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United States Department of Energy

Savannah River Site

Record of Decision
Remedial Alternative Selection for the Hydrofluoric Acid Spill (631-4G) Operable Unit (U)

CERCLIS Number: 75

WSRC-RP-2005-4000

Revision 0

February 2005

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

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

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Prepared for
U.S. Department of Energy
and
Westinghouse Savannah River Company LLC
Aiken, South Carolina

RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION (U)

Hydrofluoric Acid Spill (631-4G) Operable Unit (U)

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Savannah River Site
Aiken, South Carolina

Prepared by:

Westinghouse Savannah River Company LLC
for the
U. S. Department of Energy under Contract DE-AC09-96SR18500
Savannah River Operations Office
Aiken, South Carolina

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DECLARATION FOR THE RECORD OF DECISION

Unit Name and Location

Hydrofluoric Acid Spill (631-4G) Operable Unit

Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Identification Number: 75

Savannah River Site

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Identification Number: SC1 890 008 989

Aiken, South Carolina

United States Department of Energy

The Hydrofluoric Acid Spill (631-4G) (HFAS) Operable Unit (OU) is listed as a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) unit in Appendix C of the Federal Facility Agreement (FFA) for the Savannah River Site (SRS).

The FFA is a legally binding agreement between regulatory agencies (United States Environmental Protection Agency [USEPA] and South Carolina Department of Health and Environmental Control [SCDHEC]) and regulated entities (United States Department of Energy [USDOE]) that establishes the responsibilities and schedules for the comprehensive remediation of SRS. The only medium associated with this OU is soil. The groundwater beneath HFAS OU is being managed under the Central Shops Groundwater OU.

Statement of Basis and Purpose

This decision document presents the selected remedy for the HFAS OU, located in Barnwell County, South Carolina. The remedy was chosen in accordance with CERCLA, as amended by the Superfund Amendments Reauthorization Act (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record File (ARF) for this site.

Because this remedy will not result in hazardous substances, pollutants or contaminants remaining on the site above levels that allow for unlimited use and unrestricted exposure, a five-year review will not be required for this remedial action.

USEPA, SCDHEC and USDOE concur with the selected remedy.

Description of the Selected Remedy

The selected remedy for the HFAS OU is No Action. The site poses no risk to human health and the environment based on unrestricted (residential) land use; therefore, no land use controls or other remedies are required. There are no human health or ecological refined constituents of concern (COCs), no contaminant migration concerns, and no principal threat source material (PTSM). The HFAS OU is capable of supporting unrestricted (residential) use without any remedial actions; however, actual site use will remain industrial because of the physical location of the HFAS OU within the Central Shops Area.

Statutory Determinations

Hazardous substances may have been released at the site; however, their concentrations do not pose a risk to human health and the environment based on unrestricted (residential) usage and unlimited exposure. Therefore, no remedial action is necessary to ensure protection of human health and the environment. Because the selected remedy for the HFAS OU is No Action, a Certification Checklist is unnecessary.

6/17/05
Date

Jeffrey M. Allison
Manager
U. S. Department of Energy
Savannah River Operations Office

10/21/05
Date

~~Winston A. Smith~~ Beverly H. Banister
Acting Director
Waste Management Division
U. S. Environmental Protection Agency - Region 4

12/12/05
Date

Robert W. King, Jr.
Deputy Commissioner
Environmental Quality Control
South Carolina Department of Health and Environmental Control

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DECISION SUMMARY
REMEDIAL ALTERNATIVE SELECTION (U)

Hydrofluoric Acid Spill (631-4G) Operable Unit (U)

CERCLIS Number: 75

WSRC-RP-2005-4000
Rev. 0

February 2005

Savannah River Site
Aiken, South Carolina

Prepared By:

Westinghouse Savannah River Company LLC
for the
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Savannah River Operations Office
Aiken, South Carolina

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LIST OF ACRONYMS AND ABBREVIATIONS

amsl	above mean sea level
ARAR	applicable or relevant and appropriate requirement
ARF	Administrative Record File
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
cm	centimeter
COC	constituent of concern
COPC	constituent of potential concern
CSA	monitoring well identification prefix specific to HFAS OU
CSM	conceptual site model
FFA	Federal Facility Agreement
ft	feet
GPR	ground penetrating radar
HFAS OU	Hydrofluoric Acid Spill Operable Unit
IOU	integrator operable unit
km	kilometer
LLC	Limited Liability Company
m	meter
μCi/g	microcurie per gram
MCL	maximum contaminant level
mg/kg	milligram per kilogram
mi	mile
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Protection Act
NPL	National Priorities List
OU	operable unit
PCB	polychlorinated biphenyl
PP	Proposed Plan
PRG	preliminary remedial goal
PTSM	principal threat source material
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RI	Remedial Investigation
ROD	Record of Decision

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

SARA	Superfund Amendments Reauthorization Act
SCDHEC	South Carolina Department of Health and Environmental Control
SCS	Soil Conservation Service
SRS	Savannah River Site
SVOC	semi-volatile organic compound
TAL	target analyte list
TCL	target compound list
USC	unit-specific contaminant
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WSRC	Westinghouse Savannah River Company, LLC

I. SAVANNAH RIVER SITE AND OPERABLE UNIT NAME, LOCATION, AND DESCRIPTION

Unit Name, Location, and Brief Description

Hydrofluoric Acid Spill (631-4G) Operable Unit

Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Identification Number: 75

Savannah River Site

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Identification Number: SC1 890 008 989

Aiken, South Carolina

United States Department of Energy (USDOE)

Savannah River Site (SRS) occupies approximately 310 square miles of land adjacent to the Savannah River, principally in Aiken and Barnwell counties of South Carolina (Figure 1). SRS is located approximately 25 miles southeast of Augusta, Georgia, and 20 miles south of Aiken, South Carolina.

USDOE owns SRS, which historically produced tritium, plutonium, and other special nuclear materials for national defense and the space program. Chemical and radioactive wastes are byproducts of nuclear material production processes. Hazardous substances, as defined by CERCLA, are currently present in the environment at SRS.

The Federal Facility Agreement (FFA) (1993) for SRS lists the Hydrofluoric Acid Spill (631-4G) (HFAS OU) Operable Unit (OU) as a CERCLA unit requiring further evaluation.

The HFAS OU was evaluated through the CERCLA Remedial Investigation (RI) process to determine the actual or potential impact to human health and the environment of releases of hazardous substances to the environment.

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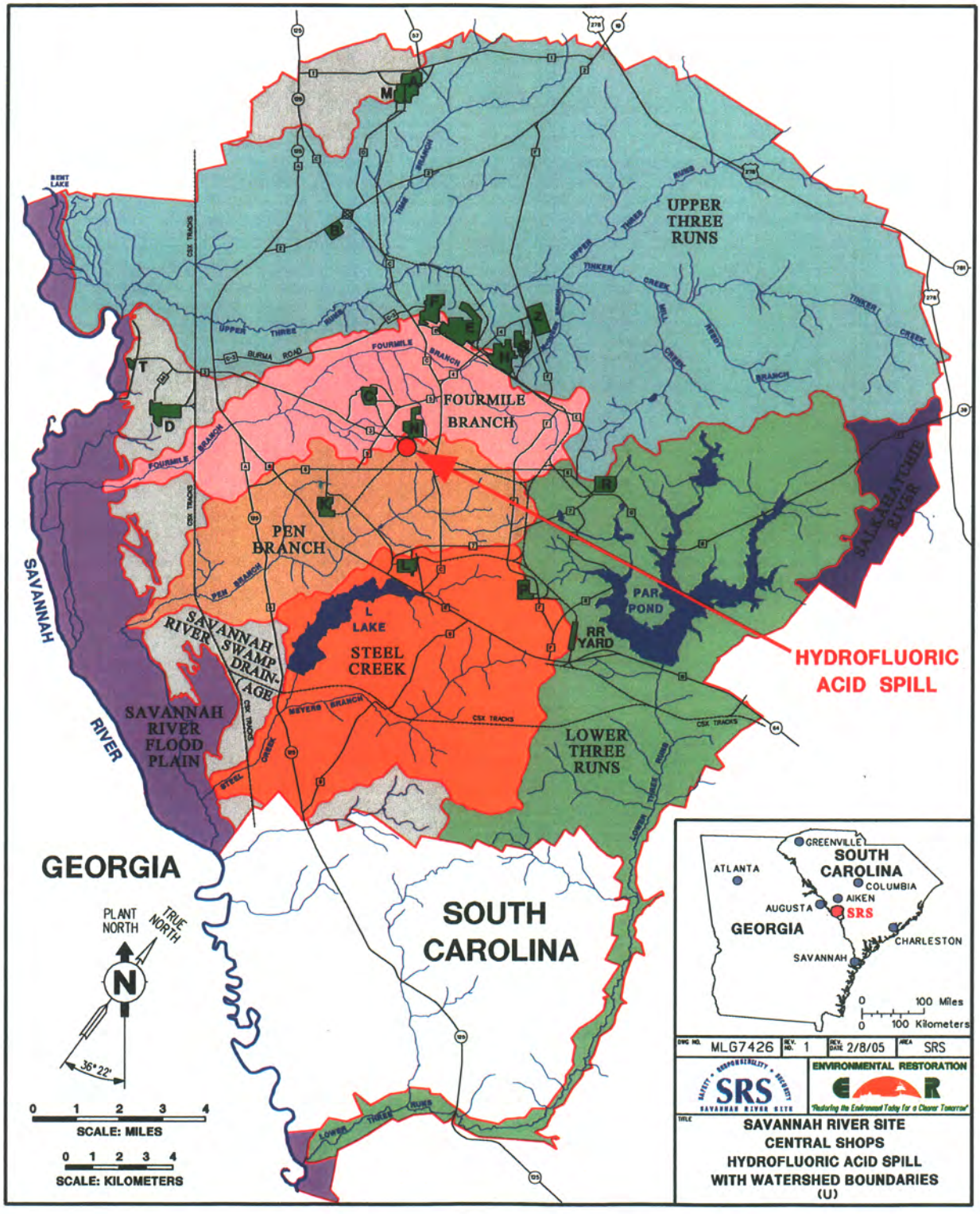

