation for guests, visitors, or contractors who perform work for the organization, and tenants and concessionaires. Immediately addresses any unacceptable conditions, including possible regulatory noncompliance issues, by notifying the EQA Manager. Completes the assessment checklist. Analyzes data from the assessment to provide useful information for the organization's management. The Assessor shares data, objective evidence, and preliminary analyses and identifies the strengths and weaknesses associated with the element and activities being assessed. Findings shall be clear, accurate and actionable. The Assessor/Assessment Team concludes the assessment by briefing the EMS VP EP&SP and the EQA Manager and other managers as appropriate, of the assessment findings. The results of the assessment will be included in the management review per Section 8.0, *Management Review of the Environmental Management System Manual*, PRC-MP-EP-40182.
Lead Auditor	• Conducts periodic (daily recommended) meetings with the assessment team to

Actionee	Action
	discuss the progress of the assessment and any potentially adverse condition. • Conduct periodic (daily recommended) meetings with management of the assessed organization, as appropriate, to report the progress and status of the assessment, and to coordinate required interfaces involved in the assessment. • Conduct an exit meeting to present the results of the assessment to appropriate management of the assessed organization. • Document the exit meeting scope and date and provide to attendees for signature.
Lead Auditor	Identifies audit findings and categorizes them as one of the following: Nonconformity: Objective evidence exists that a requirement has not been addressed (intent), a practice differs from the defined system (implementation), or the system is not effective. Major nonconformity: A system element is missing, or there is evidence that a system element is not implemented or not effective. Multiple minor nonconformities may be grouped together as a major if they are all examples of the same type of nonconformity. Minor nonconformity: A single observed discrepancy in the system, with evidence that the overall system is defined, implemented, and effective. Observation: Not a nonconformity, but something that could lead to a nonconformity if allowed to continue uncorrected, or an existing condition without adequate supporting evidence to verify that it constitutes a nonconformity. Opportunity for Improvement/Recommendation: A suggested means of accomplishing an activity, fulfilling the intent of a procedural requirement, or improving the efficiency or effectiveness of the EMS. It is not a nonconformity or observation. A recommendation involves an element that meets the minimum ISO 14001 requirements, but could bring that element of the EMS to the next level, as part of continual improvement. Noteworthy Practice: Performance that exceeds expectations in terms of efficiency and/or effectiveness and provides a model for others to follow.
Preparing the EMS Audit Report	
Lead Auditor	Prepares the draft assessment report including: • Audit Objectives • Scope • Identification of lead auditor and members • Dates and Places where audit activities were conducted • Audit criteria • Audit findings including Major and Minor nonconformities, observations, opportunities for improvement and noteworthy practices and a statement of the effectiveness of the EMS Program elements which were evaluated. • Audit conclusions • Attachments to the report, if any, may include: – Identification of assessment team members – Areas reviewed – Personnel contacted during the assessment – Procedures and documents reviewed. Forward the draft assessment report, for technical and factual accuracy review, as applicable, to the responsible assessed manager(s) of the assessed organization(s) and resolve any issues from this review. Enters the findings, nonconformities and opportunities for improvement into the Condition Report and Resolution System (CRRS) per PRC-PRO-QA-052, *Issues Management.*

Actionee	Action
	Prepare the transmittal letter and ensure distribution of the final assessment report the responsible managers and ^CHPRC IEP. Distribute approved report within 30 days of final report issuance.
EQA Manager	Retains the audit records, in accordance with PRC-MP-QA-599, *Quality Assurance Program* (QAP) and PRC-PRO-IRM-10588, *Records Management Processes.* **Note**: Completion and effectiveness of corrective action is verified as part of a subsequent audit. It is the responsibility of the EQA Manager to assure this occurs.

J8 Management Assessments

Management Assessments evaluate how well management processes are meeting organizational objectives and customer expectations and are normally performed at the program level to determine whether the overall organizational programs are properly established and effectively implemented. Management Assessments will be performed in accordance with PRC-PRO-QA-246, *Management Assessment.*

J9 Surveillances

Surveillances are similar to assessments but differ in the extent covered. Surveillances are conducted to verify conformance with specified requirements and to evaluate the adequacy and effectiveness of activities affecting the quality of work processes and products. Surveillances are performed by personnel who are technically knowledgeable about, and not directly responsible for, the work under surveillance. Surveillances will be performed in accordance with PRC-PRO-QA-9769, *Surveillance Process.*

J10 EMS Assessment Report

The EMS Assessment Report will be written in a timely manner upon completion of the assessment. The report will include major and minor nonconformities, opportunities for improvement and also document noteworthy practices. The report may also include the assessment scope, the executive summary, a statement of the effectiveness of the program elements which were evaluated, as applicable. The report will include the identification of the assessment team members, areas reviewed, personnel contacted and interviewed during the assessment and the documents reviewed.

