LUCIP for the
A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) and the Miscellaneous Chemical Basin/Metals Burning Pit (731-4A and -5A) Operable Unit
Land Use Control Implementation Plan for the A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) & the Miscellaneous Chemical Basin/Metals Burning Pit (731-4A & -5A) Operable Unit
(WSRC-RP-2006-4073, Rev.1, September 2007)

This page was intentionally left blank.

United States Department of Energy

Savannah River Site

Land Use Control Implementation Plan (LUCIP) for the A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) and the Miscellaneous Chemical Basin / Metals Burning Pit (731-4A, -5A) Operable Unit (U)

CERCLIS NUMBER: 19, 28, 92

WSRC–RP–2006-4073

Revision 1

September 2007

Prepared by:
Washington Savannah River Company LLC
Savannah River Site
Aiken, SC 29808

Prepared for the U. S. Department of Energy Under Contract No. DE-AC09-96SR18500

DISCLAIMER

Printed in the United States of America
Prepared for
U.S. Department of Energy
and
Washington Savannah River Company LLC
Aiken, South Carolina

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

LIST OF ACRONYMS AND ABBREVIATIONS

ABRP	A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A)
ARAR	applicable or relevant and appropriate requirements
bgs	below ground surface
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm	centimeter
CM	contaminant migration
CMCOC	contaminant migration constituent of concern
COC	constituent of concern
ECA	Environmental Compliance Authority
ECO	ecological
ESD	Explanation of Significant Difference
FFA	Federal Facility Agreement
ft	feet
ft^2	square feet
ft^3	cubic feet
HAZWOPER	Hazardous Waste Operations and Emergency Response
HH	human health
HQ	hazard quotient
IC	institutional control
in	inch
IROD	Interim Record of Decision
LOAEL	lowest observable adverse effects level
LUC	land use control
LUCIP	Land Use Control Implementation Plan
LUCAP	Land Use Control Assurance Plan
μg/kg	microgram per kilogram
μg/L	microgram per liter
m	meter
m^2	square meter
m^3	cubic meter
MBP	Metals Burning Pit (731-5A)
MCB	Miscellaneous Chemical Basin (731-4A)
MCL	maximum contaminant level
mg/kg	milligram per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OU	operable unit

LIST OF ACRONYMS AND ABBREVIATIONS *(Continued)*

PCB	polychlorinated biphenyl
PCE	tetrachloroethylene
pCi/g	picoCurie per gram
PCM	Post-Closure Manager
PCR	Post-Construction Report
QA	Quality Assurance
RA	remedial action
RCOC	refined constituent of concern
RCRA	Resource Conservation and Recovery Act
RFI/RI	RCRA Facility Investigation/ Remedial Investigation
RG	remedial goal
RGO	remedial goal option
ROD	Record of Decision
SCDHEC	South Carolina Department of Health and Environmental Control
SGCP	Soil and Groundwater Closure Projects
SRS	Savannah River Site
SVE	soil vapor extraction
TCE	trichloroethylene
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WSRC	Washington Savannah River Company LLC
yd^3	cubic yard

1.0 INTRODUCTION

This Land Use Control Implementation Plan (LUCIP) has been prepared for the A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) and the Miscellaneous Chemical Basin / Metals Burning Pit (731-4A, -5A) Operable Unit (ABRP/MCB/MBP OU) at the Savannah River Site (SRS). The ABRP/MCB/MBP OU includes the eight ABRP subunits (Burning/Rubble Pit 731-A, Burning/Rubble Pit 731-1A, Rubble Pit 731-2A, Potential Pit, Depressional Area, Ash Scatter Area/Ditch, A-Area Ash Pile 788-2A, and Trench), two MCB subunits (MCB Surface Soil and MCB Vadose Zone) and one MBP subunit (MBP Surface Soil). The anticipated future land use for the ABRP/MCB/MBP OU is industrial. Due to groundwater contamination, institutional controls (ICs) to prevent access to or use of groundwater until cleanup level are met under the Resource Conservation Recovery Act (RCRA) program are required for all of the subunits in this OU. Groundwater contamination in the vicinity of the ABRP/MCB/MBP OU is being addressed under the RCRA Part B Permit Renewal Application for M-Area and Metallurgical Laboratory Hazardous Waste Management Facilities Postclosure. The purpose of the LUCIP is to describe how the land use controls (LUCs) selected in the ABRP/MCB/MBP OU Record of Decision (ROD) (WSRC 2006a) will be implemented and maintained. The following LUC objectives have been selected for this OU:

- Restrict worker access and prevent unauthorized contact, removal or excavation of contaminated media (i.e., vadose zone soils)

- Prohibit the development and use of property for residential housing, elementary schools, childcare facilities and playgrounds

- Maintain the integrity of any current or future remedial or monitoring systems such as soil vapor extraction (SVE) systems, soil cover, or groundwater monitoring wells

- Prevent access to or use of groundwater until cleanup levels are met (under the RCRA program)

- Prevent construction of inhabitable buildings without an evaluation of indoor air quality to address vapor intrusion

Current access controls and deed notification needed to maintain the future land use are described in the following sections of this LUCIP.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the soil and groundwater are at levels that allow for unrestricted use. As agreed on March 30, 2000, among the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and South Carolina Department of Health and Environmental Control (SCDHEC), SRS is implementing a Land Use Control Assurance Plan (LUCAP) to ensure that the LUCs required by numerous remedial decisions at SRS are properly maintained and periodically verified. The requirements of that LUCAP also apply to the LUCs that were selected as part of the remedial action (RA) for the ABRP/MCB/MBP OU. This additional document, the ABRP/MCB/MBP OU LUCIP, contains the detailed and specific measures required to implement and maintain the LUCs selected as part of this particular remedial decision. The LUCs shall be maintained until the OU is suitable for unlimited exposure and unrestricted use. Approval by USEPA and SCDHEC is required for any modification or termination of the ICs.

USDOE is responsible for implementing, maintaining, monitoring, reporting, and enforcing the LUCs in accordance with the approved LUCIP. Upon final approval, the LUCIP will be appended to the LUCAP and should be considered incorporated by reference into the ABRP/MCB/MBP OU ROD (WSRC 2006a), establishing implementation and maintenance requirements for the LUCs under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the SRS Federal Facility Agreement (FFA) (FFA 1993). The LUCIP will remain in effect unless and until modifications are approved by USEPA and SCDHEC as necessary for protection of human health and the environment. This LUCIP will be evaluated for accuracy during the five-year remedy review and any approved LUCIP

modification will be appropriately documented for incorporation by reference into the ABRP/MCB/MBP OU ROD.

1.1 Format of LUCIP

The format of this LUCIP is consistent with the FFA protocol format approved by the USEPA and SCDHEC in March 2004.

2.0 OVERVIEW OF ABRP/MCB/MBP OU REMEDIAL ACTION

2.1 General Description and History of the Unit

SRS occupies approximately 803 square kilometers (310 square miles) of land adjacent to the Savannah River, principally in Aiken and Barnwell counties of South Carolina. SRS is located approximately 40 kilometers (25 miles) southeast of Augusta, Georgia, and 32 kilometers (20 miles) south of Aiken, South Carolina. The ABRP/MCB/MBP OU is located within the Upper Three Run Creek Integrator Operable Unit. M Area is located in the northwest portion of SRS.

The ABRP/MCB/MBP OU is comprised of three separate, adjacent waste sites; the A-Area Burning/Rubble Pits (ABRP), the Miscellaneous Chemical Basin (MCB), and the Metals Burning Pit (MBP) (See Figure 1).

The ABRP is divided into eight subunits (Burning/Rubble Pit 731-A, Burning/Rubble Pit 731-1A, Rubble Pit 731-2A, Potential Pit, Depressional Area, Ash Scatter Area/Ditch, A-Area Ash Pile 788-2A, and Trench) as shown in Figure 2. These potential waste sites were identified based upon field investigations of existing sites and surface features and by reviewing historical aerial photographs from the 1950's through 1980's.

