0076385

DOE/RL-98-19
Revision 3

Surveillance and Maintenance Plan for the 202-S Reduction Oxidation (REDOX) Facility

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

United States
Department of Energy
P.O. Box 550
Richland, Washington 99352

RECEIVED
FEB 2 9 2008
EDMC

Approved for Public Release;
Further Dissemination Unlimited

Attach to: 0076383

DOE/RL-98-19
Revision 3

Surveillance and Maintenance Plan for the 202-S Reduction Oxidation (REDOX) Facility

Date Published
January 2008

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

United States Department of Energy
P.O. Box 550
Richland, Washington 99352

S. D. Aardal 01/10/2008
Release Approval Date

Approved for Public Release;
Further Dissemination Unlimited

TRADEMARK DISCLAIMER

Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

This report has been reproduced from the best available copy.

Printed in the United States of America

CONTENTS

1.0 INTRODUCTION 1-1

2.0 FACILITY ACTIVITIES 2-1
- 2.1 HISTORICAL BACKGROUND 2-1
- 2.2 FACILITY DESCRIPTION 2-1
  - 2.2.1 Inactive Waste Sites 2-2
  - 2.2.2 Operational Systems Description 2-2
- 2.3 SURVEILLANCE ACTIVITIES 2-4
  - 2.3.1 Environmental Monitoring of the Canyon Ventilation System Stack 2-4
  - 2.3.2 Annual Surveillance 2-5
  - 2.3.3 Routine Surveillance 2-5

3.0 FACILITY MAINTENANCE 3-1
- 3.1 MAINTENANCE ORGANIZATION AND ADMINISTRATION 3-1
- 3.2 TYPES OF MAINTENANCE 3-1
- 3.3 TYPES OF MAINTENANCE AND FREQUENCY 3-2

4.0 QUALITY ASSURANCE 4-1

5.0 TRAINING AND QUALIFICATION 5-1

6.0 ENVIRONMENTAL COMPLIANCE/PROTECTION 6-1
- 6.1 REDOX FACILITY AIR PERMITTING 6-1
- 6.2 RECORD KEEPING/DOCUMENTATION 6-1
- 6.3 HAZARDOUS MATERIAL PROTECTION 6-1
- 6.4 INSTITUTIONAL CONTROLS 6-1

7.0 OCCUPATIONAL RADIOLOGICAL CONTROLS 7-1

8.0 EMERGENCY MANAGEMENT 8-1

9.0 HEALTH AND SAFETY 9-1
- 9.1 FIRE HAZARD ANALYSIS 9-1
- 9.2 OCCUPATIONAL SAFETY AND HEALTH 9-1

10.0 SAFEGUARDS AND SECURITY 10-1

11.0 COST AND SCHEDULE 11-1

12.0 REFERENCES 12-1

APPENDIX

A HAZARDOUS MATERIAL REMAINING AT THE REDOX FACILITY A-1

FIGURE

Figure 2-1. REDOX Plot Plan. 2-3

TABLES

Table 2-1. REDOX Facility Structures and Components. 2-4
Table 11-1. Surveillance and Maintenance Cost Estimate. 11-1

ACRONYMS

ALARA	as low as reasonably achievable
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CFR	*Code of Federal Regulations*
CRD	Contractor Requirements Document
DOE	U.S. Department of Energy
EMS	Environmental Management System
ISMS	Integrated Safety Management System
QA	quality assurance
QAPD	Quality Assurance Program Description
REDOX	Reduction Oxidation Facility
RCRA	*Resource Conservation and Recovery Act of 1976*
RL	Richland Operations Office
ROD	record of decision
S&M	surveillance and maintenance
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TSD	treatment, storage, and/or disposal
WAC	*Washington Administration Code*
WDOH	Washington State Department of Health

This page intentionally left blank.

SURVEILLANCE AND MAINTENANCE PLAN FOR THE 202-S REDUCTION OXIDATION (REDOX) FACILITY

1.0 INTRODUCTION

The *Hanford Federal Facility Agreement and Consent Order*, referred to as the Tri-Party Agreement ensures compliance with the *Resource Conservation and Recovery Act of 1976* (RCRA) and the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA), as amended. The Tri-Party Agreement sets forth certain requirements and milestones for cleanup activities at the Hanford Site.