The report must be reviewed and approved by the EMS EQA Manager. Information on the results of audits is provided to management.

J11 Review

The EMS EQA Manager is responsible for administering this document. This document will be reviewed, and updated as necessary, at a minimum of every three years.

J12 Required Records

All records are generated, processed, and maintained in accordance with PRC-PRO-IRM-10588, *Records Management Processes.*

J13 Applicable Standards and References

International Organization for Standardization (ISO) Standard 14001:2004 Revision.

ISO 19011:2002, Guidelines for Quality and/or Environmental Management Systems Auditing.

DOE O 450.1A and associated guidance documents, including CEQ Instructions for implementing EO 13423, 03/29/07.

CHPRC EMS Program Description: PRC-MP-EP-40182, *Environmental Management System Manual.*

PRC-MP-QA-599, *Quality Assurance Program* (QAP).

PRC-PRO-IRM-10588, *Records Management Processes.*

PRC-PRO-QA-052, *Issues Management.*

Attachment A - Assessment Matrix

Assessment Matrix

ISO 14001	CRD DOE 450.1A
	Contractors managing and operating Department of Energy (DOE), including National Nuclear Security Administration (NNSA), facilities are responsible for: (1) compliance with the requirements of this contractor requirements document (CRD) regardless of the performer of the work, and (2) flowing down the requirements of the CRD of the Order to subcontracts to the extent necessary to ensure contractors' compliance with the requirements. As directed by the contracting officer, to assist the Department in meeting its responsibilities under E.O. 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, and its Implementing Instructions, contractors must—
4.1 General Requirements The organization shall establish, document, implement, maintain and continually improve an environmental management system in accordance with the requirements of this International Standard and determine how it will fulfill these requirements. The organization shall define and document the scope of its environmental management system.	**4.b.(1)** Each environmental management system must— Reflect the environmental management system elements and framework found in the International Organization for Standardization's (ISO) 14001:2004 (E) International Standard or equivalent, including policies, procedures and training to identify operations and activities with significant environmental impacts; to manage, control, and mitigate the impacts of these operations and activities; and to assess performance, implement corrective actions where needed, and ensure continual improvement.
4.2 Environmental policy Top management shall define the organization's environmental policy and ensure that, within the defined scope of its environmental management system, it a) is appropriate to the nature, scale and environmental impacts of its activities, products and services, b) includes a commitment to continual improvement and prevention of pollution, c) includes a commitment to comply with applicable legal requirements and with other requirements to which the organization subscribes which relate to its environmental aspects, d) provides the framework for setting and reviewing environmental objectives and targets, e) is documented, implemented and maintained, f) is communicated to all persons working for or on behalf of the organization, and g) is available to the public.	1a. Each environmental management system must— Develop and implement an environmental management system. **1. a.** Each environmental management system must— 1.a.(1)Reflect the environmental management system elements and framework found in the International Organization for Standardization's (ISO) 14001:2004 (E) International Standard or equivalent, including policies, procedures and training to identify operations and activities with significant environmental impacts; to manage, control, and mitigate the impacts of these operations and activities; and to assess performance, implement corrective actions where needed, and ensure continual improvement. 1. a. (4) (a) (Include) A clear statement by senior leadership committing to achieve and maintain compliance with applicable environmental protection requirements.
	(3) Protection of site resources from wildland fires consistent with site wildland and operation fire management plans that consider the Federal Wildfire Management Policy recommendations. (See DOE G 450-1.4, Implementation Guide, Wildland Fire Management Program, for Use with DOE 450.1, Environmental Protection Program, dated 2-11-04).