The two Burning/Rubble Pits (731-A, 731-1A) were constructed in 1951 and are approximately 6.7 m (22 ft) wide, 2.7 to 3 m (9 to 10 ft) deep, and 76.2 m (250 ft) long. They were used on a monthly schedule to burn paper, plastics, wood, rubber, rags, cardboard, oil degreasers, and solvents. After burning was discontinued in October 1973, the burned remains were covered

with a layer of soil. The pits were subsequently filled with rubble consisting of paper, wood, concrete, empty galvanized steel barrels, and cans. The pits reached capacity in 1978 and were taken out of service in 1983. The pits were then covered with native soils to grade level, and vegetation was allowed to re-establish.

Rubble Pit 731-2A was used from about 1951 until 1983 and is approximately 12.2 m (40 ft) wide and 198.1 m (650 ft) long, with an unknown depth that could extend to 6.1 m (20 ft). No specific disposal records are known to exist for this pit. However, SRS rubble pits were generally used to dispose of construction debris, waste wood products, and non-returnable empty drums. After the last use of Rubble Pit 731-2A in 1983, the area was backfilled and seeded.

The Potential Pit has estimated dimensions of 61 x 79.2 m (200 x 260 ft). This subunit was designated based on the existence of an area of depression/subsidence located approximately 15.2 m (50 ft) east of the A-Area Ash Pile and discussions with SRS personnel. Ground penetrating radar results suggested the presence of a trench boundary; however, further investigation produced no evidence of a trench.

The Depressional Area has estimated dimensions of 48.8 x 112.8 m (160 x 370 ft). It was identified by field observations as a potential receptor of surface runoff from the overflow of the pits/trenches or from spills in the immediate area. Although this area is a topographical "low spot," it does not contain permanent standing water or boggy areas, nor does it exhibit characteristic wetland soils and vegetation.

As shown in Figure 2, the Ash Scatter Area/Ditch is located between the A-Area Ash Pile and the Depressional Area and has approximate dimensions of 91 x 46 m (300 x 150 ft). A historic east-northeast trending ditch (currently filled) is located within this subunit and measures approximately 91 x 6 m (300 x 20 ft).

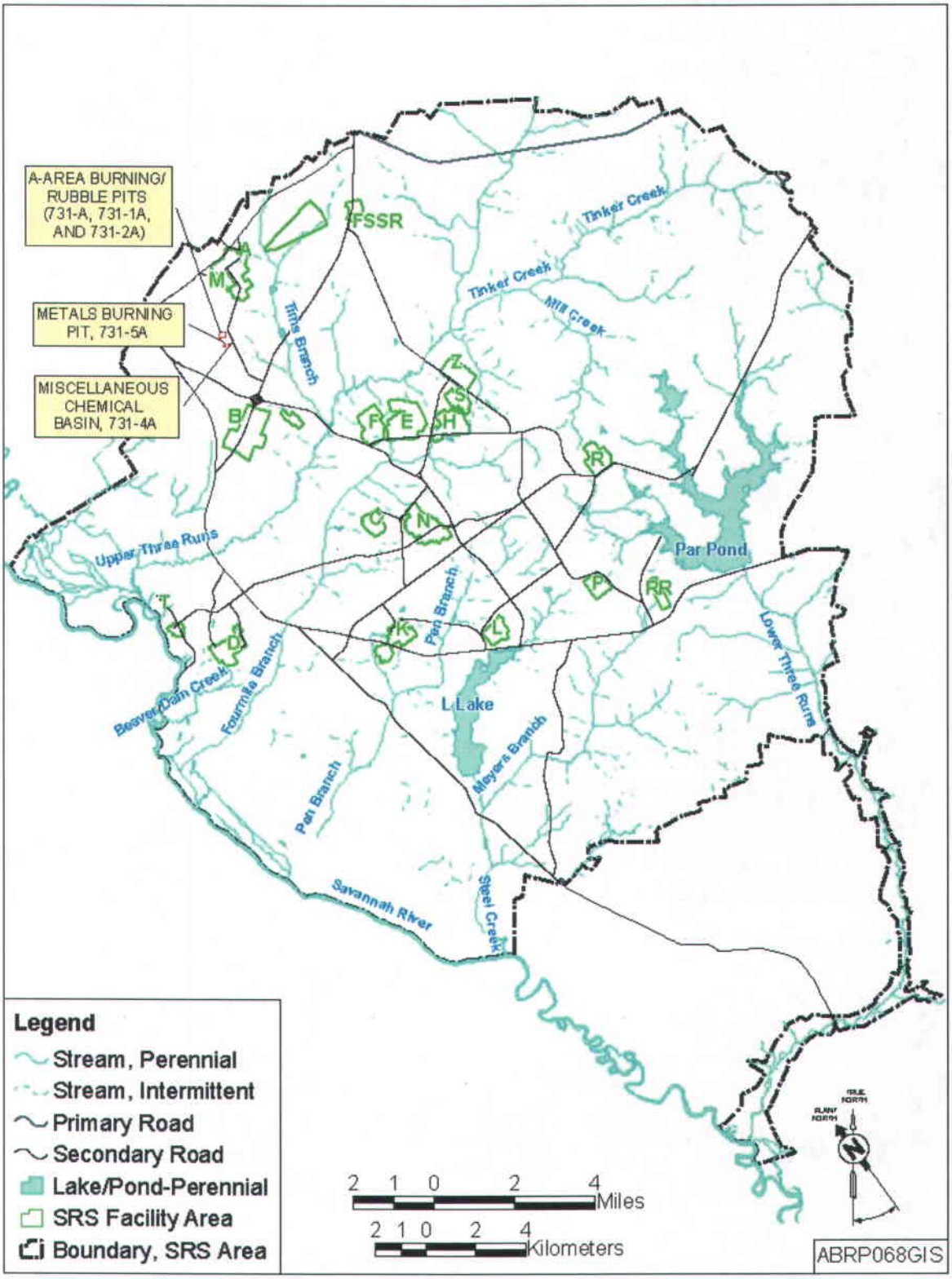

Figure 1. Location of the ABRP/MCB/MBP OU in M Area within the Savannah River Site