This document provides the plan for the surveillance and maintenance (S&M) phase of the Reduction Oxidation Facility (REDOX). This plan has been prepared in accordance with the Tri-Party Agreement, Attachment 2 (Tri-Party Agreement Action Plan), Section 8.6, "Surveillance and Maintenance Phase" and will remain in effect until the Remedial Design/Remedial Action Work Plan has been approved. The objectives of the S&M phase are to ensure adequate containment of any contaminants left in place and to provide physical safety and security controls and to maintain the facility in a manner that will minimize risk to human health or the environment. S&M plans are prepared by U.S. Department of Energy (DOE), Richland Operations Office (RL) and detail facility aspects and associated requirements including the following: (1) surveillance, (2) maintenance, (3) quality assurance, (4) radiological controls, (5) hazardous substance inventory, management and protection, (6) health and safety/emergency preparedness, (7) safeguards and security, (8) cost and schedule, and (9) environmental compliance. A list of the buildings managed as part of the REDOX facility S&M Plan or a list of implementing procedures can be obtained by contacting the manager of the project responsible for managing REDOX.

This page intentionally left blank.

2.0 FACILITY ACTIVITIES

Surveillance and maintenance activities conducted during the S&M phase are established to monitor containment of contaminants left in place, to provide physical safety and security controls, and to maintain the facility in a manner that will minimize risk to human health or the environment. Waste generated while performing S&M activities will be dispositioned according to waste handling regulations.

2.1 HISTORICAL BACKGROUND

This section of the REDOX S&M plan discusses the facility's operational history, includes prior usage of the facility, previous processes that resulted in hazardous and radioactive contamination, and completed disposition activities.

The REDOX Facility, also known as S Plant and the 202-S Facility, is located in the southwest portion of the 200 West Area of the Hanford Site. The REDOX Facility was constructed in accordance to the design codes, standards, and regulations in place at the time of construction. The REDOX Facility, which was constructed between 1950 and 1952, was the first large-scale, continuous-flow, solvent-extraction process plant built in the United States for recovering plutonium from irradiated uranium fuel. The extraction process, which replaced the batch precipitation methods first used at the Hanford Site, was designed to separate uranium, plutonium, and neptunium as individual product streams from associated fission products in the irradiated fuel. The plant operated from 1952 until 1967. Deactivation started in 1967 and was completed in 1969, when the REDOX Facility was transferred to S&M. Further details regarding the REDOX deactivation can be found in ISO-1108, *REDOX Deactivation*. Deactivation included multiple flushes using water, diluted hot nitric acid, permanganate, and oxalic acid. The facility was flushed regularly with water for nearly a year after the initial cleaning.

The deactivated REDOX Facility contains buildings and process equipment formerly used for dissolution and separation of uranium, neptunium, and plutonium, as well as deactivated equipment formerly used for waste concentration, waste neutralization, and solvent recovery. In addition to the main process areas, the REDOX Facility includes buildings that were formerly used to store chemicals and materials and support systems (e.g., ventilation, exhaust stacks, and environmental monitoring systems). The REDOX Facility will remain unoccupied for the duration of S&M activities.

Completion of these activities has established a safe and environmentally-secure configuration suitable for a long-term S&M program.

Not all the hazardous materials were removed when the facility was deactivated. Those hazardous materials remaining in the facility are listed in Appendix A, *Hazardous Material Remaining at the REDOX Facility*.

2.2 FACILITY DESCRIPTION

This section of the S&M Plan describes the major structures and operations of active systems; includes status of systems such as ventilation, fire protection, radiation detection, remote monitoring, utility distribution, compressed air, and water.

The REDOX Facility S&M includes 202-S Building, ancillary buildings, and their associated equipment within the REDOX perimeter fence and encompasses approximately 13 buildings listed in Table 2-1, "REDOX Facility Structures and Components" (see Plot Plan in Figure 2-1).

2.2.1 Inactive Waste Sites

The scope of the S&M program is limited to the facilities described in Section 8 of the Tri-Party Agreement (Ecology et al. 2003); therefore, waste sites are not addressed in this document.

2.2.2 Operational Systems Description

The REDOX Facility Canyon Building Exhaust System, Fire Protection System, Canyon Compressed Air System, Surveillance Lighting System, and the Instrumentation, Monitoring, and Control System are the only systems operating during the S&M phase.

2.2.2.1 Electrical

The original electrical distribution system to REDOX is isolated and disconnected. Power for the canyon ventilation exhaust fans, compressed air, supporting control system, canyon gallery heating, canyon 60-ton crane, and surveillance lighting are supplied from two 13.8 kV lines. One supplies a 13.8kV/480 V transformer supplying the majority of the loads in the facility, while the second supplies a 13.8 kV/240/120 V transformer for the surveillance lighting system.