Assessment Matrix

ISO 14001	CRD DOE 450.1A
	Develop and implement an environmental management system. 1. This system must be integrated into the site's Integrated Safety Management (ISM) system. 1. a. (3)Address tenant or concessionaire activities wherever such activities affect DOE's environmental, energy, and transportation management 1. a. (4)Contain the elements of an Environmental Compliance Management Plan pursuant to the Council on Environmental Quality's Instructions for Implementing Executive Order 13423, page 9,section B, including— The environmental management system must address the following— 1.b.(1)Sustainable practices for enhancing environmental, energy, and transportation management performance, as stipulated in Section 3(a) of E.O. 13423 and its Implementing Instructions.
4.3 Planning	
4. 3.1 Environmental Aspects The organization shall establish, implement and maintain a procedure(s) a) to identify the environmental aspects of its activities, products and services within the defined scope of the environmental management system that it can control and those that it can influence taking into account planned or new developments, or new or modified activities, products and services, and b) to determine those aspects that have or can have significant impact(s) on the environment (i.e. significant environmental aspects). The organization shall document this information and keep it up to date. The organization shall ensure that the significant environmental aspects are taken into account in establishing, implementing and maintaining its environmental management system.	**1.b.** The environmental management system must encompass the environmental aspects of site operations and activities, including environmental aspects of energy and transportation functions, and it must promote the long-term stewardship of a site's natural and cultural resources throughout its design and construction, operation, closure, and post-closure life cycle. The environmental management system must address the following—
	1.b.(2)Protection of public health and the environment, including but not limited to— (a)Conformity with State Implementation Plans to attain and maintain national ambient air quality standards. (b)Implementation of a watershed approach for surface water protection. (c)Implementation of a site-wide approach for groundwater protection. (d)Protection of other natural resources, including biota. (e)Assessment of the hazard of engineered nanomaterials and implementation of appropriate environment, safety and health controls. (See DOE P 456.1, Secretarial Policy Statement on Nanoscale Safety, dated 9-15-05.)

Assessment Matrix

ISO 14001	CRD DOE 450.1A
	(4) Identification and protection of cultural resources.
	1.C. (2) Environmental management systems, including those already declared under the previous requirements of the CRD in DOE O 450.1 must meet the new requirements for being "fully implemented" by June 30, 2009.
	3. Include in site environmental management systems practices to maximize the use of safe alternatives to ozone-depleting substances (ODS), whereby— **3.a**. The use of ODS in new equipment and facilities is eliminated. **3.b**. The use of ODS in existing equipment is phased out as the existing equipment reaches its expected service life, and the maintenance of equipment is conducted to prevent or fix leaks. **3.c**. The replacement of leaking equipment is carried out when leak repair is no longer cost-effective or where it is life-cycle cost-effective to replace the equipment. **3.d**. Coordination is conducted within DOE and with the Department of Defense's (DOD) Defense Supply Center Richmond, a component of the Defense Logistics Agency (DLA), as appropriate, before disposal of ODS removed or reclaimed from equipment (including disposal as part of a contract, trade, or donation). For situations in which the recovered ODS is a critical requirement for DoD missions, the DOE facility transfers the ODS to DoD. (See DLA's ODS website at: www.dscr.dla.mil/ExternalWeb/UserWeb/AviationEngineering/Ozone/contact.htm) **4**. Assist the Department in meeting the chemical emergency planning, release, and reporting requirements of the Emergency Planning and Community Right-to-Know Act and the Pollution Prevention Act of 1990, without regard to Standard Industrial Classification/North American Industrial Classification designations. All other statutory and regulatory exemptions apply. **5**. Assist the Department in meeting obligations imposed on it by E.O. 13327, Federal Real Property Asset Management, Section 3b(vi), by ensuring incorporation of planning and management requirements for historic property.
4.3.2 Legal & other requirements The organization shall establish, implement and maintain a procedure(s) a) to identify and have access to the applicable legal requirements and other requirements to which the organization subscribes related to its environmental aspects, and b) to determine how these requirements apply to its environmental aspects.	**2. GOALS, OBJECTIVES, AND SUSTAINABLE PRACTICES.** The Department is to achieve these performance-based Sustainable Environmental Stewardship goals through site implementation of the accompanying sustainable practices, as appropriate, and their integration into environmental management systems pursuant to DOE 450.1A and its Contractor Requirements Document (CRD). DOE sites are to consider legal requirements, requirements in E.O. 13423 and its Implementing Instructions, mission performance, and life-