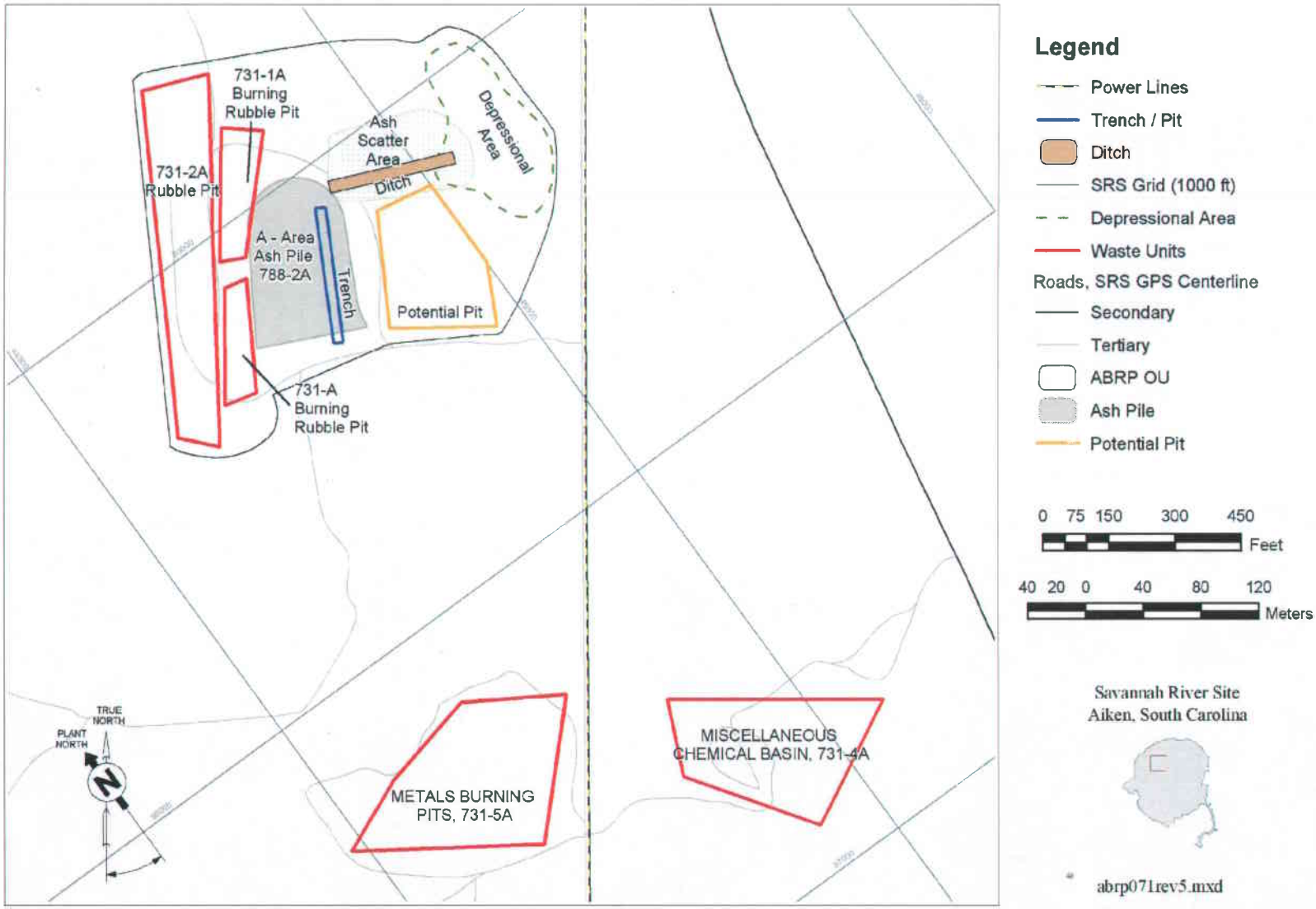

Figure 2. Layout of the ABRP/MCB/MBP OU

The A-Area Ash Pile 788-2A subunit is located in the central portion of the ABRP. It covers an area of approximately 128 x 79 m (420 x 260 ft) and rises approximately 4.6 to 8 m (14 to 24 ft) above the surrounding topography. The A-Area Ash Pile was used to dispose of ash from the A-Area Powerhouse prior to 1994. The A-Area Ash Pile is permitted under Industrial Wastewater Permit No. 7289, which was issued on June 29, 1981.

The Trench subunit extends north-south and is mostly buried beneath 6.1 m (20 ft) of compacted ash along the eastern portion of the A-Area Ash Pile. The Trench was filled with debris and covered with soil prior to construction of the A-Area Ash Pile. The Trench measures approximately 4.6 x 91.4 m (15 x 300 ft). The Trench is between 2.4 and 4.6 m (8 and 15 ft) deep with approximately 5 to 10% of its length is exposed to the south of the A-Area Ash Pile.

MCB/MBP Operational History

The MCB is an old borrow pit that received liquid chemical waste from about 1956 to 1974. No records of the types or amounts of material disposed of are available. It is believed that drums were emptied at the MCB and then discarded at the MBP. In 1974, the MCB, which was approximately 6 x 6 m (20 x 20 ft) and approximately 0.3 m (1 ft) deep, was graded and allowed to revegetate naturally.

The MBP is a cleared area that was used to burn lithium-aluminum alloys, scrap, and cuttings from A/M-Area operations. The MBP is irregular in shape, approximately 122 x 122 m (400 x 400 ft); it is not an excavated pit. Materials deposited there were placed in piles from 0.9 to 1.8 m (3 to 6 ft) high upon the ground. Wastes were accumulated in two areas, one large pile and a series of small piles oriented in a semicircular arc. The MBP reportedly was in service from about 1960 to 1974. In 1974, the area was graded and allowed to revegetate with weeds, grasses and small pine trees.

2.2 Nature and Extent of Contamination

No human health (HH), ecological (ECO) or contaminant migration (CM) refined constituents of concern (RCOCs) have been identified at the Burning/Rubble Pits (731-A, -1A), Potential Pit, Depressional Area, and Ash Scatter Area/Ditch subunits. Thus, there is no problem warranting action for these subunits.

Benzo(a) pyrene in surface soil at Rubble Pit 731-2A was identified as an RCOC for the future industrial worker at concentrations exceeding the remedial goal (RG) of 0.2 mg/kg. The final action selected for the surface soil in the ABRP Interim Record of Decision (IROD) consisted of a minimum 0.3 m (1-ft) thick soil cover combined with ICs. Construction of the soil cover, which also covered the Burning/Rubble Pits (731-A, 731-1A) in order to insure adequate drainage, was completed in 2001. This action remains protective of human health. No further problems warranting action exist at the Rubble Pit 731-2A surface soil subunit.

At the MCB subunit, polychlorinated biphenyls (PCBs) exceeding both the human health RG (1 mg/kg) and the ecological RG (0.215 mg/kg) were present in soils. Octachlorodibenzo-p-dioxin was also present as a human health RCOC. The final action selected for MCB surface soils in the MCB IROD was ICs combined with excavation of PCB-contaminated soils to a maximum depth of 1 .2 m (4 ft). The excavation, which included an area of about 8826 m^2 (95,000 ft^2), was completed in February 2002. Confirmatory sampling was performed to verify that RGs were met. The excavation was backfilled with clean soil. This action remains protective of human health. No further problems warranting action exist at the MCB surface soil subunit.

Aluminum concentrations at the MBP subunit exceeded the ecological RG of 11,000 mg/kg at two areas totaling approximately 1,765 m^2 (19,000 ft^2). The final action selected for MBP surface soils in the MCB/MBP IROD was excavation of contaminated soils to a maximum depth of 1.2 m (4 ft). Confirmatory sampling was performed to verify that RGs were met. The excavation was backfilled with clean soil. No further problems warranting action exist at the MBP surface soil subunit.

Arsenic and coal-related radionuclides are present at the A-Area Ash Pile (788-2A) subunit at concentrations that exceed the $1x10^{-6}$ risk for the future industrial worker. Arsenic and selenium are present in concentrations that may be predictive of a potential ecological hazard (lowest observable adverse effects level [LOAEL] hazard quotients [HQs] > 1). These RGs are listed in Table 1. The A-Area Ash Pile covers approximately 10,000 m^2 (110,000 ft^2). Based on an average thickness of 6.1 m (20 ft), the total volume of the ash is approximately 60,400 m^3 (79,000 yd^3).

The Trench subunit is approximately 4.6 m (15 ft) wide by 91.4 m (300 ft) long, most of which is overlain by about 6.1 m (20 ft) of compacted ash. The Trench is between 2.4 and 4.6 m (8 and 15 ft) deep, and approximately 5 to 10% of the Trench is exposed south of the Ash Pile. The vadose zone in the vicinity of the ABRP is about 40 m (130 ft) thick. The upper 24 m (80 ft) is made up of sands and silt. This is underlain by a predominantly clay, 1.8 to 2.4 m (6 to 8 ft) layer that sits atop another sand/silt layer approximately 12.2 m (40 ft) thick. A perched water zone is present at times just above the clay-rich zone at a depth of 22.9 to 25.9 m (75 to 85 ft) below the surface. The ABRP IROD was supplemented by an Explanation of Significant Difference (ESD) that added an interim action of low-energy SVE to address trichloroethylene (TCE) contamination in the vadose zone beneath the Trench. Three wells are currently in operation as MicroBlowers™ and one is operating with a BaroBall™ as part of this ongoing interim action. In 2001, before the start of the interim action, the maximum detection of TCE was 487 mg/kg. TCE concentrations are also present at levels in the vadose zone that would migrate to groundwater above the maximum contaminant level (MCL) of 5.0 μg/L in less than 10 years.