2.2.2.2 Canyon Ventilation System

The 202-S canyon S&M ventilation system provides a negative pressure in the facility with respect to atmosphere. Two parallel exhaust fans operate in a run-standby configuration and discharge through a stack; all of which are located in the yard east of the canyon. Each fan is designed for 100 percent airflow. Infiltration air enters the canyon through the galleries, air locks, and the silo building. The S&M filtration system is made up of a single air path from the canyon facility via a wind tunnel, sand filter, fans, and stack.

2.2.2.3 Instrumentation, Monitoring, and Control System

A programmable logic control system with components located in the 202-S and 291-S Buildings provides data acquisition for monitoring data and controls for the ventilation system exhaust fans and, stack flow and sampling systems. Remote monitoring, control, and alarm are provided.

2.2.2.4 Fire Protection System

The fire protection system is a three-zone heat detection/fire alarm system that responds to heat detection or manual pull stations. The system transmits an alarm signal via a Radio Fire Alarm Reporter box to the central fire alarm system in the 200 West Fire Station.

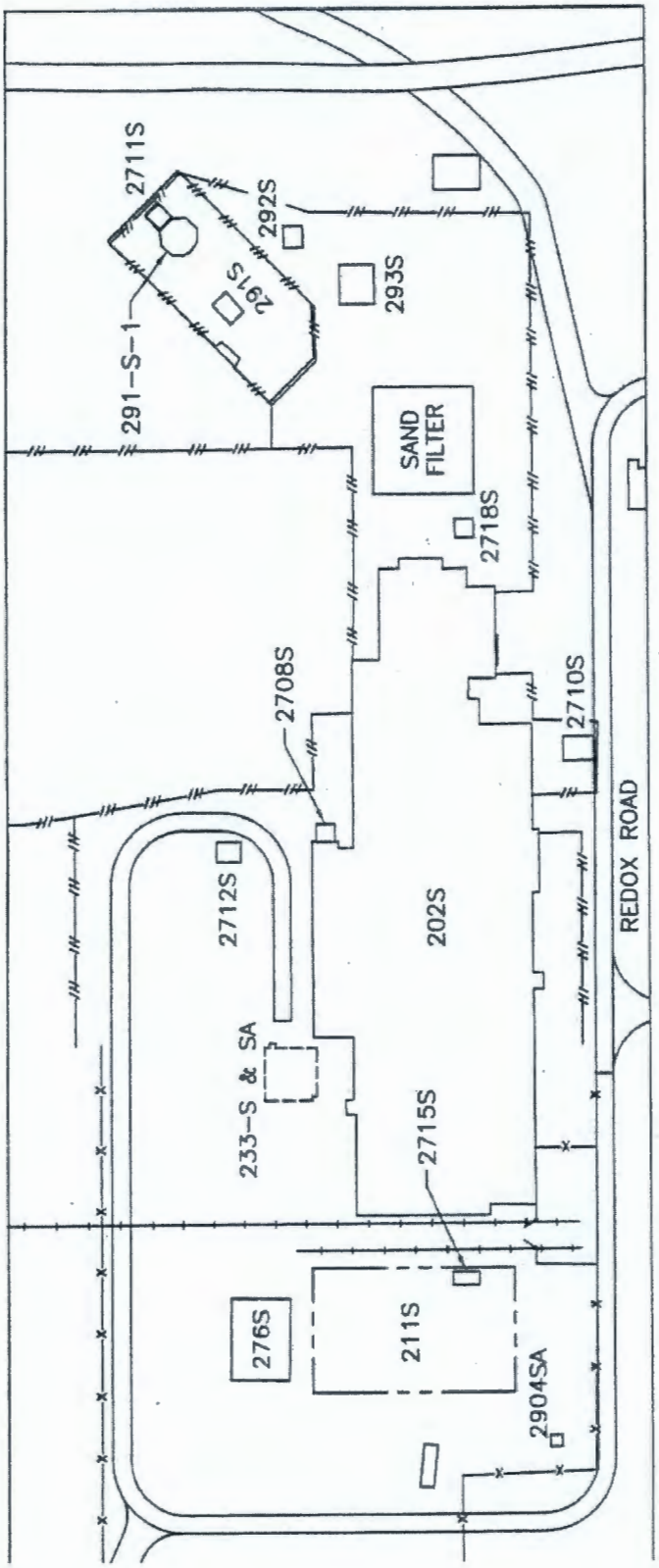

Figure 2-1. REDOX Plot Plan.

Table 2-1. REDOX Facility Structures and Components.