Assessment Matrix

ISO 14001	CRD DOE 450.1A
The organization shall ensure that these applicable legal requirements and other requirements to which the organization subscribes are taken into account in establishing, implementing and maintaining its environmental management system.	cycle costs when selecting specific sustainable practices for achieving the Sustainable Environmental Stewardship goals. Additionally, sites may identify other sustainable practices appropriate to site-specific operations and activities, as necessary to achieve the goals.
4.3.3 Objectives, targets and program The organization shall establish, implement and maintain documented environmental objectives and targets, at relevant functions and levels within the organization. The objectives and targets shall be measurable, where practicable, and consistent with the environmental policy, including the commitments to prevention of pollution, to compliance with applicable legal requirements and with other requirements to which the organization subscribes, and to continual improvement. When establishing and reviewing its objectives and targets, an organization shall take into account the legal requirements and other requirements to which the organization subscribes, and its significant environmental aspects. It shall also consider its technological options, its financial, operational and business requirements, and the views of interested parties. The organization shall establish, implement and maintain a program(s) for achieving its objectives and targets. Program(s) shall include a) designation of responsibility for achieving objectives and targets at relevant functions and levels of the organization, and b) the means and time-frame by which they are to be achieved.	**1.a.** Each environmental management system must: **1.a. (2)** Include environmental, energy, and transportation objectives and measurable targets that are reviewed annually, updated as appropriate, and contribute to achieving the DOE Sustainable Environmental Stewardship goals found in Attachment 2 of DOE O 450.1A, *Environmental Protection Program*, dated 6-4-08, and the energy and transportation goals in the CRD in DOE O 430.2B, *Departmental Energy, Renewable Energy and Transportation Management*, dated 2-27-08.
4.4 IMPLEMENTATION AND OPERATION	
4.4.1 Resources, roles, responsibilities and authority Management shall ensure the availability of resources essential to establish, implement, maintain and improve the environmental management system. Resources include human resources and specialized skills, organizational infrastructure, technology and financial resources. Roles, responsibilities and authorities shall be defined, documented and communicated in order to facilitate effective environmental management. The organization's top management shall appoint a specific management representative(s) who, irrespective of other responsibilities, shall have defined roles, responsibilities and authority for a) ensuring that an environmental management system is established, implemented and maintained in accordance with the requirements of this International Standard, b) reporting to top management on the performance of the environmental management system for review, including recommendations for improvement	**4. (a) (b)** Clearly articulated roles and responsibilities related to environmental performance at all appropriate levels to ensure accountability for less than desired environmental performance.
4.4.2 Competence, training and awareness The organization shall ensure that any person(s) performing	**1. a.** Each environmental management system must **(1)** Reflect the environmental management system elements

Assessment Matrix

ISO 14001	CRD DOE 450.1A
tasks for it or on its behalf that have the potential to cause a significant environmental impact(s) identified by the organization is (are) competent on the basis of appropriate education, training or experience, and shall retain associated records. The organization shall identify training needs associated with its environmental aspects and its environmental management system. It shall provide training or take other action to meet these needs, and shall retain associated records. The organization shall establish, implement and maintain a procedure(s) to make persons working for it or on its behalf aware of a) the importance of conformity with the environmental policy and procedures and with the requirements of the environmental management system, b) the significant environmental aspects and related actual or potential impacts associated with their work, and the environmental benefits of improved personal performance, c) their roles and responsibilities in achieving conformity with the requirements of the environmental management system, and d) the potential consequences of departure from specified procedures	and framework found in the International Organization for Standardization's (ISO) 14001:2004 (E) International Standard or equivalent, including policies, procedures and training to identify operations and activities with significant environmental impacts; to manage, control, and mitigate the impacts of these operations and activities; and to assess performance, implement corrective actions where needed, and ensure continual improvement. As directed by the contracting officer, to assist the Department in meeting its responsibilities under E.O. 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, and its Implementing Instructions, contractors must— **1**. Develop and implement an environmental management system. This system must be integrated into the site's Integrated Safety Management (ISM) system. (See the CRD in DOE M 450.4-1, *Integrated Safety Management System Manual*, dated 11-1-06.) **1.a. (4) (b)** Clearly articulated roles and responsibilities related to environmental performance at all appropriate levels to ensure accountability for less than desired environmental performance.
4.4.3 Communication With regard to its environmental aspects and environmental management system, the organization shall establish, implement and maintain a procedure(s) for a) internal communication among the various levels and functions of the organization, b) receiving, documenting and responding to relevant communication from external interested parties. The organization shall decide whether to communicate externally about its significant environmental aspects, and shall document its decision. If the decision is to communicate, the organization shall establish and implement a method(s) for this external communication.	
4.4.4 Documentation The environmental management system documentation shall include a) the environmental policy, objectives and targets, b) description of the scope of the environmental management system, c) description of the main elements of the environmental management system and their interaction, and reference to related documents, d) documents, including records, required by this International Standard, and e) documents, including records, determined by the organization to be necessary to ensure the effective	