The MCB vadose zone is approximately 36.6 m (120 ft) thick. The vadose zone contains a fine-grained sediment zone up to 4.6 m (15 ft) below ground surface (bgs), underlain by 18.3 to 21.3 m (60 to 70 ft) of sands/silts, a 3.0 m (10 ft) thick clay lens at a depth of 22.9 to 25.9 m (75 to 85 ft), and sands and silts to the water table. Tetrachloroethylene (PCE) and TCE contamination was found in the vadose zone at levels that would migrate to groundwater at a concentration above the MCL of 5.0 μg/L in less than 10 years. The final action selected for the MCB vadose zone in the MCB IROD was active/passive SVE, with a

contaminant migration remedial goal option (RGO) of 0.344 mg/kg for both PCE and TCE. Twenty-seven SVE wells were installed covering an area of about 8,659 m^2 (93,200 ft^2). Active SVE operation has been completed and passive SVE is ongoing. Effectiveness monitoring indicates declining contaminant concentrations consistent with effective removal of contaminated soil gas. Residual TCE and PCE contamination remains above the RG of 0.344 mg/kg at depths of 0 to 4.6 m (0 to 15 ft) bgs. Passive SVE is ongoing per the MCB/MBP IROD, with 14 wells currently venting. No further response action is required.

PCE and TCE have been determined to be contaminant migration constituents of concern (CMCOCs) at the Trench Area and at the MCB subunit. Computer modeling was used to establish TCE and PCE soil concentrations that would not adversely impact the underlying groundwater. These RGs are listed in Table 1. Actual soil sampling in the vadose zone at the points of greatest contamination will be conducted to determine when the RGs have been achieved, and no change in the operation of the SVE process will be allowed without the concurrence of the Core Team.

Although the proposed RA is intended to prevent the leaching of contaminants from the soil to underlying aquifers, groundwater is not considered part of the ABRP/MCB/MBP OU. Any groundwater contaminated by the ABRP/MCB/MBP OU will be addressed by the remedial systems operating under the SRS RCRA Part B Permit.

The selected remedy for the ABRP/MCB/MBP OU leaves hazardous substances in place that pose a potential future risk and will require land use restrictions until the concentrations of hazardous substances in the soil and groundwater are at levels that allow for unrestricted use and exposure.

2.3 Remedial Actions Selected

The selected RA established in the ROD is based on an evaluation of potential alternatives performed in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and the CERCLA (as amended).

As stated in the ROD (WSRC 2006a), for the ABRP/MCB/MBP OU, no action is required for the following subunits:

- Burning/Rubble Pits 731-A and 731-1A
- Depressional Area
- Potential Pit
- Ash Scatter Area/Ditch

This decision is based on a hypothetical future resident scenario; i.e., unrestricted land use. These subunits do not require any surficial land use controls as part of the final remedy. The future land use for ABRP/MCB/MBP OU is anticipated to be industrial. Due to groundwater contamination, ICs to prevent access to or use of groundwater until cleanup levels are met under the RCRA program are required for all of the subunits in this operable unit. Groundwater contamination in the vicinity of the ABRP/MCB/MBP OU is being addressed under the 2000 RCRA Part B Permit Renewal Application for M-Area and Metallurgical Laboratory Hazardous Waste Management Facilities Postclosure.

As per the respective IRODs, final actions have been completed for the following subunits and no further action is required:

- Rubble Pit 731-2A (WSRC 2000)
- MCB/MBP surface soils (WSRC 1999)

The decisions for the Rubble Pit and MCB are based on the future industrial worker scenario; these subunits require land use controls as part of the final remedy. The MBP does not require surface land use controls (based on a hypothetical future resident scenario, i.e., unrestricted land use) as part of the final remedy since it only had an ecological risk driver.

The future land use for ABRP/MCB/MBP OU is anticipated to be industrial. Due to groundwater contamination, ICs to prevent access to or use of groundwater until cleanup level are met under the RCRA program are required for all of the subunits in this operable unit. Groundwater contamination in the vicinity of the ABRP/MCB/MBP OU is being addressed

under the RCRA Part B Permit Renewal Application for M-Area and Metallurgical Laboratory Hazardous Waste Management Facilities Postclosure.

A final action for the MCB vadose zone is on-going and will continue. The final action is the continued passive operation of SVE BaroBall™ wells.

The selected RA for the ABRP Trench area is Alternative AT-3, Operation of SVE and ICs. This includes the following elements:

- Soil Vapor Extraction – Up to eleven new SVE wells will be installed to remove volatile organic compound VOC source material from the vadose zone adjacent to the Trench area. The existing four SVE wells will remain in service. The wells will enable the removal of mobile VOCs, which have migrated downwards toward the water table. Should actual vadose zone sampling indicate that the VOCs have not been removed to the levels specified in the ROD, additional action must be taken as specified by concurrence of the Core Team.
- Institutional Controls - ICs will consist of site maintenance (site inspections, mowing, general housekeeping, repair of erosion damage, and other routine maintenance as needed) and access controls (warning signs and land use restrictions). ICs will include continued use of SRS's Site Use and Site Clearance Programs to restrict disturbance of the site and to prevent access to or use of groundwater until cleanup levels are met.
- CERCLA ROD RA Reviews - The ROD RA will be reviewed every five years to ensure that the selected remedy remains protective of human health and the environment.

RGs are target cleanup criteria. RGs are provided in Table 1.

The post-RA conceptual site model (see Appendix C to this LUCIP) shows the broken pathways and the remaining residual risk to the future industrial worker.

Table 1. Summary of Remedial Action Objectives and Remedial Goals for Soil

Area/Media of Concern	Refined COCs	Type of COC				Final Remedial Goal Option	Final Remedial Goal Option Basis
		ARAR	CM	HH	ECO		
MCB Vadose Zone	TCE		X			344 µg/kg	Final RG – WSRC 1999
Remedial Action Objectives	PCE		X			344 µg/kg	Final RG – WSRC 1999
▪ Prevent migration of TCE and PCE contamination in soil to groundwater at a concentration above its MCL							
ABRP Trench Subunit	TCE		X			610 µg/kg	Contaminant Migration
Remedial Action Objectives							
▪ Treat or remove the TCE to the extent practicable.[2]							
▪ Prevent migration of TCE contamination in soil to groundwater at a concentration above its MCL							
A-Area Ash Pile Subunit	Arsenic			X	X	9,753 µg/kg	Background[1]
Remedial Action Objectives	Selenium				X	15,280 µg/kg	Background[1]
• Prevent human exposure to refined COCs that present a risk to future industrial workers	Potassium-40			X		1.60 pCi/g	Background[1]
• Prevent ecological exposure to refined COCs that present a hazard to ecological receptors	Radium-226			X		0.0255 pCi/g	HH-industrial
	Radium-228			X		1.83 pCi/g	Background[1]
	Thorium-228			X		1.69 pCi/g	Background[1]
	Uranium-238			X		1.79 pCi/g	HH – Industrial

1. Background value is two times average site-specific background concentration from Table 4-3 of the RFI/RI with BRA for the A-Area Burning/Rubble Pits and Rubble Pit (WSRC 1997). The activities of the daughter products of some of the radiological COCs identified in the table were used to establish the activity of the parent since these constituents are in secular equilibrium. Specifically, the two times background mean of Ac-22 (from Table 4-3) was used to establish the Ra-228 concentration and the two times background mean of Pb-212 (from Table 4-3) was used to establish the Th-228 background concentration.
2. Actual soil sampling in the vadose zone at the points of greatest contamination will be conducted to determine when the RGs have been achieved and no change in the operation of the SVE process will be allowed without concurrence of the Core Team.