Identification #	Building Description/Components
202-S	Canyon and Service Building
211-S	Liquid Chemical Storage Tank Farm
233-S & SA	Slabs (remaining after demolition)
2706-S	Slab (remaining after demolition)
2708-S	Lager Storage Building
2710-S	Nitrogen Storage Building
2711-S	Stack Gas Monitoring Building
2715-S	Storage Building
2718-S	Sand Filter Sample Building
276-S	Solvent Handling Facility
2904-SA	Cooling Water Sampling Building
291-S	Canyon Exhaust System (Exhaust Building, Sand Filter and Stack)
291-S-1	Exhaust Stack
292-S	Control and Jet Pit House
293-S	Nitric Acid Recovery and Iodine Backup Building

2.2.2.5 Water Systems

Water systems to the facility structures have been isolated. Active fire hydrants are supplied by sanitary and raw water utility lines located in the facility yard.

2.3 SURVEILLANCE ACTIVITIES

This section describes the surveillance activities to be conducted on a routine and non-routine basis by the S&M contractor. Routine activities ensure that structural and passive confinement integrity is maintained. Non-routine activities include major responses to undesirable observations (e.g., action to be taken if damaged friable asbestos is present). The canyon area, which includes the process cells, cover blocks, deck and overhead space, will not be accessed during the S&M phase.

2.3.1 Environmental Monitoring of the Canyon Ventilation System Stack

The 291-S-1 Ventilation System Stack remains designated as a minor stack in accordance with the National Emissions Standards in Hazards Air Pollutants criteria, Title 40 *Code of Federal Regulations* (CFR) Part 61, Subpart H. This designation is due to the stack's low potential to emit radionuclides into the air such that the discharge could not cause an effective dose equivalent to any member of the public in an unrestricted area in excess of 0.1 millirem per year. Since operations supplying airborne radionuclides to the S&M ventilation system are not expected during S&M, monitoring activities have been reduced to a minimum, yet still meet the U.S. Environmental Protection Agency's requirements and the state requirements of *Washington Administrative Code* (WAC) 246-247, *Radiation Protection – Air Emissions*. Environmental sampling of the REDOX ventilation stack emissions during the S&M phase consists of stack effluent particulate sampling (as licensed with the State of Washington, Department of Health), designed to allow an accurate radionuclide release record for the stack.

2.3.2 Annual Surveillance

Indoor surveillance will consist of a walk-through of the 202-S galleries, aqueous make up, and silo galleries as identified in the contractor's annual REDOX Facility surveillance procedure. The annual S&M contractor walk-through surveillance includes checking for indications of:

- Internal and/or external structural defects,
- Roof deterioration,
- Posting deficiencies,
- Contamination migration,
- Suspect hazardous materials,
- Hazardous conditions,
- Electrical hazards,
- Unidentified friable asbestos,
- Failed lights,
- Doors unlocked,
- Water leaks,
- Excess combustible materials,
- Excess equipment or material,
- Ground subsidence,
- Inadequate housekeeping,
- Occupational hazards,
- Previously unidentified hazards,
- Unidentified or unlabeled containers, and
- Animal or insect intrusion.

In addition, routine general housekeeping such as tumbleweed and miscellaneous debris removal is performed throughout the REDOX complex.

A qualified contractor structural engineer will conduct an inspection of the roof and structures of those facilities that provide a passive confinement function. The frequency, extent of future inspections, and recommendations resulting from these periodic inspections will be documented by the contractor structural engineer.

2.3.3 Routine Surveillance

Routine surveillance governed by S&M contractor's operations, maintenance, and radiological work packages, and procedures are performed in addition to annual walk-through surveillance to ensure adequate facility S&M phase operation. These S&M contractor documents establish the frequency and activities necessary to monitor, control, and thereby preclude potential health and safety impacts and equipment failure.

S&M contractor's documents describe the required surveillance and frequency for the remaining active equipment. S&M contractor's documents also describe the preventive maintenance and instrument calibrations to maintain the remaining active equipment. The radiation protection procedures, radiation work permit, and radiological condition assessments describe the radiological control activities such as posting, access control, work place air monitoring, and radiological surveys.

This page intentionally left blank.

3.0 FACILITY MAINTENANCE

This section describes the methodology applied by DOE to ensure that the S&M contractor establishes preventive and corrective maintenance activities to be performed. Preventive maintenance is conducted on a prescheduled basis to ensure proper functioning of operational equipment. Corrective maintenance is performed after equipment has malfunctioned, has required structural repair due to degradation, or to upgrade facilities and/or equipment.