Assessment Matrix

ISO 14001	CRD DOE 450.1A
planning, operation and control of processes that relate to its significant environmental aspects.	
4.4.5 Control of documents Documents required by the environmental management system and by this International Standard shall be controlled. Records are a special type of document and shall be controlled in accordance with the requirements given in 4.5.4.The organization shall establish, implement and maintain a procedure(s) to a) approve documents for adequacy prior to issue, b) review and update as necessary and re-approve documents, c) ensure that changes and the current revision status of documents are identified, d) ensure that relevant versions of applicable documents are available at points of use, e) ensure that documents remain legible and readily identifiable, f) ensure that documents of external origin determined by the organization to be necessary for the planning and operation of the environmental management system are identified and their distribution controlled, and g) prevent the unintended use of obsolete documents and apply suitable identification to them if they are retained for any purpose.	
4.4.6 Operational control The organization shall identify and plan those operations that are associated with the identified significant environmental aspects consistent with its environmental policy, objectives and targets, in order to ensure that they are carried out under specified conditions, by a) establishing, implementing and maintaining a documented procedure(s) to control situations where their absence could lead to deviation from the environmental policy, objectives and targets, and b) stipulating the operating criteria in the procedure(s), and c) establishing, implementing and maintaining procedures related to the identified significant environmental aspects of goods and services used by the organization and communicating applicable procedures and requirements to suppliers, including contractors.	(7)The conduct of appropriate operational assessments, such as pollution prevention opportunity assessments, of site operations and activities to identify opportunities to implement sustainable practices as part of achieving DOE's Sustainable Environmental Stewardship goals found in Attachment 2 of DOE O 450.1A.
4.4.7 Emergency preparedness and response The organization shall establish, implement and maintain a procedure(s) to identify potential emergency situations and potential accidents that can have an impact(s) on the environment and how it will respond to them. The organization shall respond to actual emergency situations and accidents and prevent or mitigate associated adverse environmental impacts. The organization shall periodically review and, where	

Assessment Matrix

ISO 14001	CRD DOE 450.1A
necessary, revise its emergency preparedness and response procedures, in particular, after the occurrence of accidents or emergency situations. The organization shall also periodically test such procedures where practicable	
4.5 Checking	
4.5.1 Monitoring and measurement The organization shall establish, implement and maintain a procedure(s) to monitor and measure, on a regular basis, the key characteristics of its operations that can have a significant environmental impact. The procedure(s) shall include the documenting of information to monitor performance, applicable operational controls and conformity with the organization's environmental objectives and targets. The organization shall ensure that calibrated or verified monitoring and measurement equipment is used and maintained and shall retain associated records.	**1.b**....."The environmental management system must address the following-" **1.b.(5)** The conduct of environmental and effluent monitoring, as appropriate, to characterize pre-operational conditions, and to detect, characterize, and respond to releases from site operations and activities; assess impacts; estimate dispersal patterns in the environment; characterize the pathways of exposure to members of the public; characterize the exposures and doses to individuals and the population; and evaluate the potential impacts to the biota in the vicinity of the release. Where appropriate, conduct an integrated monitoring and sampling approach to avoid duplicative data collection. **1.b.(6)** Assurance that analytical work for environmental and effluent monitoring supports data quality objectives, using a documented approach for collecting, assessing, and reporting environmental data.
4.5.2 Evaluation of Compliance **4.5.2.1** Consistent with its commitment to compliance, the organization shall establish, implement and maintain a procedure(s) for periodically evaluating compliance with applicable legal requirements. The organization shall keep records of the results of the periodic evaluations. **4.5.2.2** The organization shall evaluate compliance with other requirements to which it subscribes. The organization may wish to combine this evaluation with the evaluation of legal compliance referred to in 4.5.2.1 or to establish a separate procedure(s). The organization shall keep records of the results of the periodic evaluations.	**2.** Monitor progress toward meeting the requirements of paragraph 1a, 1b, and 1c of this CRD, and make such information available annually through the DOE operations/field/site office to the Senior Agency Officer (SAO) and the Office of Health, Safety and Security (7)The conduct of appropriate operational assessments, such as pollution prevention opportunity assessments, of site operations and activities to identify opportunities to implement sustainable practices as part of achieving DOE's Sustainable Environmental Stewardship goals found in Attachment 2 of DOE O 450.1A.
4.5.3 Nonconformity, corrective action & preventive action The organization shall establish, implement and maintain a procedure(s) for dealing with actual and potential nonconformity(ies) and for taking corrective action and preventive action. The procedure(s) shall define requirements for a) identifying and correcting nonconformity(ies) and taking action(s) to mitigate their environmental impacts, b) investigating nonconformity(ies), determining their cause(s) and taking actions in order to avoid their	4. (c) An environmental compliance audit and review program that identifies compliance deficiencies and root causes of non-compliance. (d) Integration of compliance management information and resource allocation procedures to ensure that audit findings and root causes of non-compliance are tracked and addressed, including allocation of funding.