The selected RA for the A-Area Ash Pile (788-2A) is Alternative AP-3, Soil Cover and Institutional Controls. This includes the following elements:

- Soil Cover – A minimum of a 0.6 m (2 ft) thick soil layer on the A Area Ash Pile. This consists of 46 cm (18 in) of clean common fill, 15 cm (6 in) of topsoil and grass sod. The purpose is to establish a 0.6 m (2 ft) thick barrier on the ash to prevent ecological receptors from coming in contact with the ash. The cover will be contoured for the control of stormwater runoff and will be vegetated to prevent erosion.

- Institutional Controls - ICs will consist of site maintenance (site inspections, mowing, general housekeeping, repair of erosion damage, and other routine maintenance as needed) and access controls (warning signs and land use restrictions). ICs will include continued use of SRS's Site Use and Site Clearance Programs to restrict disturbance of the site and to prevent access to or use of groundwater until cleanup levels are met.

- CERCLA ROD RA Reviews - The ROD RA will be reviewed every five years to ensure that the selected remedy remains protective of human health and the environment.

RGs are target cleanup criteria. RGs are provided in Table 1.

The post-RA conceptual site model (see Appendix C to this LUCIP) shows the broken pathways and the remaining residual risk to the future industrial worker.

According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land should be prohibited.

3.0 LAND-USE CONTROL OBJECTIVES

The following ABRP/MCB/MBP OU LUC objectives have been developed to ensure the protectiveness of the remedy described above:

- Restrict worker access and prevent unauthorized contact, removal or excavation of contaminated media (i.e., vadose zone soils);

- Prohibit the development and use of property for residential housing, elementary schools, child care facilities and playgrounds;
- Maintain the integrity of any current or future remedial or monitoring system such as SVE systems or groundwater monitoring wells;
- Prevent access to or use of the groundwater until cleanup levels are met (under the RCRA program); and
- Prevent construction of inhabitable buildings without an evaluation of indoor air quality to address vapor intrustion.

Current access controls and deed notification needed to maintain the future land use are described in the following sections of this LUCIP.

4.0 IMPLEMENTATION OF LAND-USE CONTROLS

This section describes the LUCs selected in the ROD to achieve the objectives stated in Section 3.0. A summary of the remedies for the different subunits is provided in Table 2. A summary of the types of controls is provided in Table 3. USDOE is responsible for implementing, maintaining, reporting on, and enforcing the LUCs required for the ABRP/MCB/MBP OU. The LUCIP will become enforceable and will be implemented when approved by USEPA and SCDHEC and following the completion of the RA prescribed by the ABRP/MCB/MBP OU ROD. USDOE shall notify USEPA and SCDHEC 60 days in advance of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.

The ABRP/MCB/MBP OU will be maintained as an industrial use area by implementation of the property record notices (Section 4.1) and restrictions (Section 4.2), and the use of a certified LUC survey plat (Section 4.3). Figure 3 illustrates land use requirements at the different subunits.

The Site Use Program (Section 4.4) will be implemented to prevent onsite worker exposure to contamination left in place at the ABRP/MCB/MBP OU. Other existing measures (i.e., Site

Clearance Program, worker training, health and safety requirements, work controls) will also be used to ensure worker safety at the ABRP/MCB/MBP OU.

Physical access controls (Section 4.5) are implemented at the SRS boundary to control and restrict public and trespasser access to the ABRP/MCB/MBP OU.

Signs at the ABRP/MCB/MBP OU will be maintained to alert onsite workers to the presence of hazardous substances. The signs will also convey the restrictions of unauthorized personnel. Access control warning signs will be placed and maintained around the ABRP/MCB/MBP OU to prevent unknowing entry and unrestricted use.

4.1 Property Record Notices

In the long term, if the property is ever transferred to non-federal ownership, the United States Government will take those actions necessary pursuant to Section 120(h) of CERCLA. Those actions will include a deed notification disclosing former waste management and disposal activities as well as RAs taken on the site. The contract for sale and the deed will contain the notification required by CERCLA Section 120(h).

The deed notification shall notify any potential purchaser that the property has been used for the management and disposal of waste. These requirements are also consistent with the intent of RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

4.2 Property Record Restrictions

The deed shall also include deed restrictions precluding residential use of the property and/or any other property record restrictions necessary to achieve the LUC objectives. The deed shall expressly prohibit activities inconsistent with the remedial goals and objectives in the ABRP/MCB/MBP OU ROD upon any and all transfers. USDOE shall provide a copy of the executed deeds to the regulatory agencies as soon as practicable after the transfer of fee title, but no later than 30 days. However, the need for these deed restrictions may be re-evaluated at the

time of transfer in the event that exposure assumptions differ and/or the residual contamination no longer poses an unacceptable risk under residential use. Any re-evaluation of the need for the deed restrictions will be done through an amended ROD.

USDOE shall provide USEPA and SCDHEC six months' notice prior to transfer or sale to ensure that USEPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective ICs. If it is not possible for the facility to notify USEPA and SCDHEC at least six months prior to any transfer or sale, then the facility will notify USEPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to ICs. In addition to the land transfer notice and discussion provisions above, USDOE further agrees to provide USEPA and SCDHEC with similar notice within the same time frames as to federal to federal transfer of property.

4.3 Other Public Notices

The LUCIP identifies the proposed area under land use restrictions via Figure 3 for the ABRP/MCB/MBP OU and the final survey plat (when available) located in Appendix A. After construction completion, a final survey plat will be prepared to document the as-built arrangement of the ICs and area subject to LUCs. The drawing will present a polygon of the ABRP/MCB/MBP OU subject to LUCs, including the benchmarks, the location of warning signs, access control points and other information for LUCs. This post-construction survey plat will be certified by a professional land surveyor and will be submitted to USEPA and SCDHEC concurrently with the Post-Construction Report (PCR). In addition, if the site is ever transferred to non-federal ownership, a professional land surveyor- certified survey plat of the OU will be prepared at or near the time of conveyance to support the LUCIP required restrictive covenants on land use and will be recorded with the appropriate county recording agency.