3.1 MAINTENANCE ORGANIZATION AND ADMINISTRATION

The DOE requires the S&M contractor to develop and implement plans, programs, and procedures that specify maintenance program requirements for nuclear and non-nuclear facilities required by Contractor Requirements Document (CRD) O 433.1, *Maintenance Management Program for DOE Nuclear Facilities*, and CRD O 430.1B, *Real Property Asset Management*. The DOE conducts oversight of the S&M contractor's maintenance program implementation.

CRD O 433.1 specifically mandates that the S&M contractor implement a maintenance management program using a graded approach and that the maintenance management program shall address the following elements, as appropriate:

- Maintenance Organization and Administration
- Training and Qualification of Maintenance Personnel
- Maintenance Facilities, Equipment, and Tools
- Types of Maintenance
- Maintenance Procedures
- Planning, Scheduling, and coordination of Maintenance
- Control of Maintenance Activities
- Post-maintenance Testing
- Procurement of Parts, Materials, and Services
- Receipt, Inspection, Handling, Storage, Retrieval, Issuance, and Disposal Turn In of Personal Property
- Control and Calibration of Measuring and Test Equipment
- Maintenance Tools and Equipment Control
- Facility Condition Inspection
- Management Involvement
- Maintenance History
- Analysis of Maintenance Problems
- Modification Work
- Seasonal Facility Preservation.

3.2 TYPES OF MAINTENANCE

A proper balance of routine and preventive maintenance is employed to provide a high degree of confidence that facility equipment degradation is identified and corrected. Preventive and routine maintenance is conducted as described S&M contractor work control procedures.

3.3 TYPES OF MAINTENANCE AND FREQUENCY

The following maintenance and frequencies are recommended to satisfy code and specification, manufacturer's recommendations, and to ensure optimum equipment operating life during the S&M program.

• Inspect and lube canyon exhaust fans and bearings EF-1 and EF–2	As recommended in procedures
• Calibration of equipment controlled by and for canyon ventilation instrumentation and control system	As recommended in procedures
• Sand Filter aerosol test	Determined from regulatory requirements
• Canyon ventilation stack monitoring system inspections	Determined from regulatory requirements
• Potential cold weather protection	As defined in the S&M contractor's cold weather protection program

4.0 QUALITY ASSURANCE

The DOE requires the S&M contractor to comply with the requirements of Title 10, Code of Federal Regulations, Part 830, Subpart A, *Quality Assurance Requirements* (10 CFR 830), DOE O 414.1C, Contractor Requirements Document (CRD), *Quality Assurance*, and State and Federal Environmental Regulations, for the establishment and implementation of its quality assurance (QA) program. The S&M contractor's Quality Assurance Program Description (QAPD), which is approved by DOE, describes the S&M contractor's implementation of these requirements. The QAPD is also the management system used for the conduct of environmental programs that acquire, generate, compile, report, and use environmental data and technology. The S&M contractor QA program, as described by its QAPD, is to be applied on a graded basis to S&M contractor activities.

The QAPD requires the S&M Contractor to establish and implement QA program/project plans for specific quality-affecting activities. These plans identify the applicable QA requirements, how the requirements are implemented, and the responsibilities, interfaces, and authority for their implementation. These plans also incorporate other local, state, and federal government QA requirements as established in applicable permits, agreements, orders, regulations, laws, codes, and standards.

This page intentionally left blank.

5.0 TRAINING AND QUALIFICATION

The DOE requires that the S&M contractor training and qualification programs be established and implemented to satisfy the requirements of 10 CFR 830.122(b), *Criterion 2 – Management/Personnel Training and Qualification,* and DOE O 414.1C CRD, Section 3.b, *Management/Criterion 2 – Personnel Training and Qualification*. (See Section 4.0, "Quality Assurance.")

This page intentionally left blank.

6.0 ENVIRONMENTAL COMPLIANCE/PROTECTION

This section identifies environmental compliance/protection requirements that are applicable to the S&M scope of work and has been prepared in accordance with the Tri-Party Agreement, Section 8.6, "Surveillance and Maintenance Phase."

The S&M contractor is required to comply with all environmental laws, regulations, and procedures applicable to the work being performed under the Contract. This includes, but is not limited to, compliance with applicable federal, state and local laws and regulations, interagency agreements such as the Tri-Party Agreement, consent orders, consent decrees, and settlement agreements between DOE and federal and state regulatory agencies.