Figure 1. Location of the Hydrofluoric Acid Spill OU at SRS

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II. SITE AND OPERABLE UNIT COMPLIANCE HISTORY

SRS Operational and Compliance History

The primary mission of SRS has been to produce tritium, plutonium, and other special nuclear materials for our nation's defense programs. Production of nuclear materials for the defense program was discontinued in 1988. SRS has provided nuclear materials for the space program, as well as for medical, industrial, and research efforts up to the present. Chemical and radioactive wastes are byproducts of nuclear material production processes. These wastes have been treated, stored, and in some cases, disposed of at SRS. Past disposal practices have resulted in soil and groundwater contamination.

On December 21, 1989, SRS was included on the National Priorities List (NPL). In accordance with Section 120 of CERCLA 42 United States Code Section 9620, USDOE has negotiated an FFA (1993) with the United States Environmental Protection Agency (USEPA) and South Carolina Department of Health and Environmental Control (SCDHEC) to coordinate remedial activities at SRS as one comprehensive strategy that fulfills these regulatory requirements. USDOE functions as the lead agency for remedial activities at SRS, with concurrence by the USEPA - Region 4 and the SCDHEC.

Operable Unit Operational and Compliance History

The HFAS OU was included in the FFA in 1989 based on the potential hazards described on a sign that once stood at the OU. The sign read, "CONTAMINATED AREA - HYDROFLUORIC ACID BURIED 6 FEET. DO NOT DIG 15 FEET EACH SIDE OF POST" (Figure 2). Historic documents report that it is uncertain whether hydrofluoric acid was spilled or if acid-contaminated soil or acid-filled containers were buried at the site (duPont 1987). No spill report was available to describe the events that generated the assumption that hydrofluoric acid material was disposed of at this location.

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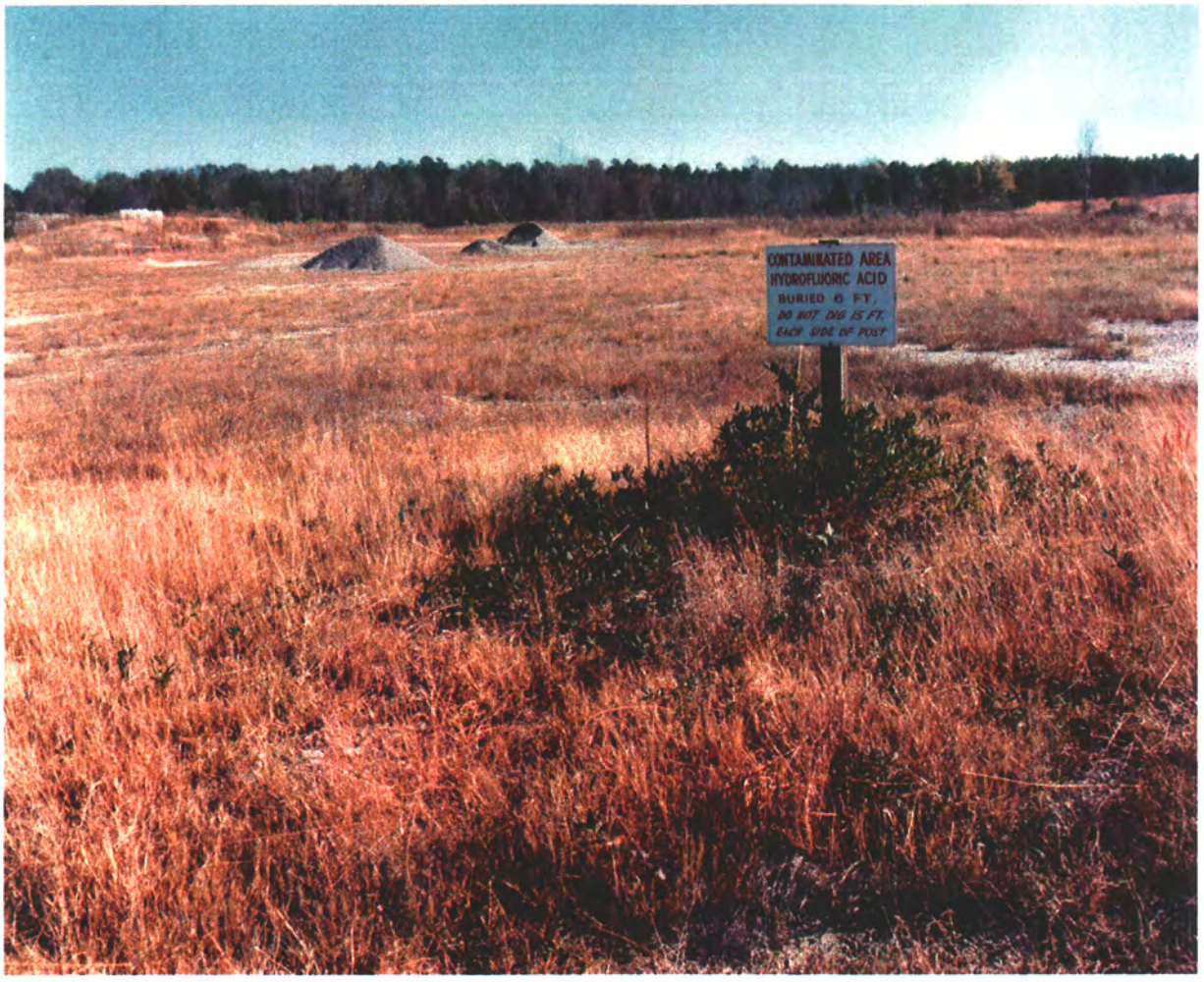

Figure 2. Sign Identifying Location of Buried Hydrofluoric Acid from 1973

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The HFAS OU is located at SRS within N Area (Central Shops), approximately 200 m (660 ft) southwest of the industrial area and south of Road 3 (Figure 3). Four orange balls atop metal poles currently identify the corners of the OU, which measures approximately 9.1 by 9.1 m (30 by 30 ft). The ground surface is flat and sparsely covered with grass and weeds (Figure 4). The area surrounding the OU is highly industrialized and covered with asphalt and gravel. Two sides of the OU are bounded by the adjacent New Salvage Yard. No critical or sensitive habitats are known to exist at or near the OU.

The unit lies at a ground elevation of approximately 88.4 m (290 ft) above mean sea level (amsl) within the Pen Branch watershed. The area drains south to railroad grade, approximately 30.5 m (100 ft) from the OU, then southeast along the railroad grade to a drainage area on the opposite side of the railroad grade that eventually leads to Pen Branch.

The surface soils in the vicinity of the HFAS OU are identified as Udorthents in the Soil Conservation Service (SCS) *Soil Survey of Savannah River Plant Area, Parts of Aiken, Barnwell, and Allendale Counties, South Carolina* (SCS 1990). The surface soil is a dense clayey sand of the Upland Formation down to a depth of approximately 9.1 to 12.2 m (30 to 40 ft) where a contact zone of sub-angular quartz cobbles marks contact with the Tobacco Road Formation. The description of the Upland Formation is consistent with the native soil identified during the trenching of other waste units in Central Shops in 2003. Borehole logs from the four monitoring wells surrounding the OU boundary are also consistent with designation of the soil as Upland Formation. Below the Upland Formation is the Tobacco Road Formation, which extends to an approximately 27.4 to 30.5 m (90 to 100 ft) depth. The CSA (well identification prefix specific to HFAS OU) wells around the HFAS OU are screened across the water table within the Tobacco Road Formation. The water table is at a depth of approximately 15 m (50 ft). The first confining zone that controls contaminant migration in the area is the Tan Clay, which is approximately 43 m (140 ft) below the surface.