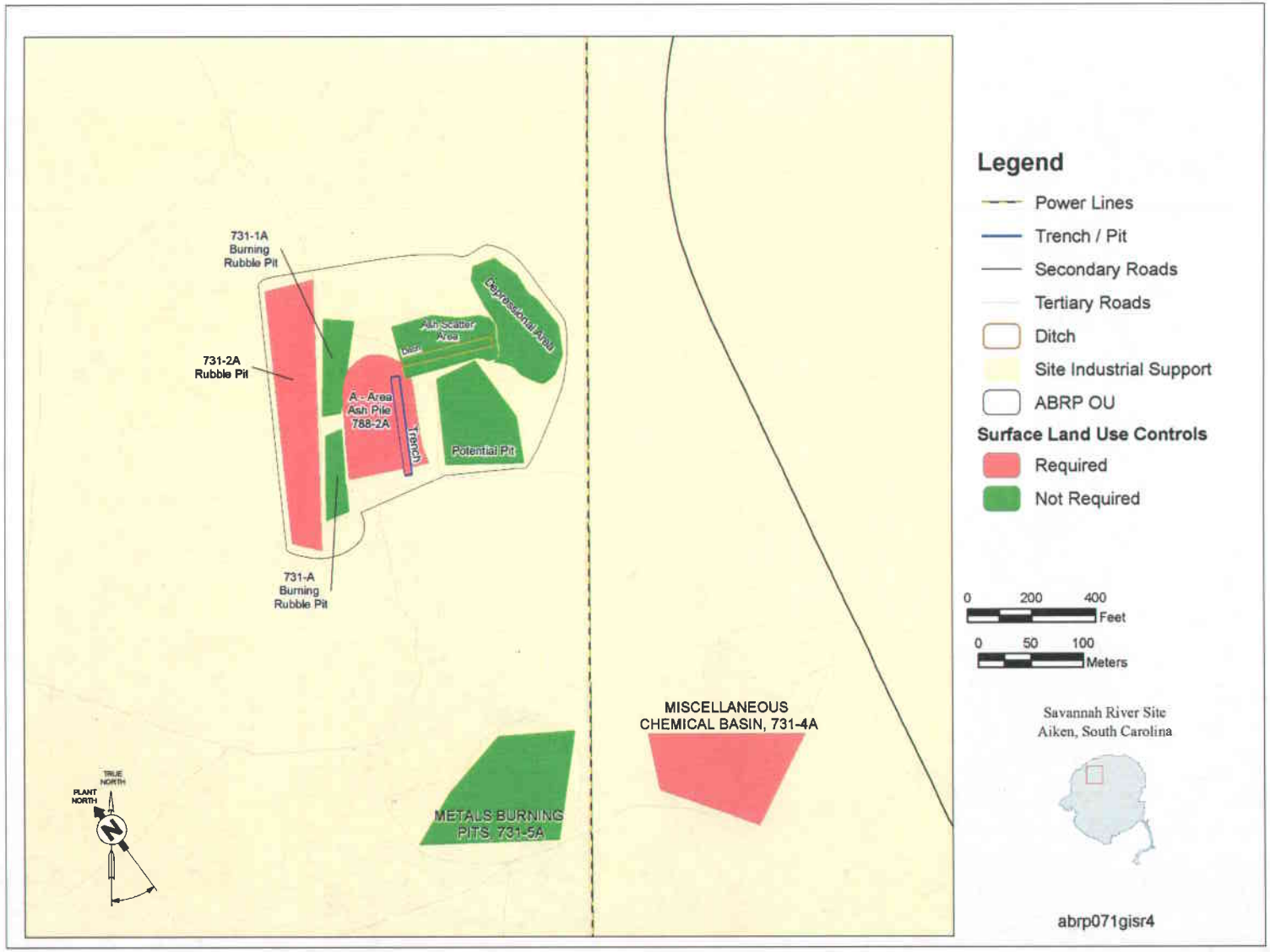

Figure 3. Land Use Map for ABRP/MCB/MBP OU

Note:

Land use refers to the soil portion of the unit. Due to groundwater contamination, ICs to prevent access to or use of groundwater until cleanup levels are met under the RCRA program are required for all of the subunits in this OU.

Table 2. Remedial Summary for the ABRP/MCB/MBP Operable Unit

Unit	Media	Land Use*	Remedy	Regulatory Mechanism
ABRP OU				
Burning/Rubble Pit 731-A Burning/Rubble Pit 731-1A Potential Pit Depressional Area	Surface Soil Vadose Zone	Residential	No Action (soil) No Action (vadose zone)	WSRC 2000 IROD for ABRP
Rubble Pit 731-2A	Surface Soil	Industrial	Earthen Cap, IC No Further Action (final action complete)	WSRC 2000 IROD for ABRP WSRC 2006a ROD for ABRP/MCB/MBP OU
Ash Scatter Area/ Ditch	Surface Soil Vadose Zone	Residential	No Action (soil) No Action (vadose zone)	WSRC 2006a ROD for the ABRP/MCB/MBP OU
Trench	Surface Soil Vadose Zone	Industrial	No Action (soil) SVE, IC (vadose zone)	WSRC 2002 ESD for ABRP IROD WSRC 2006a ROD for ABRP/MCB/MBP OU
788-2A A-Area Ash Pile	Surface Soil Vadose Zone	Industrial	Earthen Cap, IC (soil) No Action (vadose zone)	WSRC 2006a ROD for ABRP/MCB/MBP OU
MCB/MBP OU				
MCB	Surface Soil	Industrial	Excavation, Off-site Disposal No Further Action (final action complete)	WSRC 1999 IROD for MCB/MBP WSRC 2006a ROD for the ABRP/MCB/MBP OU
MCB Vadose Zone	Vadose Zone	Industrial	SVE, IC (final action ongoing)	WSRC 1999 IROD for MCB/MBP WSRC 2006a ROD for the ABRP/MCB/MBP OU
MBP	Surface Soil	Residential	Excavation, Off-site Disposal (ecological risk driver) No Further Action (final action complete)	WSRC 1999 IROD for MCB/MBP WSRC 2006a ROD for ABRP/MCB/MBP OU

* Land use refers to the soil portion of the unit. Due to the groundwater contamination, ICs to prevent access to or use of groundwater until cleanup levels are met under the RCRA program are required for all of the subunits in this OU. Although the interim actions for groundwater were described in the respective IRODs, groundwater is not within the scope of this OU and is not presented in this table.

Table 3. Land Use Controls for the ABRP/MCB/MBP Operable Unit

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
1. Property Record Notices[b]	Provide notice to anyone searching records about the existence and location of contaminated areas.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions
2. Property record restrictions[c]: a. Land Use b. Groundwater	Restrict use of property by imposing limitations. Prohibit the use of groundwater.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Drafted and implemented by USDOE upon any transfer of affected areas. Recorded by USDOE in accordance with state law at County Register of Deeds office.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions
3. Other Notices[d]	Provide notice to county/city about the existence and location of waste disposal and residual contamination areas for zoning/planning purposes.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Notice recorded by USDOE in accordance with state laws at County Register of Deeds office if the property or any portion thereof is ever transferred to non-federal ownership.	All waste management areas and other areas where hazardous substances are left in place at levels requiring land use and/or groundwater restrictions
4. Site Use Program[e]	Provide notice to worker/developer (i.e., permit requestor) on extent of contamination and prohibit or limit excavation/penetration activity.	As long as property remains under USDOE control.	Implemented by USDOE and site contractors. Initiated by permit request.	Remediation systems, all waste management areas, and areas where levels requiring land use and / or groundwater restrictions

Table 3. Land Use Controls for the ABRP/MCB/MBP Operable Unit (Continued)

Type of Control	Purpose of Control	Duration	Implementation	Affected Areas[a]
5. Physical Access Controls[f] (e.g., fences, gates, portals)	Control and restrict access to workers and the public to prevent unauthorized access.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Controls maintained by USDOE.	At select locations throughout SRS
6. Warning Signs[g]	Provide notice or warning to prevent unauthorized uses.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Signage maintained by USDOE.	At select locations throughout SRS
7. Security Surveillance Measures	Control and monitor access by workers/public.	Until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.	Established and maintained by USDOE. Necessity of patrols evaluated upon completion of RAs.	Patrol of selected area throughout SRS, as necessary

[a]Affected areas – Specific locations identified in the SRS LUCIP or subsequent post-ROD documents.

[b]Property Record Notices – Refers to any non-enforceable, purely informational document recorded along with the original property acquisition records of USDOE and its predecessor agencies that alerts anyone searching property records to important information about residual contamination; waste disposal areas in the property.

[c]Property Record Restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recoded along with original property acquisition records of USDOE and its predecessor agencies.

[d]Other Notices – Includes information on the location of waste disposal areas and residual contamination depicted on as survey plat, which is provided to a zoning authority (i.e., city planning commission) for consideration in appropriate zoning decisions for non-USDOE property.

[e]Site Use Program – Refers to the internal USDOE/USDOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case contaminated soil or groundwater, will not disturb the affected areas without the appropriate precautions and safeguards.

[f]Physical Access Controls – Physical barriers or restrictions to entry.

[g]Signs – Posted command, warning, or direction.

4.4 Site Use Program

Under DOE Order 430.1A, *Life Cycle Management* (USDOE 1998), SRS is required to implement an asset management program for the use, maintenance, and disposal of physical assets, including real estate. SRS complies with this order through its Site Use Program, which is conducted in accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control" (WSRC 2006b). All employees, contractors, and visitors at SRS are required to adhere to the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. Also, in accordance with WSRC 1D, Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before any activities are conducted. All Site Clearance Requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that the request is sanctioned by an existing Site Use Permit. All land use requirements applicable for the OU will be provided to the Site Use Program for use in determining issuance of Site Clearance Permits. In addition, the Site Use Permit must be amended when the geographic configuration or buffer zone used to establish the permit boundary changes or there is a change to the permitted land use.