The DOE requires that the S&M contractor must establish, implement, and maintain an environmental protection program in accordance with the provisions of CRD DOE O 450.1, *Environmental Protection Program*. This CRD requires contractors to integrate numerous environmentally related requirements already placed on it by existing statutes, regulations, and policies through the use of an Environmental Management System (EMS) incorporated into an Integrated Environmental, Safety and Health Management System (ISMS). EMS requirements must be addressed in the contractor's ISMS, which must be submitted for DOE review and approval under DEAR 970.5223-1, *Integration of Environment, Safety, and Health into Work Planning and Execution*.

The hazardous material remaining at the REDOX Facility (Appendix A) identifies and describes the material, location, and quantity of mixed waste and hazardous materials covered by the scope of this plan. Hazards associated with these materials are minimal due to their remote locations and existing form.

Dangerous waste generation and disposal is not expected during S&M. However, waste generated will be handled in compliance with the applicable regulatory, environmental, and waste management requirements.

6.1 REDOX FACILITY AIR PERMITTING

Under the US Department of Energy Hanford Site Radioactive Air Emissions License #FF-01, the DOE Hanford Site and REDOX specifically are licensed for airborne radioactive emissions. The FF-01 license is issued by the State of Washington, Department of Health.

6.2 RECORD KEEPING/DOCUMENTATION

Records and documents are retained at the S&M records area.

6.3 HAZARDOUS MATERIAL PROTECTION

During the S&M program, the REDOX Facility complies with the applicable requirements and as low as reasonably achieveable (ALARA) considerations for control of potential personnel exposures to hazardous materials. Hazardous material protection requirements are accomplished by complying with the S&M contractor's safety and health procedures.

6.4 INSTITUTIONAL CONTROLS

Institutional controls do not apply to activities addressed by the REDOX S&M plan because a CERCLA decision document has not been issued. Once a CERCLA decision document is issued for the REDOX

Facility, the identified institutional controls will be implemented as required. Site security and access control are implemented as part of S&M activities. Site security and access control are implemented as part of S&M activities.

7.0 OCCUPATIONAL RADIOLOGICAL CONTROLS

This section provides a reference to the DOE ALARA policy and program, which includes but is not limited to the following;

- External radiation exposure control;
- External dosimetry;
- Internal radiation exposure control;
- Internal dosimetry;
- Radiological protection instrumentation programs (both calibration and use);
- Respiratory protection program;
- Air monitoring;
- Radiological monitoring and contamination control;
- Radiological protection record keeping;
- Radiological area boundaries, posting, and controls;
- Radiological protection training; and
- Entry and exit control program.

The DOE requires the S&M contractor to establish, implement, and maintain a radiation protection program that satisfies the minimum requirements established by 10 CFR 835, *Occupational Radiation Protection Final Rule*.

This page intentionally left blank.

8.0 EMERGENCY MANAGEMENT

This section describes the DOE philosophy, objectives, and organization of the emergency preparedness functions for a spectrum of emergencies covering a range from local area emergencies to those that could affect persons off-site. This section addresses the activation of emergency organizations, assessment actions, notification processes, emergency facilities and equipment, training and exercises, and recovery actions.

The DOE requires the S&M contractor to comply with DOE Order 151.1A, *Comprehensive Emergency Management System*, CRD, DOE/Richland Operations Office (RL) (DOE/RL)-94-02. If an emergency or abnormal incident occurs, the situation will be responded to in accordance with the *Hanford Emergency Management Plan*, current revision, and DOE-0223, *Emergency Plan Implementing Procedures*, which establishes the emergency preparedness requirements for the Hanford Site. The S&M Contractor REDOX-specific emergency plan is written to meet a variety of requirements. Personnel are trained ahead of time to deal with emergencies or abnormal incidents through formal classroom instruction and drills.

This page intentionally left blank.

9.0 HEALTH AND SAFETY

This section discusses the DOE activities to ensure the health and safety of the workforce. Other topical areas such as radiological controls and facility maintenance may be driven by health and safety requirements; therefore, health and safety are discussed throughout the plan.

9.1 FIRE HAZARD ANALYSIS

The DOE requires the S&M contractor to establish requirements for the preparation, maintenance, and approval of a fire hazards analysis that comprehensively assesses the risk from fire within a DOE facility to determine whether the fire protection objectives of CRD O 420.1A, *Facility Safety*, Supplemental Contractor Requirements Document (SRCD) DOE O 420.1A, (Rev. 2) *Facility Safety*, and CRD O 440.1A, *Worker Protection Management for DOE Federal and Contractor Employees*, are met.