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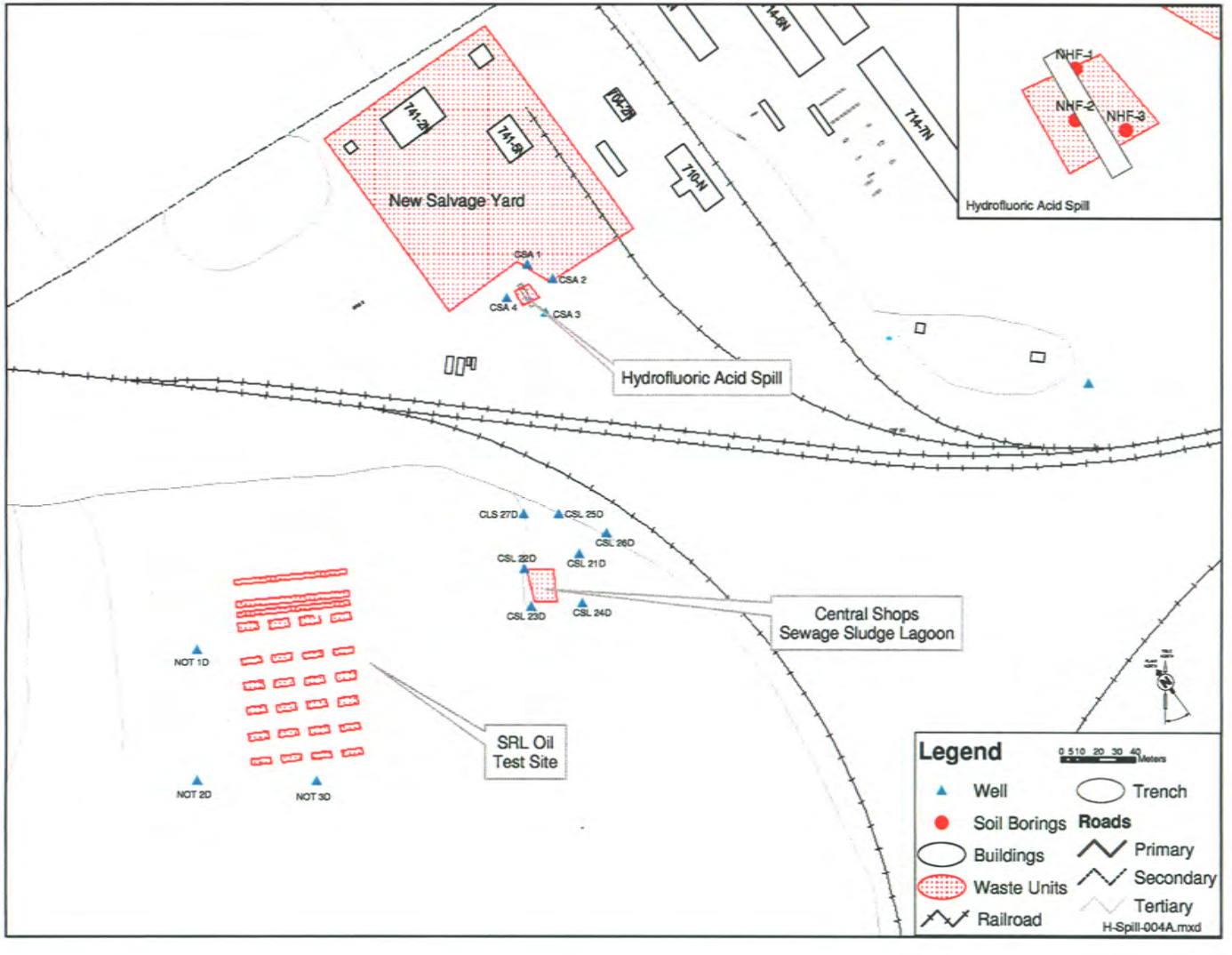

Figure 3. Location of Hydrofluoric Acid Spill OU within Central Shops

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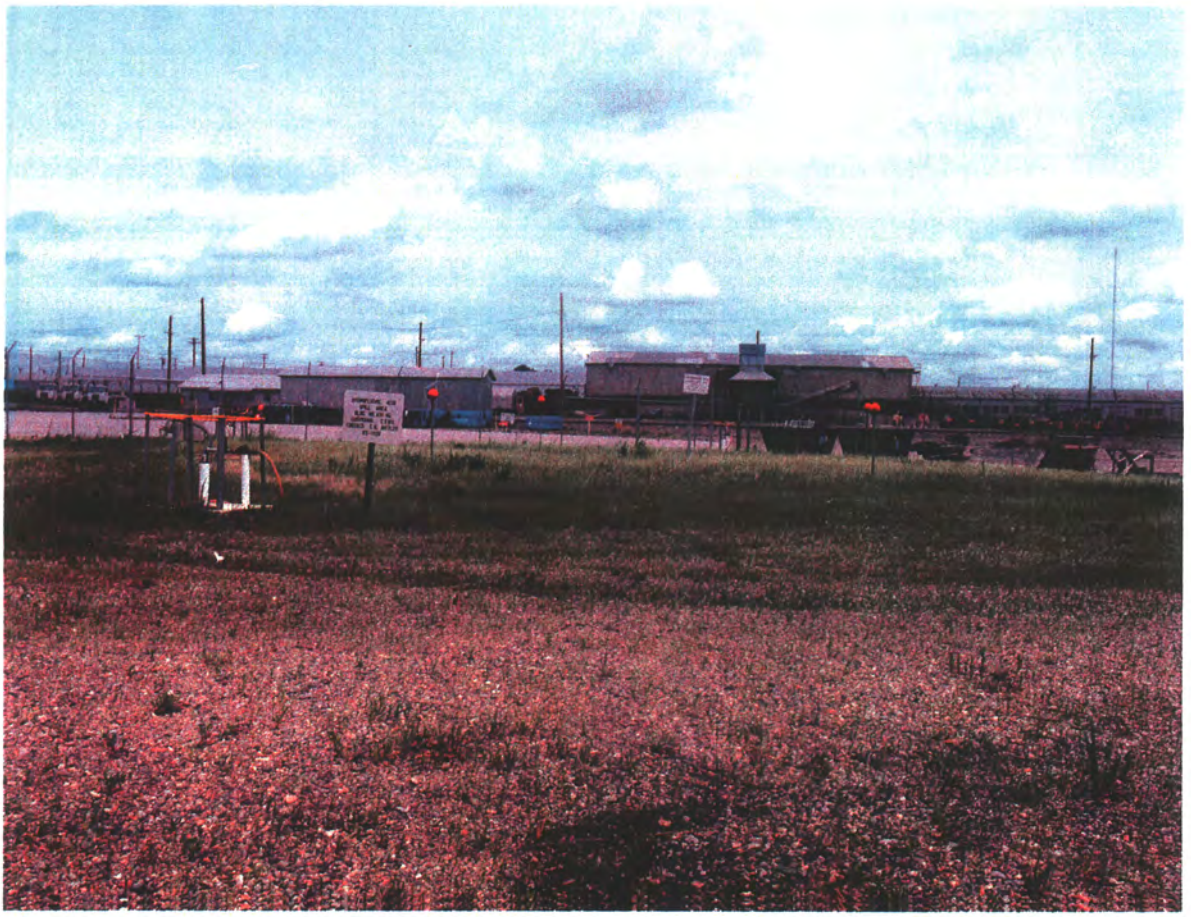

Figure 4. Photograph of Current Conditions at the HFAS OU

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The Savannah River Site Future Use Project Report (USDOE 1996) presents SRS stakeholders with preferred future land use recommendations. The report recommends that the HFAS OU area be designated for future industrial use (Figure 5).

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

CERCLA requires the public to be given an opportunity to review and comment on the proposed remedial alternative. Public participation requirements are listed in Sections 113 and 117 of CERCLA (42 United States Code Sections 9613 and 9617). These requirements include establishment of an Administrative Record File (ARF) that documents the investigation and selection of the remedial alternative for addressing the soils at the HFAS OU. The ARF must be established at or near the facility at issue.

The SRS Public Involvement Plan (USDOE 1994) is designed to facilitate public involvement in the decision-making process for permitting, closure, and the selection of remedial alternatives. The SRS Public Involvement Plan addresses the requirements of RCRA, CERCLA, and the National Environmental Policy Act, 1969 (NEPA). Section 117(a) of CERCLA, as amended, requires notice of any proposed remedial action and provides the public an opportunity to participate in the selection of the remedial action. The *Proposed Plan (PP) for the Hydrofluoric Acid Spill (631-4G) Operable Unit* (WSRC 2004a), a part of the Administrative Record File, highlights key aspects of the investigation and identifies the preferred action for addressing the HFAS OU.