Assessment Matrix

ISO 14001	CRD DOE 450.1A
recurrence, c) evaluating the need for action(s) to prevent nonconformity(ies) and implementing appropriate actions designed to avoid their occurrence, d) recording the results of corrective action(s) and preventive action(s) taken, and e) reviewing the effectiveness of corrective action(s) and preventive action(s) taken. Actions taken shall be appropriate to the magnitude of the problems and the environmental impacts encountered. The organization shall ensure that any necessary changes are made to environmental management system documentation.	
4.5.4 Control of records The organization shall establish and maintain records as necessary to demonstrate conformity to the requirements of its environmental management system and of this International Standard, and the results achieved. The organization shall establish, implement and maintain a procedure(s) for the identification, storage, protection, retrieval, retention and disposal of records. Records shall be and remain legible, identifiable and traceable.	
4.5.5 Internal Audit The organization shall ensure that internal audits of the environmental management system are conducted at planned intervals to a) determine whether the environmental management system 1) conforms to planned arrangements for environmental management including the requirements of this International Standard, and 2) has been properly implemented and is maintained, and b) provide information on the results of audits to management. Audit program(s) shall be planned, established, implemented and maintained by the organization, taking into consideration the environmental importance of the operation(s) concerned and the results of previous audits. Audit procedure(s) shall be established, implemented and maintained that address — the responsibilities and requirements for planning and conducting audits, reporting results and retaining associated records, — the determination of audit criteria, scope, frequency and methods. Selection of auditors and conduct of audits shall ensure objectivity and the impartiality of the audit process.	c. The environmental management system must be validated according to the following criteria. (1) An environmental management system shall be considered fully implemented when— (a) The environmental management system has been the subject of a formal audit by a qualified party outside the control or scope of the environmental management system. (b) The appropriate contractor senior management and DOE field office management have recognized and addressed the findings of the audit. (c) The appropriate senior manager accountable for implementation of the environmental management system and the cognizant Field Officer Manager, have declared conformance of the environmental management system to the requirements of this CRD. 1(2) To remain fully implemented, at least every three years (a) the environmental management system must be audited by a qualified party outside the control or scope of the organization implementing the environmental management system, and (b) the conformance declaration 1c(1)(c) is renewed, as appropriate 1.C. (3) To remain fully implemented, at least every three years (a) the environmental management system must be audited by a qualified party outside the control or scope of the organization implementing the environmental management system, and (b) the conformance declaration 1c(1)(c) is renewed, as appropriate

Attachment B

EMS Lead Auditor Qualification/Certification Record

Name:	Date:
Employer:	

Education:

Has Lead Auditor candidate completed a level of education, work experience, auditor training and audit experience sufficient to acquire the following knowledge and skills?

Yes	No	Knowledge and Skill	Comments
☐	☐	a) Audit principles, procedure and techniques. A lead auditor should be able to: • to apply audit principles, procedures and techniques, • to plan and organize the work effectively, • to conduct the audit within the agreed time schedule, • to prioritize and focus on matters of significance, • to collect information through effective interviewing, listening, observing and reviewing documents, records and data, • to understand the appropriateness and consequences of using sampling techniques for auditing, • to verify the accuracy of collected information, • to confirm the sufficiency and appropriateness of audit evidence to support audit findings and conclusions, • to assess those factors that can affect the reliability of the audit findings and conclusions, • to use work documents to record audit activities, • to prepare audit reports, • to maintain the confidentiality and security of information, and • to communicate effectively, either through personal linguistic skills or through an interpreter.	