SRS is responsible for updating, maintaining, and reviewing site maps, including FFA (FFA 1993) OU identifications. If a Site Clearance Request potentially impacts an FFA OU, the Site Clearance Request Form is sent to the appropriate FFA OU reviewer for approval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Before a Site Clearance Permit is issued, verification of USDOE approval for intended land use must be obtained. The site use and site clearance processes are applicable to all activities and personnel on site (including subcontractors). The USDOE will notify USEPA and SCDHEC in advance of any change to any internal procedure, including the Site Use Program, which would affect implementing or maintaining the LUCs. The processes are controlled within the SRS Quality Assurance (QA) Program in accordance with WSRC 1Q Manual, *Quality Assurance* (WSRC 2007). The SRS QA program governs all SRS activities.

SRS identifies all buildings and facilities on maps used in the Site Use Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No change in land use or excavation at the ABRP/MCB/MBP OU shall be undertaken without USEPA and SCDHEC approval. Approval by USEPA and SCDHEC is required for any modification or termination of the ICs and implementation actions, and USDOE must obtain approval from USEPA and SCDHEC that a proposed new land use is sufficiently protective.

4.5 Physical Access Controls

There are no physical access controls required at the ABRP/MCB/MBP OU; however, physical access controls are provided at the SRS boundary as mentioned in Table 3, item 5.

4.6 Warning Signs

To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while the unit is under ownership of the government, access control warning signs will be posted at the unit as shown in Appendix D. The signs shall be legible for a distance of at least 7.6 m (25 ft).

Custodial responsibilities for maintenance and inspection of the ABRP/MCB/MBP OU will be maintained by Post-Closure Maintenance Group within Soil and Groundwater Closure Projects (SGCP).

4.7 Other Access Controls and Security/Surveillance Measures

While under the ownership of USDOE, access control of the entire SRS will be maintained in accordance with the 2000 RCRA Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or

natural barriers (R.61-79.264.14(b)(2)(I)), control entry systems (R.61-79.264.14(b)(2)(ii)), and access control warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

4.8 Field Inspection and Maintenance for Institutional Controls

After remediation of the ABRP/MCB/MBP OU, only inspection and maintenance activities will be required by the RA.

The ABRP/MCB/MBP OU will be inspected per the Field Inspection Checklist in Appendix B. Field inspections will be performed annually. Additional inspections may be necessary in the event of unusual weather or any other condition warranting inspection. For the ABRP/MCB/MBP OU, inspections will be performed to ensure that signs are in place and that the Ash Pile cover is developing self-sustaining vegetation. Inspection records will be kept in the operations record file for future access.

Maintenance (including site inspections, mowing, general housekeeping, and repair of erosion damage) will be performed as needed at ABRP/MCB/MBP OU. Necessary upkeep of the access control signs for ABRP/MCB/MBP OU will be performed.

USEPA and SCDHEC will be notified within 30 days of identification by USDOE of any events and/or actions that indicate potential compromise of the ICs, including any activity that is inconsistent with the IC objectives or use restrictions, or any other action that may interfere with the effectiveness of the ICs and the proposed action to address the potential compromise. The FFA Annual Progress Report, submitted to the regulatory agencies by the USDOE, will provide the status of the ICs and describe how any IC deficiencies or inconsistent uses have been addressed. In the event of property transfer or lease, the Annual Report will cite findings on the following: whether the use restrictions and controls referenced above were communicated in the deed(s) or lease restrictions; whether property use conforms with the deed or lease restrictions and controls; and whether the owners and state/local agencies have been notified regarding the deed or lease restrictions and controls.

All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the SGCP Document Control. The LUCs shall be maintained until the concentration of hazardous substances associated with the unit have been reduced to levels that allow for unlimited exposure and unrestricted use.

The waste unit inspectors are to be trained in Hazardous Waste Operations and Emergency Response (HAZWOPER), RCRA Well Inspections (SGCP-specific training), SGCP RCRA Waste Unit Inspections, Radiological Worker Training, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years, different personnel may conduct the inspections and grass cutting operations.

This unit-specific LUCIP, including the checklist (Appendix B), will be appended to the SRS LUCAP upon final regulatory approval. After completion of the PCR, the preliminary checklist in the LUCAP will be replaced with the final approved checklist.

5.0 REFERENCES

FFA, 1993. *Federal Facility Agreement for the Savannah River Site*, Administrative Docket No. 89-05-FF (Effective Date: August 16, 1993)

USDOE, 1996. *Savannah River Site Future Use Project Report*, Stakeholder-Preferred Recommendations for SRS Land and Facilities, USDOE Savannah River Operations Office, January

USDOE, 1998. DOE Order 430.1A, Life Cycle Management (approved October 14, 1998)

WSRC, 1997. *RCRA Facility Investigation / Remedial Investigation Report with Baseline Risk Assessment for the A-Area Burning/Rubble Pits and Rubble Pit,* Revision 1.2, WSRC-RP-96-168, Savannah River Site, Aiken, SC (June)

WSRC, 1999. *Interim Record of Decision Remedial Alternative Selection for the Miscellaneous Chemical Basin/Metals Burning Pit (731-4A/5A),* Revision 1.1, WSRC-RP-98-4031, Savannah River Site, Aiken, SC (December)

WSRC, 2000. *Interim Record of Decision Remedial Alternative Selection for the A-Area Burning/Rubble Pits (731-A/1A) and Rubble Pit (731-2A),* Revision 1, WSRC-RP-2000-4001, Savannah River Site, Aiken, SC (April)

WSRC, 2002. *Explanation of Significant Difference (ESD) for the A-Area Burning/Rubble Pits (731-A/1A) and Rubble Pit (731-2A) (ABRP)*, WSRC-RP-2001-4281, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC (April)

WSRC, 2006a. *Record of Decision Remedial Alternative Selection for the A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) and the Miscellaneous Chemical Basin / Metals Burning Pit (731-4A, -5A) Operable Unit (U)*, WSRC-RP-2005-4095, Revision 0, Washington Savannah River Company, Aiken, SC

WSRC, 2006b. WSRC Procedure Manual 1D, *Site Infrastructure and Services Manual (U)*, Procedure 3.02, "Site Real Property Configuration Control," Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2006c. *Corrective Measures Implementation/Remedial Action Implementation Plan (CMI/RAIP) for the A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) and the Miscellaneous Chemical Basin / Metals Burning Pit (731-4A, -5A) Operable Unit (U)* , WSRC-RP-2006-4071, Revision 0, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

WSRC, 2007. WSRC Procedure Manual 1Q, *Quality Assurance (U)*, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

APPENDIX A – AS-BUILT DRAWINGS

Land Use Control Implementation Plan

(Drawing to be provided at a later date.)

APPENDIX B – FIELD INSPECTION CHECKLIST

For the A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A)
and the
Miscellaneous Chemical Basin / Metals Burning Pit (731-4A, -5A) OU

FIELD INSPECTION CHECKLIST

A-Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) and the Miscellaneous Chemical Basin / Metals Burning Pit (731-4A, -5A) OU

☐ SCHEDULED ☐ UNSCHEDULED

A= Satisfactory X= Unsatisfactory (Explanation required)	A or X	Observation of Corrective Action Taken
1. Verify that roads are accessible.		
2. Verify that the waste unit signs (quantity to be inserted later) are in acceptable condition, have the correct information, and are legible from a distance of 25 feet.		
3. Verify that there are no unauthorized excavation, digging, or construction activities.		
4. Verify that SVE wells and support systems are accessible and in good condition.		

Inspected by:		
(Print Name)	(Signature)	(Date)

Post-Closure Manager:		
(Print Name)	(Signature)	(Date)

CAUTION: The inspector shall notify the Post-Closure Manager (PCM) and Environmental Compliance Authority (ECA) **IMMEDIATELY** if there has been a breach or compromise of the ICs of this waste unit. The notification shall be in accordance with SRS post-closure inspection procedures.

NOTE: Monitoring wells associated with this waste unit are maintained in accordance with SGCP Monitoring Well Procedures.