The FFA Administrative Record File, which contains the information pertaining to the selection of the response action, is available at the following locations:

U.S. Department of Energy
Public Reading Room
Gregg-Graniteville Library
University of South Carolina – Aiken
171 University Parkway
Aiken, South Carolina 29801
(803) 641-3465

Thomas Cooper Library
Government Documents Department
University of South Carolina
Columbia, South Carolina 29208
(803) 777-4866

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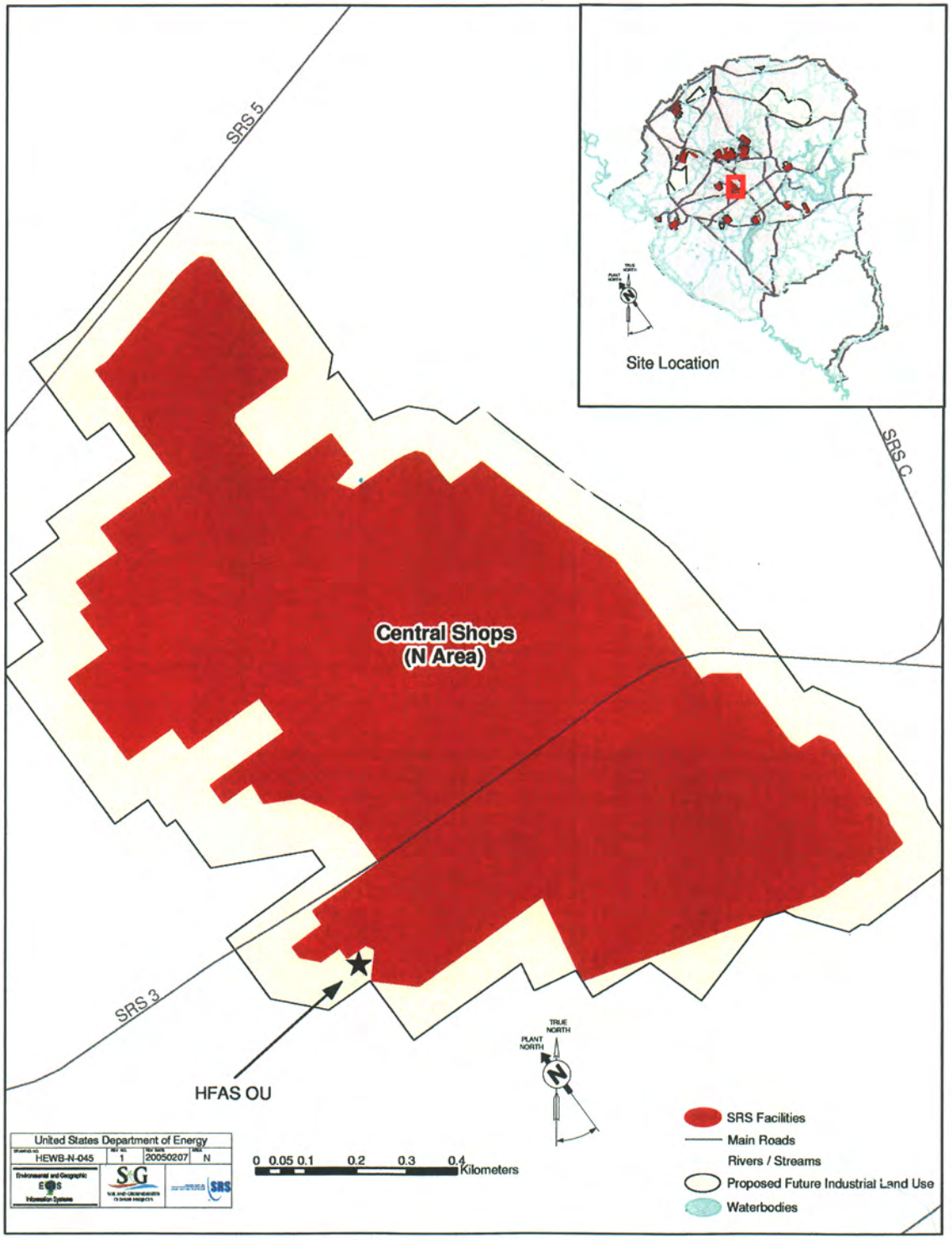

Figure 5. Land Use Map for the Central Shops (N Area)

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The RCRA Administrative Record File for SCDHEC is available for review by the public at the following locations:

The South Carolina Department of Health and Environmental Control
Bureau of Land and Waste Management
8911 Farrow Road
Columbia, South Carolina 29203
(803) 896-4000

Edisto Savannah District
Environmental Quality Control Office
206 Beaufort Street, Northeast
Aiken, South Carolina 29801
(803) 641-7670

The public was notified of the public comment period through the *SRS Environmental Bulletin*, a newsletter sent to citizens in South Carolina and Georgia, and through notices in the *Aiken Standard*, the *Allendale Citizen Leader*, the *Augusta Chronicle*, the *Barnwell People-Sentinel*, and *The State* newspaper. The public comment period was also announced on local radio stations.

The Proposed Plan 30-day public comment period began on January 17, 2005, and ended on February 16, 2005. No comments were received during the public comment period.

IV. SCOPE AND ROLE OF THE OPERABLE UNIT

Due to the complexity of multiple contaminant areas, the SRS is divided into integrator operable units (IOUs) for the purpose of managing a comprehensive cleanup strategy. Waste units within an IOU are evaluated and remediated individually.

The HFAS OU is located within the Pen Branch IOU (Pen Branch Watershed, see Figure 1), which is not a "source control" unit; i.e., the unit does not contain contaminated soil that could act as a source of future contamination to the groundwater through leaching. In addition to the HFAS OU, there are many OUs within the Pen Branch Watershed. All the source control and groundwater OUs located within this watershed will be evaluated to determine their impacts, if any, to the associated streams and wetlands. SRS will manage all source control units to prevent impact to the watershed. Upon disposition of all OUs within the Pen Branch IOU, a final comprehensive Record of Decision (ROD) for the Pen Branch Watershed will be pursued with additional public involvement.

Soils

According to the risk evaluations, the site poses no risk to human health or the environment under a unrestricted use scenario. No refined constituents of concern (COCs) have been identified for human health or ecological receptors at the HFAS OU. Since no refined COCs are associated with the HFAS OU, a No Action remedy is recommended for the unit. This means no action will be taken at the HFAS OU, and this unit will remain in its present condition.

Groundwater

The groundwater beneath the HFAS OU is not included in this unit. It is included in a separate OU, the Central Shops (N Area) Groundwater OU.

V. OPERABLE UNIT CHARACTERISTICS

Conceptual Site Model for the HFAS OU

The conceptual site model (CSM) for the HFAS OU is presented in Figure 6. A CSM identifies known and suspected sources of contamination, types of contaminants and potentially affected media, known and potential routes of migration, and known and potential human and ecological receptors.

Based on an old sign that indicated the presence of hydrofluoric acid at the OU, the primary source of contamination at the HFAS OU was assumed to be hydrofluoric acid. However, soil samples collected from the excavated trench and analytical sampling do not support the assumption that hydrofluoric acid was buried or spilled at the OU. Therefore, there is no primary source material. The release mechanism for contaminants to get to secondary sources is by direct contact with the soil or by surface

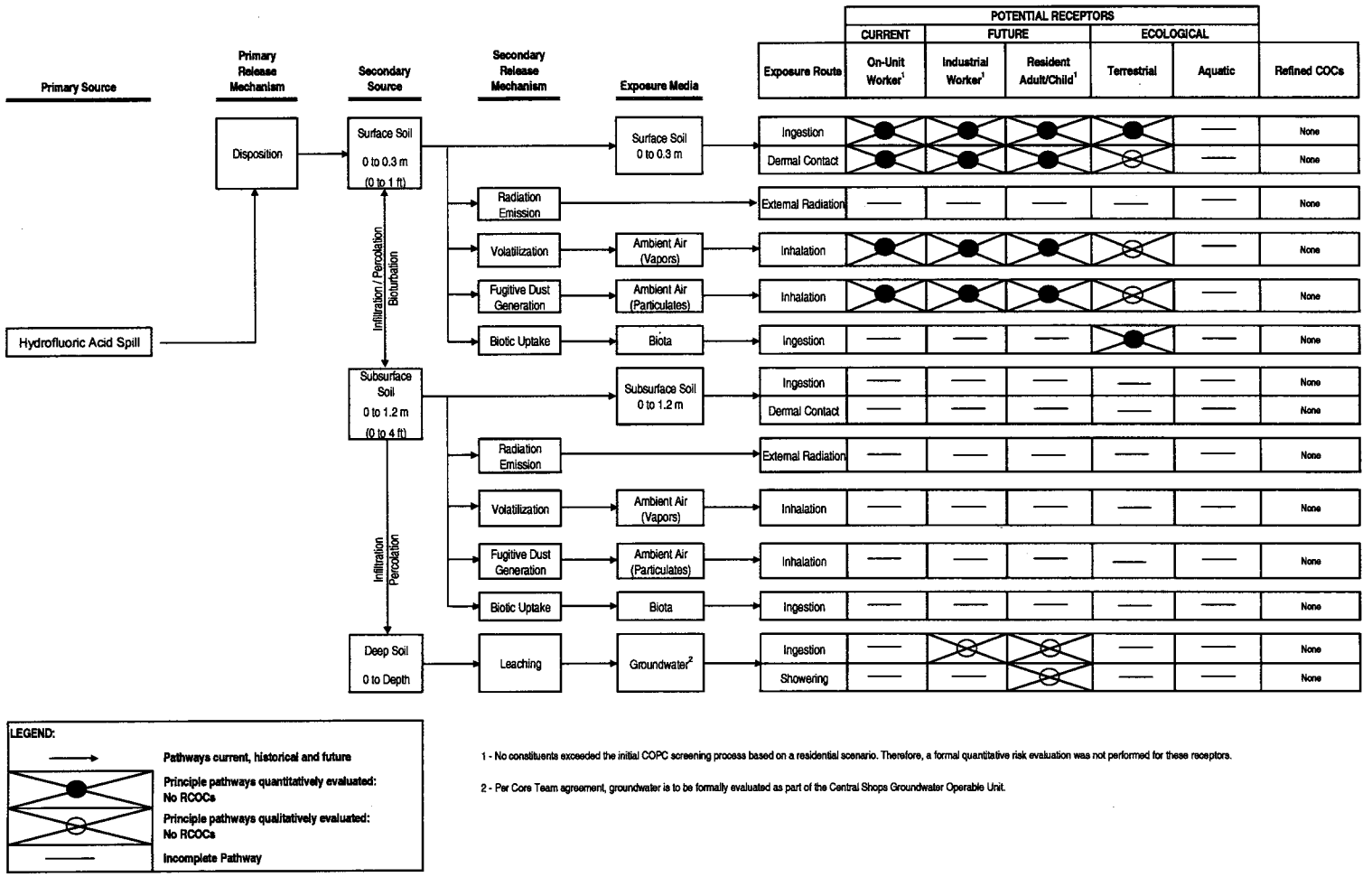

Figure 6. Conceptual Site Model for the HFAS OU

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water runoff. If contaminants were present, the environmental media impacted by the release of contamination would be soils.