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Yes	No	Knowledge and Skill	Comments
☐	☐	b) Management system and reference documents: to enable the auditor to comprehend the scope of the audit and apply audit criteria. Knowledge and skills in this area should cover • the application of management systems to different organizations, • interaction between the components of the management system, • quality or environmental management system standards, applicable procedures or other management system documents used as audit criteria, • recognizing differences between and priority of the reference documents, • application of the reference documents to different audit situations, and • information systems and technology for authorization, security, distribution and control of documents, data and records.	
☐	☐	c) Organizational situations: to enable the auditor to comprehend the organization's operational context. Knowledge and skills in this area should cover • organizational size, structure, functions and relationships, • general business processes and related terminology, and • cultural and social customs of the auditee.	
☐	☐	d) Applicable laws, regulations and other requirements relevant to the discipline: to enable the auditor to work within, and be aware of, the requirements that apply to the organization being audited. Knowledge and skills in this area should cover • local, regional and national codes, laws and regulations, • contracts and agreements, • international treaties and conventions, and • other requirements to which the organization subscribes.	
Experience: **Audit experience should have been gained while acting in the role of a lead auditor under the direction and guidance of another auditor who is competent as a lead auditor.**			
☐	☐	Does the candidate have five (5) years of work experience, two (2) of which are in quality or environmental management, that contributes to the development of the knowledge and skills described above?	
☐	☐	Is this work experience in a technical, managerial or professional position involving the exercise of judgment, problem solving, and communication with other managerial or professional personnel, peers, customers and/or other interested parties?	

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Yes	No	Knowledge and Skill	Comments
☐	☐	Is part of the Candidate's work experience in a position where the activities undertaken contribute to the development of knowledge and skills in the environmental management field?	
☐	☐	Has the Lead Auditor Candidate successfully completed 3 audits and at least 15 days of audit experience acting in the role of a lead auditor under the direction and guidance of an auditor competent as a lead auditor?	

Audit Experience

The audits should be completed within the last two consecutive years

During the required 3 audits listed above, has the candidate performed the following?:

Yes	No	Experience	Comments
☐	☐	Has the candidate informed the audit client of inadequate documentation, if found?	
☐	☐	Has the candidate prepared an audit plan?	
☐	☐	Has the candidate had experience communicating with the audit client and auditees, including the progress of the audit?	
☐	☐	Has the candidate organized, assigned audit responsibilities, and directed audit team members?	
☐	☐	Has the candidate chaired the opening and closing meetings?	
☐	☐	During the closing meeting, has the candidate advised the auditee of situations that may have decreased reliance on the audit conclusions, if any?	
☐	☐	Has the candidate provided direction and guidance to auditors in training?	
☐	☐	Has the candidate led an audit team to reach audit conclusions?	
☐	☐	During the closing meeting, has the candidate prevented or resolved any audit conflicts?	
☐	☐	Has the candidate prepared and completed an audit report?	

Auditor Training

☐	☐	Has the Lead Auditor Candidate successfully completed the ISO 14001:2004 EMS Lead Auditor Training? (A copy of that certification must be attached to this form).	

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Yes	No	Experience	Comments
Attributes **Does the candidate possess the following personal attributes in order to enable them to act in accordance with the principles of auditing?**			

Yes	No	Attribute	Comments
☐	☐	Ethical-(fair, truthful, sincere, honest and discreet)	
☐	☐	Open-minded-(willing to consider alternative ideas or points of view)	
☐	☐	Diplomatic-(tactful in dealing with people)	
☐	☐	Observant-(Actively aware of physical surroundings and activities)	
☐	☐	Perceptive-(Instinctively aware of and able to understand situations)	
☐	☐	Versatile-(Adjusts readily to different situations)	
☐	☐	Tenacious-(Persistent, focused on achieving objectives)	
☐	☐	Decisive-(Reaches timely conclusions based on logical reasoning and analysis	
☐	☐	Self-Reliant-(Acts and functions independently while interacting effectively with others)	

Communication Skills Evaluation		
Evaluate the written and verbal communication skills of the candidate:	Sat ☐	UnSat ☐
	Justification	

Qualification Expiration Date:			
EQA Manager	**Print Name**	**Signature**	**Date**

Annual Proficiency Evaluation - EQA Manager Initial and Date:

Print Name	Signature	Date	Comments

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