APPENDIX C – POST-REMEDIAL ACTION CONCEPTUAL SITE MODEL

Area Burning/Rubble Pits (731-A, -1A) and Rubble Pit (731-2A) and the Miscellaneous Chemical Basin/Metals Burning Pit (731-4A, -5A) OU Post-Remedial Action

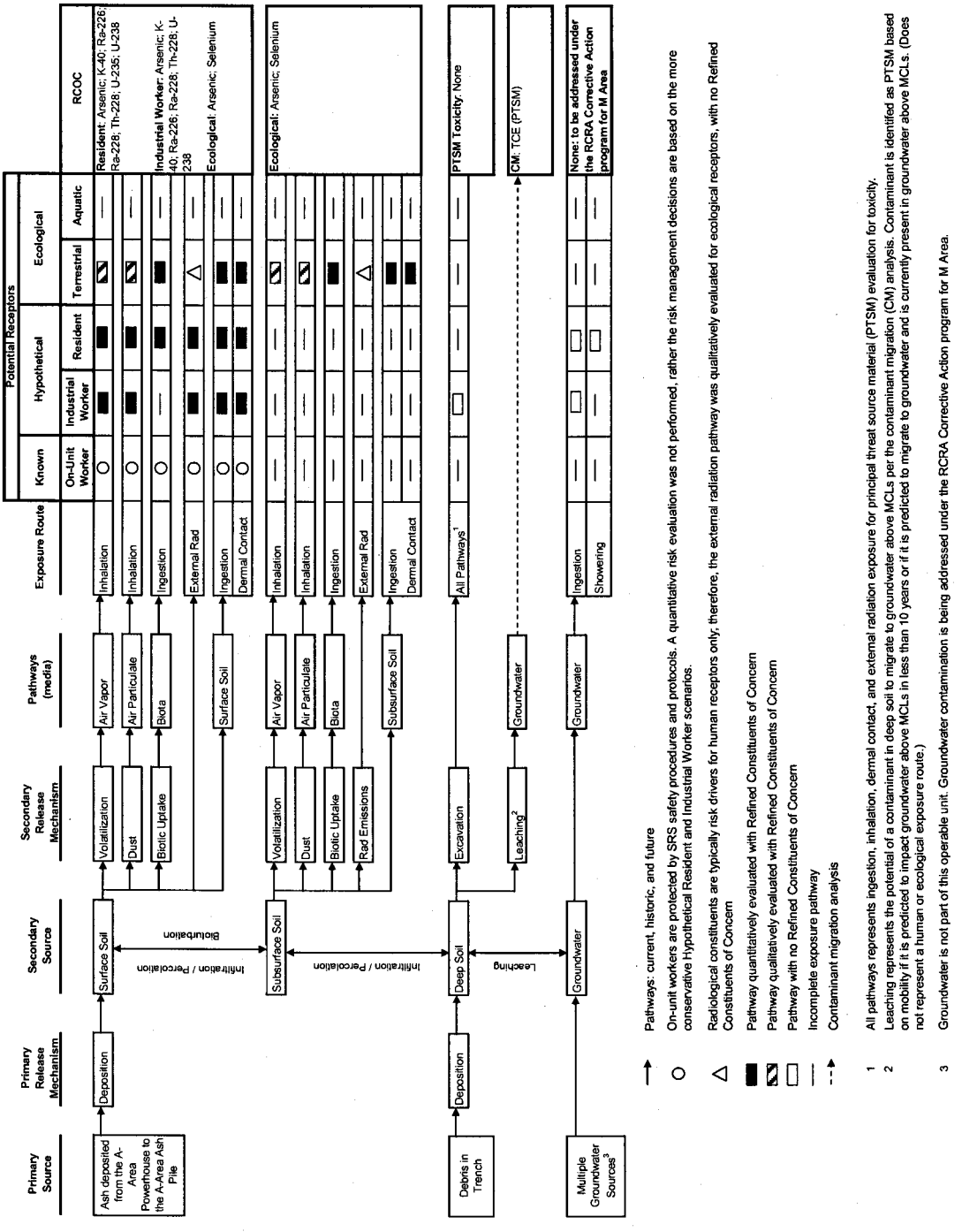

Figure C-1. Post-Remedial Action Conceptual Site Model for the ABRP/MCB/MBP OU

APPENDIX D – ACCESS CONTROL WARNING SIGN

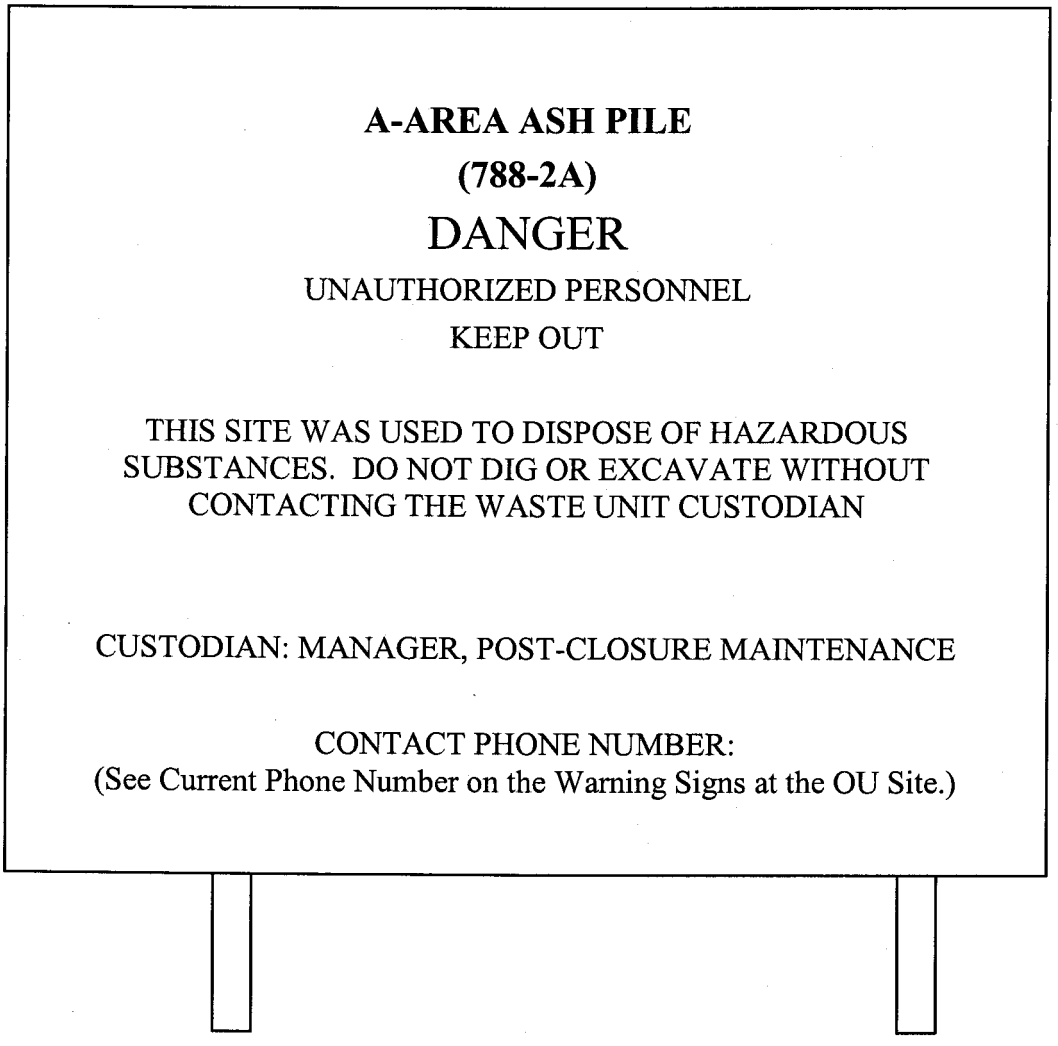

Figure D-1. Access Control Warning Sign