If the primary source were to contact other media, secondary sources of contamination could be created through several release mechanisms. Typically, the potential secondary release mechanisms include release of volatile constituents from the soil (volatilization), generation of contaminated fugitive dust by wind or other surface soil disturbance, biotic uptake, bioturbation between surface and subsurface soils and infiltration/percolation/leaching to groundwater. Contact with contaminated environmental media creates pathways for both human and ecological receptors. These are assessed in the risk evaluation. The exposure media at this OU include ambient air (vapor and particulates), soil, and biota. Groundwater beneath the HFAS OU is evaluated under the Central Shops Groundwater OU.

In the CSM, the exposure route is the final element linking the primary and secondary sources to potential receptors. Exposure routes for human and ecological receptors may include inhalation of volatile emissions and airborne dust, ingestion of contaminated media (soils and/or biota), and dermal contact with contaminated media. Potential contamination from this OU may reach either human or ecological receptors.

Human receptors evaluated for risk assessment purposes include current on-unit workers occasionally in the area, future industrial workers, and hypothetical future on-unit residents. The general public is not considered to be a potential human receptor because the unit is located approximately 10.5 km (6.5 mi) from the nearest SRS boundary. Access by the general public has been prohibited by strict, long-term entry control procedures and site security inspections. The long distances and access restrictions make all pathways for the general public incomplete. The proposed future land use for the OU is to remain industrial only. Under future industrial use, potential human receptors are most likely industrial workers.

From an ecological perspective, the area lies within an industrial complex and is not conducive to use by wildlife as habitat. Any wildlife frequenting the area would occur on

an occasional, transient basis only. The unit is very small in size 9.1 by 9.1 m (30 by 30 ft) and the overall habitat quality and diversity for the area is considered poor. Therefore, the potential for ecological impacts at the community level is considered negligible. The ecological receptors selected for evaluation are the standard receptors that include soil invertebrates (earthworm), herbivorous mammals (mouse), insectivorous mammals (shrew), omnivorous mammals (raccoon), insectivorous birds (robin) and carnivorous birds (hawk).

Media Assessment

The RI for the Hydrofluoric Acid Spill OU (WSRC 2004b) contains detailed information and analytical data for all of the investigations conducted and samples taken in the media assessment of the HFAS OU. This document is available in the ARF (see Section III of this document). A summary of significant events relating to characterization activities at the HFAS OU is presented in Table 1. Soil is the only medium evaluated for the HFAS OU. A description on the non-intrusive and intrusive site characterization activities is presented below.

Non-Intrusive Site Characterization

Uncertainty concerning the origin of the OU led investigators to conduct a variety of investigative techniques, including personnel interviews and photographic reviews. Because of the investigators' concern regarding the corrosive nature of hydrofluoric acid, they proceeded initially with non-intrusive investigative techniques such as ground penetrating radar (GPR), and soil-gas and electromagnetic surveys to determine if drums were buried at the OU. A general radiation survey was also conducted to determine if radiological material was present. Four monitoring wells were installed outside the OU boundary in 1984 to determine any impact to groundwater.

Table 1. List of Significant Historical Events, 1973 to Present

Date	Event
1973	Photo shows a sign "Contaminated Area - Hydrofluoric Acid Buried 6 ft."
1983	First report identifying the existence of a hydrofluoric acid spill.
1984	Four wells, CSA-1, -2, -3 and -4, installed and sampled 1985 to 2004. Analytical results will be formally evaluated in the Central Shops Groundwater OU.
1987	DPST-85-696 drafted with interviews indicating the site existed since 1970.
April 1992	A radiation survey of the spill area was conducted; results indicated that radioactive waste was absent.
June 1992	A soil-gas survey was conducted at the hydrofluoric acid spill area; no volatile organic compounds (VOCs) were found.
July 1992	A GPR survey was performed at the hydrofluoric acid spill OU; no buried objects or areas of disturbed soils were found.
September 1994	Electromagnetic survey performed around the OU, no drum material identified.
September 2003	Trench excavations and soil sampling (pH) conducted at the orange balls site; no metal drum parts were observed: pH ranges (6.0-7.8) not representative of conditions associated with HF.
December 2003	Soil samples collected at orange balls site for full suite analysis; no contaminant migration, human health, or ecological RCOCs were identified.
January 2004	Groundwater samples collected and analyzed for metals. Analytical results to be formally evaluated in Central Shops Groundwater OU.

Personal Interviews

Interviews with former employees regarding the history of the unit were inconclusive and are documented in the RI Report (WSRC 2004b). The names of those employees who participated in the interviews are not included in this discussion to protect their privacy. The retired SRS employee who first documented the existence of the OU (duPont 1983) delineated the OU boundary as it exists today but expressed only a basic knowledge of the unit. He mentioned two other former employees with knowledge of Central Shops activities. One of the former employees could not be reached for comment; the other was not certain about the unit's history, but believed that contaminated soil was mixed with natural soil and buried at the spill area sometime in the late 1970's. The dates provided by the former employee proved unreliable since there is an archived photograph of the sign that was taken in 1973 some time after the sign was erected.

Another former construction employee in Central Shops was also contacted as a potential source of information regarding the spill area. He had no knowledge of the site but provided the name of two other employees with potential knowledge of the unit's history. One of the employees provided information pertinent to the disposal of hydrofluoric acid drums at another location in Central Shops. He described the burial of 28 drums of hydrofluoric acid in the vicinity of Building 714-7N. The area he identified was about 122 m (400 ft) northeast of the HFAS OU boundary. This area was further investigated with GPR and trenching, but no evidence of drum burial was found.

Historic Photo Review

A historic photo review is presented in the RI Report (WSRC 2004b). The photo review begins in the early construction years (1950's) in Central Shops and continues until 1992. The photos do not show drum burial, but there is evidence of gravel piles and other construction material, which indicates that there were activities at the OU location in the 1950's.

Radiation Survey

A radiation survey was conducted at the HFAS OU in April 1992. Results of the survey indicate that the activity is less than 3.6×10^{-5} μCi/g beta-gamma and 4.5×10^{-6} μCi/g alpha. The survey results indicate that radioactive waste is not present at the HFAS OU.

Soil-Gas Survey

A soil-gas survey was conducted at the HFAS OU in June 1992. Sampling locations are identified in Figure 7. Volatile organic compounds were not above detection limits, indicating that organic materials were not disposed of at the OU.

Ground Penetrating Radar

A GPR survey was conducted at the HFAS OU during July 1992 to locate disturbed soil, buried materials, or signs of wastes around the orange ball markers. GPR operates by reflecting radar beams off of objects and differentiating their density. The information is recorded on a log chart. The GPR survey did not identify any areas of disturbed soil or any measurements indicative of a trench or drum material. A few diffractions potentially indicative of metallic targets were observed in the data. It was noted that the presence of limonite pebbles in SRS soils often causes diffractions similar to metal objects. These anomalies were not identified during the intrusive characterization.