9.2 OCCUPATIONAL SAFETY AND HEALTH

The DOE requires the S&M contractor to comply with applicable Occupational Safety and Health Administration (OSHA) standards. DOE directive DOE O 440.1A, *Worker Protection Management for DOE Federal and Contractor Employees*, Attachment 2, CRD requires compliance (when applicable) to 29 CFR 1910, *Occupational Safety and Health Standards*, and 29 CFR 1926, *Safety and Health Regulations for Construction*, and several consensus standards. Applicability of the 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response Regulations (HAZWOPER) standards and the need for HAZWOPER training will be determined based on RL guidance.

This page intentionally left blank.

10.0 SAFEGUARDS AND SECURITY

The DOE requires the S&M contractor as the facility manager/asset owner to ensure protection is provided for all property, facilities, and materials according to the provisions of CRD M 473.1-1 (Supplemented Rev. 0), *Physical Protection Program Manual*. This DOE procedure for controlling access to the facility provides for an evaluation of the adequacy of existing physical controls (e.g., fencing, signs, entrance points into exclusion areas, door locks, and other barriers), a plan for the placement and monitoring of intrusion alarms, and describes the duties and scheduling of security patrols.

This page intentionally left blank.

11.0 COST AND SCHEDULE

This section identifies the DOE cost and schedule of S&M activities. This section includes a summary table of S&M costs applicable to the facility. One surveillance as a minimum will be made each year. The frequency of routine surveillance and maintenance as identified in Section 3.0 of this plan are identified in the S&M contractor's work and maintenance procedures.

The S&M contractor shall plan, acquire, utilize, maintain and dispose of DOE assets in a cost-effective manner. The contractor shall use industry standards, and apply a graded approach, in complying with CRD O 430.1B, *Real Property Asset Management*. The DOE defines graded approach, as it applies to this CRD, as providing the depth of detail required and the magnitude of resources expended for a particular management element to be tailored to be commensurate with the element's relative importance to safety, environmental compliance, safeguards and security, programmatic importance, magnitude of hazard, financial impact, and/or other facility-specific requirements.

Table 11-1. Surveillance and Maintenance Cost Estimate.

Description	Total
FY 2008	$ 518,000
FY 2009	$ 325,000
TOTAL	$ 843,000

This page intentionally left blank.

12.0 REFERENCES

10 CFR 830.120, *Quality Assurance Requirements*, "Code of Federal Regulations," as amended.

10 CFR 835, *Occupational Radiation Protection*, "Code of Federal Regulations," as amended.

29 CFR 1910, *Occupational Safety and Health Standards*, "Code of Federal Regulations," as amended.

29 CFR 1926, *Occupational Safety and Health Standards for the Construction Industry*, "Code of Federal Regulations," as amended.

40 CFR 61, *National Emissions Standards for Hazardous Air Pollutants,* Subpart H, "National Emissions Standards for Emissions of Radionuclide Other Than Radon from Department of Energy Facilities," Code of Federal Regulations, as amended.

CRD M 473.1-1 (Supplemented Rev. 0), *Physical Protection Program Manual*

CRD O 420.1A, *Facility Safety*, Supplemental Contractor Requirements Document (SRCD)

CRD O 430.1B, *Real Property Asset Management.*

CRD O 433.1, *Maintenance Management Program for DOE Nuclear Facilities*

CRD O 450.1, *Environmental Protection Program*

DEAR 970.5223.1, *Integration of Environment, Safety, and Health into Work Planning and Execution*

DOE-0223, *Emergency Plan Implementing Procedures*

DOE O 414.1A, *Contractor Requirements Document*, "Quality Assurance, and State and Federal Environmental Regulations"

DOE O 420.1A, (Rev. 2) *Facility Safety*, DOE 151.1A

DOE O 440.1, *Worker Protection Management for DOE Federal and Contractor Employees,* as amended, U.S. Department of Energy, Washington, D.C.

DOE/RL-94-02, *Hanford Emergency Response Plan*, as amended, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Ecology, EPA, and DOE-RL, 2003, *Hanford Federal Facility Agreement and Consent Order,* State of Washington, Department of Ecology, U.S. Environmental Protection Agency, U.S. Department of Energy, Richland Operations Office, Olympia, Washington, amended periodically.

ISO-1108, *REDOX Deactivation*

Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901, et seq., as amended.

WAC 173-303, *Dangerous Waste Regulations,* "Washington Administrative Code," as amended.

WAC 173-480, *Ambient Air Quality Standards and Emission Limits for Radionuclides*, "Washington Administrative Code," as amended.