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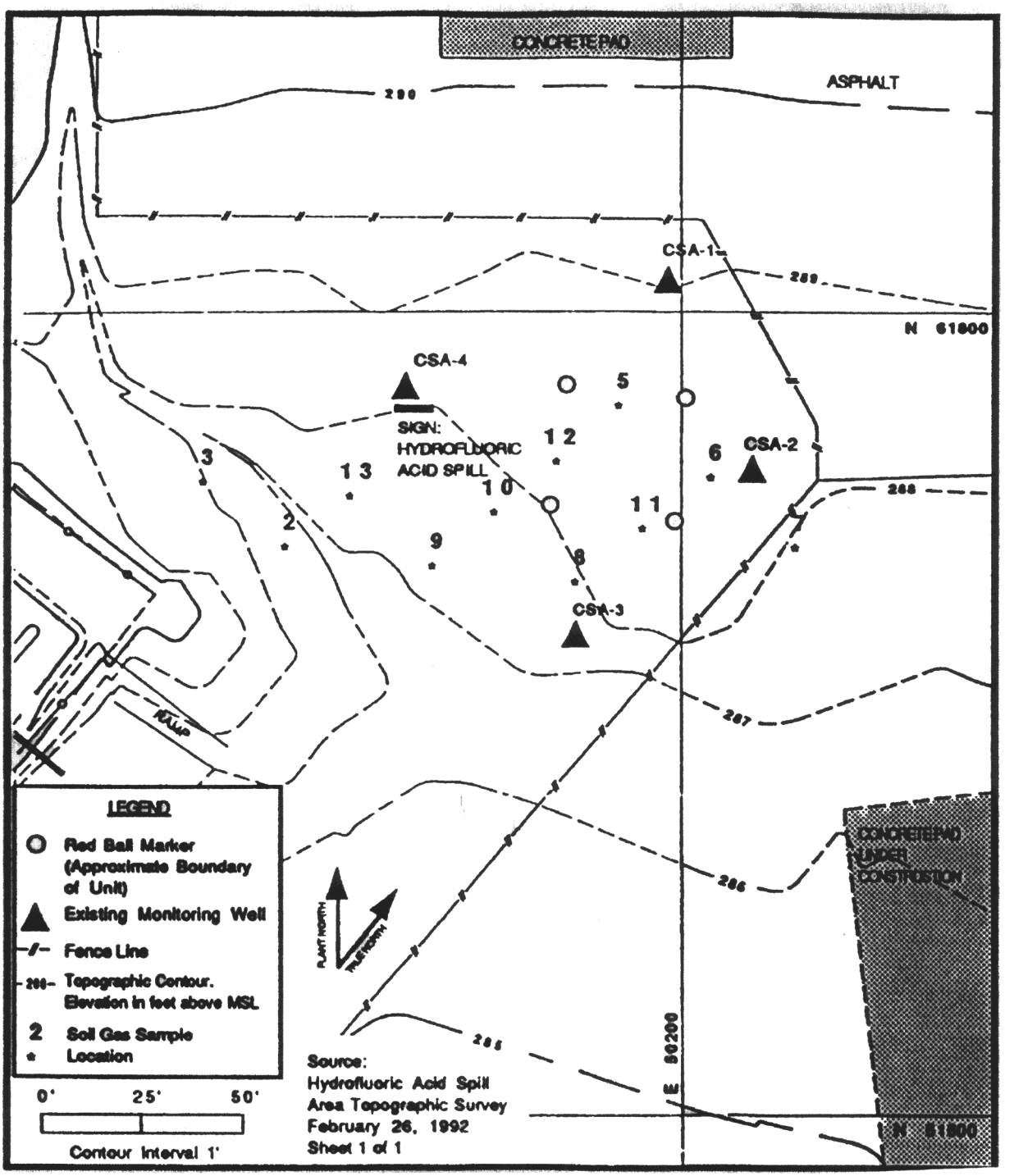

Figure 7. Soil-Gas Sampling Locations at the HFAS OU

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Electromagnetic Survey

An electromagnetic survey was performed in September 1994. The survey entailed placing a grid over the site. The grid is defined by a one-meter square grid node pattern. Electromagnetic surveys are designed to identify the magnetic fields of metallic objects such as metal drums that are buried below the surface. The survey identified one metallic anomaly on the side of the OU near the fence, but this object was not indicative of a drum or drum debris. No other anomalies were identified during the intrusive characterization.

Intrusive Site Characterization

In 2003, more intrusive modes of investigation were used to verify that drums were not buried and determine if contaminants are present at the OU. In addition, a geochemical model was performed based on a worst case scenario to confirm that hydrofluoric acid would no longer present a hazard during excavation of this soil. A trench was excavated through the middle of the OU, and pH samples were collected from the surface and bottom of excavated soil. As discussed later in this section, soil samples were also collected and analyzed for target analyte list (TAL)/target compound list (TCL) with radiological screening to determine if contaminants were present at the OU.

Trenching and pH Analysis

Although the GPR analysis did not identify buried drums or disturbed soil, trenching was performed at the OU in September 2003 to confirm these findings (Figure 8). If drums were buried at the OU, excavation of the soil should reveal a sharp contrast along the excavation between the native soil and the soil disturbed by the original excavation. There was no intent to excavate and remove any drums if found; the soil excavation was limited to 1.8 m (6 ft) on the assumption that, if present, any drum material would be revealed at that depth. A 3-ft wide trench was excavated from approximately 3 m (10 ft) outside the OU boundary on the north side and to the same distance outside the OU on the south side. The location of the trench in relation to the OU is depicted in Figure 3.

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Figure 8. Excavation Trench at the HFAS OU, September 2003

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A special non-sparking backhoe bucket was used as a precaution in case full drums were encountered during excavation. Visual observations of the side wall of the trench revealed that a shallow zone of disturbed soil, ranging from approximately 25.4 to 50.8 cm (10 to 20 inches) thick, covers undisturbed soil. Scraps of metal and debris are on the surface. These are probably from the adjacent metal recycling facility. The shallow disturbed soil is very sandy with some angular gravel and occasional chunks of asphalt pavement. The undisturbed soil is described as clayey silty sand with a moderate reddish orange color and intermittent streaks of yellow orange. The intermittent layering is uniformly oriented, which is indicative of undisturbed soil in the area. Nothing was observed that resembled any parts of a metal drum.

A total of five surface and ten subsurface samples were collected from the excavation and tested for pH. The range of pH measurements (6.0 - 7.8) were not representative of conditions associated with hydrofluoric acid.

Soil Samples

Soil samples were collected from the 0.0 - 0.3 m (0 - 1 ft) depth interval from three locations within the OU boundary (Figure 9). Site-specific background data was obtained from the RCRA Facility Investigation (RFI)/Remedial Investigation (RI) Work Plan with Risk Assessment for SRL Oil Test Site investigation (WSRC 2003). The background locations (CSL-8, -9, -10) are approximately 45.7 m (150 ft) away from the HFAS OU on the opposite side of the railroad tracks and are also identified on Figure 9. The HFAS OU soil samples were analyzed for TAL / TCL with radiological screening of gross alpha and non-volatile beta. Contaminants detected in the soil included inorganics, semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), pesticides and polychlorinated biphenyls (PCBs). Results from these soil samples were used in the fate and transport analysis and the human health and ecological risk evaluations. Contaminants whose maximum concentrations exceeded two times average background concentrations were identified as unit-specific contaminants (USCs) (Table 2).

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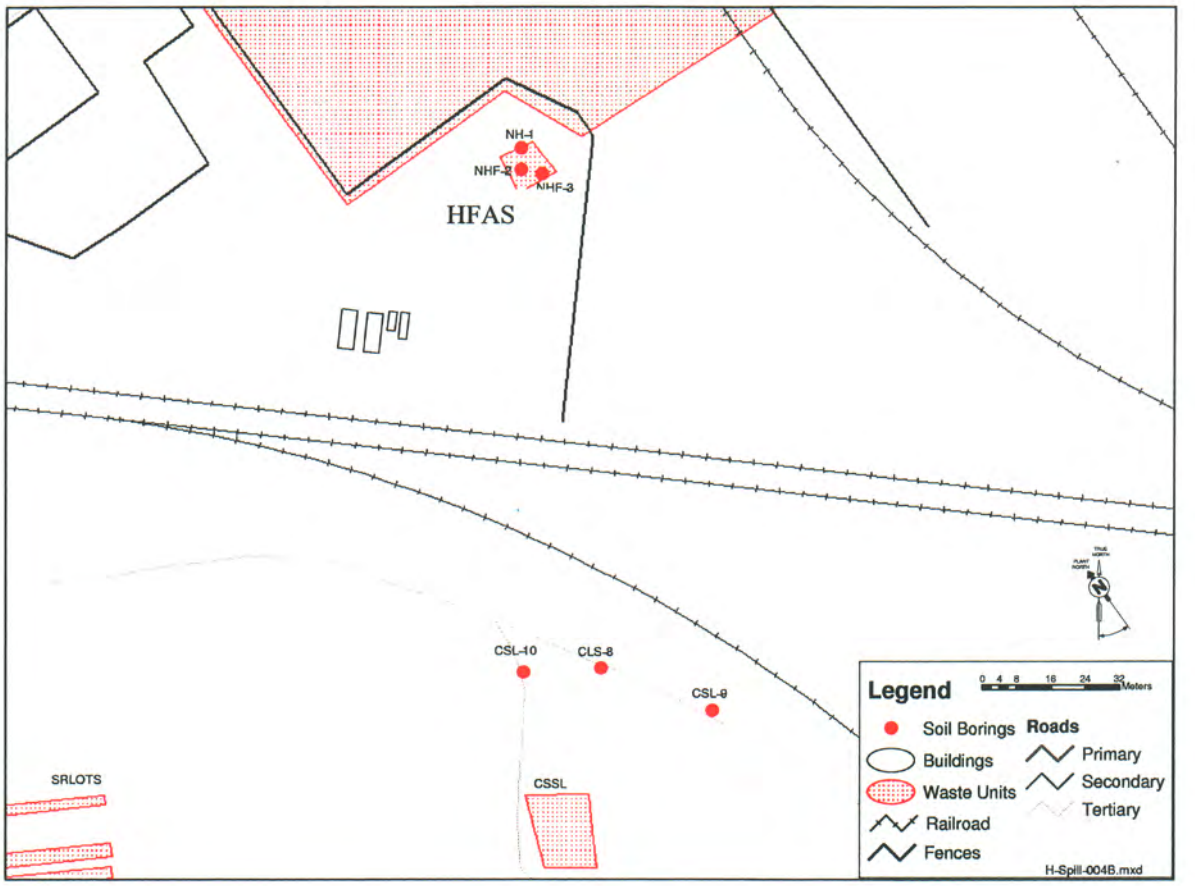

Figure 9. Soil Sample Locations, 2003

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Table 2. Unit-Specific Constituent Screening

Analyte	Detected Maximum Concentration	2X Average Background Concentration	Unit-Specific Constituent
Inorganics (mg/kg)			
Aluminum	9.67E+03	1.65E+04	no
Arsenic	1.78E+00	3.44E+00	no
Barium	3.86E+02	1.16E+02	YES
Beryllium	1.69E-01	5.70E-01	no
Calcium	4.04E+03	6.70E+02	YES
Chromium	9.06E+00	2.18E+01	no
Cobalt	9.01E-01	4.80E+00	no
Copper	4.50E+00	2.16E+01	no
Fluoride	1.18E+00	NA	YES
Iron	8.95E+03	2.00E+04	no
Lead	5.38E+00	1.74E+01	no
Magnesium	3.38E+02	3.50E+02	no
Manganese	8.22E+01	8.08E+02	no
Mercury	4.91E-02	6.82E-02	no
Nickel	2.94E+00	1.50E+01	no
Potassium	1.45E+02	2.40E+02	no
Vanadium	2.04E+01	2.82E+01	no
Zinc	1.59E+01	2.00E+01	no
Semi-volatile Organics (mg/kg)			
Benzo(b)fluoranthene	8.05E-02	7.22E-01	no
Benzo(g,h,i) perylene	8.33E-02	2.48E-01	no
Indeno(1,2,3-c,d)pyrene	6.15E-02	2.38E-01	no
Volatile Organics (mg/kg)			
Acetone	9.28E-02	2.82E-01	no
1,1-Dichloroethylene	8.60E-04	ND	YES
Dichloromethane	5.19E-03	ND	YES
Pesticides/PCBs (mg/kg)			
Aroclor 1254	6.45E-03	ND	YES
alpha-Chlordane	4.61E-04	ND	YES
gamma-chlordane	8.52E-04	ND	YES
p,p'-DDT	1.80E-03	ND	YES

NA - Not available

ND- Not detected

Media Assessment Results

The findings of the HFAS OU investigation and assessment are documented in the RI Report (WSRC 2004b) and summarized in the following paragraphs.

A single surface marker is the only indicator that the area may have been used as a hydrofluoric acid disposal area. Characterization activities at the OU included soil-gas, radiological and electromagnetic surveys, a GPR, groundwater sampling, excavation of a trench, pH analysis, and soil sampling (full suite analysis). No evidence of a burial trench, metal drums, soil discoloration, or debris was found within the HFAS OU. No VOCs were detected during the soil-gas survey. Soil pH measurements did not indicate the presence of hydrofluoric acid in the soil. Groundwater monitoring (since 1985) from four wells around the OU indicate that contaminant migration is not a concern at the OU.

The soil samples used in the contaminant migration, human health and ecological risk evaluations did not identify any refined COCs at the OU or PTSM. In addition, based on the conditions found at the HFAS OU location, any surficial disposal or spill has long been neutralized as the current pH of the area is within background for the SRS. Retired personnel who worked in the area and with the hydrofluoric acid were interviewed and the locations they identified as potential disposal sites were investigated. No evidence of hydrofluoric acid disposal activities was found at any of these locations. It has been concluded that no drums of acid are buried in the area and there is no indication of an acid or acid-contaminated soil disposal site.

No refined COCs have been identified as a result of the RI Workplan investigations at the HFAS OU (Table 3). No RCRA-listed or characteristic hazardous waste exist at the unit. No mobile or highly toxic materials (i.e., PTSM) are associated with the HFAS OU. No problems warranting action are associated with ARARs, human health risk evaluation, ecological risk evaluation, or contaminant migration analysis for the HFAS OU. Therefore, no remedial action is necessary at the HFAS OU to ensure protection of

human health and the environment. The HFAS OU is capable of supporting unrestricted (residential) use without any remedial action.

Site-Specific Factors

No site-specific factors requiring special consideration that might affect the No Action remedial decision for the HFAS OU are present at the site.

Contaminant Transport Analysis

The contaminant migration of unit-related constituents was evaluated to determine if there is any potential for contaminants to reach the groundwater. The contaminants evaluated in this assessment are the unit-specific constituents (USCs) identified in Tables 2 and 3. Three pesticides, two VOCs, three inorganics and one PCB were identified as USCs based on a comparison of unit maximum constituent concentration to site-specific background concentration. The vadose zone contaminant migration conceptual model used for the analysis of contaminant fate and transport is presented in Figure 10. The analysis was based on the lithological information, groundwater levels, and geotechnical data. The results of the migration model reveal that the concentrations of constituents detected in the HFAS OU soils will not exceed their maximum contaminant levels (MCLs) or preliminary remediation goals (PRGs) within the 1000-year modeling period. The MCL is the maximum concentration of a substance allowed in water that is delivered to any user of a public water supply as required by the Safe Drinking Water Act. The evaluation identified no refined contaminant migration COCs (Table 3). Therefore, the HFAS OU soils do not pose a migration threat to groundwater.

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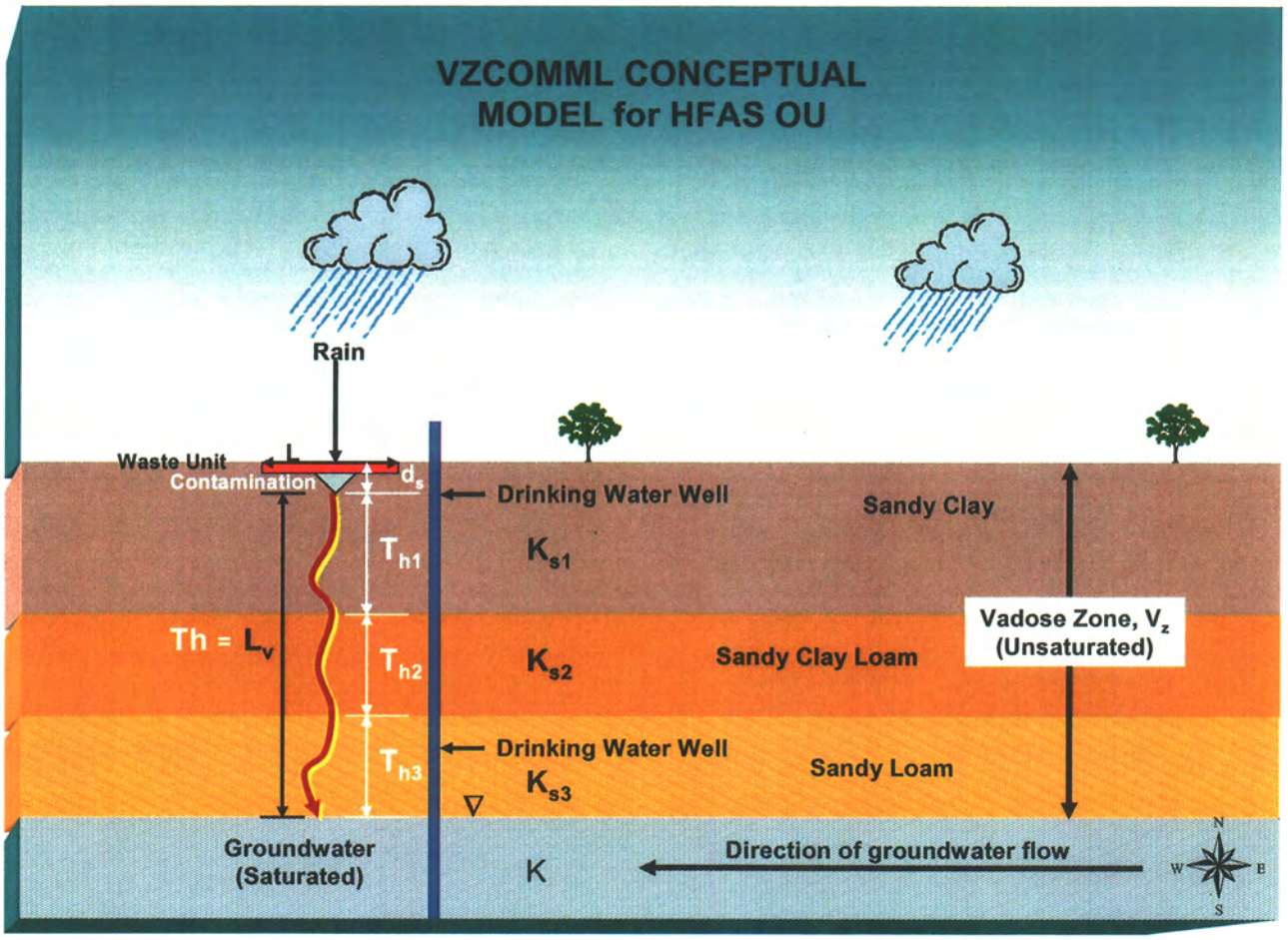