WAC 246-247, *Radiation Protection – Air Emissions,* "Washington Administrative Code," as amended.

APPENDIX A

HAZARDOUS MATERIAL REMAINING AT THE REDOX FACILITY

The list of hazardous materials remaining at REDOX is as complete as knowledge allows but the list was not developed at the time it was deactivated by personnel who worked at and deactivated the facility.

Hazardous Chemical and Toxic Material

Exposure to hazardous chemicals at the REDOX Facility was rated as "low to negligible" in a risk management study of Hanford Site surplus facilities. The study identified loose containerized chemicals, lead shielding and counterweights, deteriorating and flaking lead-based paints, mercury switches, and fluid-filled manometers present inside facility buildings and surrounding grounds. Polychlorinated biphenyls (PCB) light ballast, lead paint, lead material used for shielding, mercury in switches and in lights, and used oils may also be encountered during the conduct of S&M activities.

While deactivation activities removed a vast majority of the chemicals, minor quantities of residual chemicals are expected to be found in the process vessels and piping located in the various buildings throughout the facility. Deactivation procedures specified the use of nitric acid, permanganate, and oxalic acid that are also likely to be present in residual quantities.

Radiological Materials

The majority of the radiological inventory at the REDOX Facility is located within the cells of the canyon in the 202-S Building and the 291-S exhaust system duct work and sand filter. Relatively minor quantities exist in other buildings, typically as residues or surface contamination. The table below presents the inventory of the 202-S Canyon Building and sand filter. The values are based on the best available data. For radiological consequence calculation purposes, the alpha activity is assumed to be plutonium-239, and the beta activity is assumed to be strontium-90. These assumptions are conservative in that plutonium-239 and strontium-90 have the largest effective dose conversion factors of those radionuclides potentially present in significant quantities.

HAZARDOUS MATERIAL REMAINING AT THE REDOX FACILITY

LOCATION	SOURCE DOCUMENT	MATERIAL DESCRIPTION	QUANTITY/STATE
GENERAL		This General section addresses hazardous substances/ dangerous wastes that may not have been specifically addressed in the deactivation process. Traces of the following materials, which are expected to remain stable during surveillance and maintenance (S&M), may exist in unknown quantities throughout the facility, as noted below: • Asbestos abandoned throughout the plant as a solid component such as transite siding, utility line insulation, floor tiles, and gasket material. • Lead as a solid component, such as paint, light bulb contacts, washers affixing transite, solder in electrical and plumbing system, sanitary water line joints packed with lead mesh; steam, air and water safety relief valve seals; components of control panels-all abandoned in-place and stable during S&M. • Mercury in thermostats and in electronic switches (i.e., electronic switches) throughout the facility. • Remaining smoke detectors may contain radioactive sources. • PCBs may exist in ballasts and lubricants/gear oil once used throughout the plant. • Organic in liquid films, greases, and solid residues in bearings and gearboxes throughout the plant. • Silver and lead contacts are used in the electrical system. Lead and zinc were used as soldering in the electrical systems.	

HAZARDOUS MATERIAL REMAINING AT THE REDOX FACILITY

LOCATION	SOURCE DOCUMENT	MATERIAL DESCRIPTION	QUANTITY/STATE
202-S Canyon Building	SD-DD-001 (RHO 1982)	• 1,500 Ci alpha (24,500 g of ^{239}Pu) • 9,000 Ci beta (64 g of ^{90}Sr)	Based on historical published data, the basis of which is unknown. No location specified. Assumed distributed about the facility. Primarily concentrated in the canyon process cells, silo, and processing equipment.
202-S North Sample Gallery		• 140 Ci alpha (2,155 g of ^{239}Pu) • 840 Ci beta (6.0 g of ^{90}Sr)	• H-4 transfer line (488 ft) 45.4 g 0.049 Ci • E-3 to L-12 XFR line (29ft) 0.8 0.05 • 233-S Flr Drn Line (26ft) 2.0 0.12 • 233-S Pipe Trcnh Line (10ft) 0.6 0.04 • PR Cage Sump (6x6x6 in) 5.9 0.36 • E-16 Pre-Concentrator 1,450.0 88.9 • E-17 Concentrator 650.0 40.0 --- --- Total 2,155 g 132.1 Ci Source: BHI-00994 (BHI 1997). Uncertainty is approximately +/- 10%. The 132.1 Ci of ^{239}Pu is assumed to be 140 for conservatism. BHI-01142, *REDOX Safety Analysis Report* (BHI 1998) Source for fissionable material in the 202-S Sample Galleries)

This page intentionally left blank.