Figure 10. Contaminant Migration Conceptual Model for the HFAS OU

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Table 3. Summary of Constituent of Concern Selection for HFAS OU

Detected Analyte	USC	ARAR	PTSM[1]	Contaminant Migration		Human Health		Ecological		Refined
		COC	COC	COPC	COC	COPC	COC	COPC	COC	COC
Inorganics		(none)	(none)	(none)	(none)	(none)	(none)		(none)	(none)
Aluminum										
Arsenic										
Barium	X							X		
Beryllium										
Calcium	X									
Chromium										
Cobalt										
Copper										
Fluoride	X									
Iron										
Lead										
Magnesium										
Manganese										
Mercury										
Nickel										
Potassium										
Vanadium										
Zinc										
Semi-Volatile Organics										
Benzo(g,h,i)perylene								X		
Benzo(b)fluoranthene								X		
Indeno(1,2,3-cd)pyrene								X		

Table 3. Summary of Constituent of Concern Selection for HFAS OU (Continued)

Detected Analyte	USC	ARAR	PTSM[1]	Contaminant Migration		Human Health		Ecological		Refined
		COC	COC	COPC	COC	COPC	COC	COPC	COC	COC
Volatile Organics										
Acetone										
1,1-Dichloroethylene	X									
Dichloromethane	X									
Pesticides/PCBs										
Aroclor 1254	X									
alpha-Chlordane	X									
gamma-Chlordane	X									
DDT	X									

1. PTSM includes evaluations based on both toxicity and mobility.
*ARAR – applicable or relevant and appropriate requirement
*USC - unit-specific constituent
*COPC - constituent of potential concern

VI. CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

Land Uses

Current Land Use

Currently, the HFAS OU is an inactive waste unit. It is located within N Area (Central Shops), approximately 200 m (660 ft), southwest of the industrial area and south of Road 3 (Figure 3). Access to SRS is controlled by USDOE. Access to the HFAS OU is restricted within the SRS boundaries.

The potential receptor for exposure to constituents associated with the HFAS OU is the known on-unit worker who comes to the area on an infrequent or occasional basis. Known on-unit workers are defined as SRS employees who work at or in the vicinity of the HFAS OU under current land use conditions. A known on-unit worker may be a researcher, environmental sampler, or other SRS personnel who work in close proximity to the unit.

Future Land Use

According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential uses of SRS land should be prohibited. The SRS FFA Implementation Plan (WSRC 1996) designates the preferred land use for the HFAS OU as industrial with buffer. The potential receptor for exposure to constituents associated with the HFAS OU will be the future industrial worker.

Groundwater Uses/Surface Water Uses

Groundwater beneath the HFAS OU is not used for any type of human consumption. Furthermore, the groundwater associated with the HFAS OU has been separated from the OU and placed in the Central Shops Groundwater Operable Unit. Future use of the

groundwater will be addressed by the Central Shops Groundwater Operable Unit ROD. The groundwater that flows beneath the HFAS OU is discharged into Pen Branch.

There are no distinct surface water features on the unit and no drainage or surface runoff features that indicate that the surface runoff is being used for irrigation or any other beneficial uses.

VII. SUMMARY OF OPERABLE UNIT RISKS

Baseline Risk Assessment

As a component of the CERCLA process, a risk evaluation was performed and included in the RI Report (WSRC 2004b) for the HFAS OU. The evaluation estimates what risks the site poses if no action were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. The evaluation includes both the human health risk and ecological risk assessments. A review of the analytical data contained in the RI Report for HFAS OU (WSRC 2004b) indicates that the data are of sufficient quality for use in the risk evaluation. The results of the risk evaluations are summarized in the following paragraphs.

Summary of the Human Health Risk Evaluation

Based on the existing analytical data, an evaluation was conducted to estimate the human health and environmental problems that could result from the current physical and waste characteristics of the HFAS OU. No constituent exceeded the initial constituent of potential concern (COPC) screening process that compares maximum unit concentrations to residential PRG concentrations and site-specific background concentrations (Table 4). Therefore, a formal quantitative risk evaluation was not performed since no COPCs were identified for further assessment. Consequently, no refined human health COCs are associated with the HFAS OU. In conclusion, no health risks to current on-unit workers,

Table 4. Human Health COPC Screening

Analyte	Detected Maximum Concentration	Human Health Screening Value	Human Health Screening Value Source[A]	Exceeds Human Health Screening Value?	2X Average Background Concentration	Exceeds 2X Average Background?[B]	COPC?
Inorganics *(mg/kg)*							
Aluminum	9.67E+03	7.61E+03	0.1xPRG	YES	1.65E+04	no	no
Arsenic	1.78E+00	3.90E-01	PRG	YES	3.44E+00	no	no
Barium	3.86E+02	5.37E+02	0.1xPRG	no	1.16E+02	YES	no
Beryllium	1.69E-01	1.54E+01	0.1xPRG	no	5.70E-01	no	no
Calcium	4.04E+03	NA	Nutrient	no[C]	6.70E+02	YES	no
Chromium	9.06E+00	2.11E+02	PRG	no	2.18E+01	no	no
Cobalt	9.01E-01	9.03E+02	PRG	no	4.80E+00	no	no
Copper	4.50E+00	3.13E+02	0.1xPRG	no	2.16E+01	no	no
Fluoride	1.18E+00	3.67E+02	0.1xPRG	no	NA	YES	no
Iron	8.95E+03	2.35E+03	0.1xPRG	YES	2.00E+04	no	no
Lead	5.38E+00	4.00E+01	0.1xPRG	no	1.74E+01	no	no
Magnesium	3.38E+02	NA	Nutrient	no[C]	3.50E+02	no	no
Manganese	8.22E+01	1.76E+02	0.1xPRG	no	8.08E+02	no	no
Mercury	4.91E-02	2.35E+00	0.1xPRG	no	6.82E-02	no	no
Nickel	2.94E+00	1.56E+02	0.1xPRG	no	1.50E+01	no	no
Potassium	1.45E+02	NA	Nutrient	no[C]	2.40E+02	no	no
Vanadium	2.04E+01	5.47E+01	0.1xPRG	no	2.82E+01	no	no
Zinc	1.59E+01	2.35E+03	0.1xPRG	no	2.00E+01	no	no
Semi-volatile Organics *(mg/kg)*							
Benzo(b)fluoranthene	8.05E-02	6.21E-01	PRG	no	7.22E-01	no	no
Benzo(g,h,i) perylene	8.33E-02	2.32E+02	0.1xPRG	no[D]	2.48E-01	no	no
Indeno(1,2,3-c,d)pyrene	6.15E-02	6.21E-01	PRG	no	2.38E-01	no	no
Volatile Organics *(mg/kg)*							
Acetone	9.28E-02	1.57E+02	0.1xPRG	no	2.82E-01	no	no
1,1-Dichloroethylene	8.60E-04	1.24E+01	0.1xPRG	no	ND	YES	no
Dichloromethane	5.19E-03	9.11E+00	PRG	no	ND	YES	no
Pesticides/PCBs *(mg/kg)*							
Aroclor 1254	6.45E-03	2.22E-01	PRG	no	ND	YES	no
alpha-Chlordane	4.61E-04	1.62E+00	PRG	no	ND	YES	no
gamma-chlordane	8.52E-04	1.62E+00	PRG	no	ND	YES	no
p,p'-DDT	1.80E-03	1.72E+00	PRG	no	ND	YES	no

A - Nonradiological PRGs are residential soil values from the EPA Region IX PRG table, 10/02
B - For screening purposes, maximum concentration of only the naturally-occurring (nonanthropogenic) constituents are compared to 2X average background concentration.
Background concentration of anthropogenic constituents are presented for information purposes only.
C - Essential nutrients are not identified as COPCs.
D - PRG for pyrene used as a surrogate for benzo(g,h,i)perylene.

NA - Not available
ND- Not detected

future industrial workers, or future residents that warrant remedial action are posed by the HFAS OU. The HFAS OU is suitable for unrestricted land use.

Summary of the Ecological Risk Evaluation

The purpose of the ecological risk evaluation is to consider the likelihood that adverse ecological effects may occur or are occurring as a result of exposure to unit-related constituents based on a line-of-evidence approach. From an ecological perspective, the HFAS OU lies within an industrial complex and is not conducive to use by wildlife as habitat. In addition, the unit is very small in size and the overall habitat quality and diversity for the area is considered poor. Although the potential for ecological impact at the community level is considered negligible based on the environmental setting, a quantitative assessment was performed. Four constituents [barium, benzo(b)fluoranthene, benzo(g,h,i)perylene, and indeno(1,2,3-c,d)pyrene] exceeded the most conservative initial screen in the process and were identified as COPCs. More detailed risk calculations for these constituents and an uncertainty (lines-of-evidence) discussion did not identify any COCs. The ecological risk evaluation concluded that no refined COCs are associated with the HFAS OU. Therefore, the unit poses a negligible risk to ecological receptors.

Summary of the Fate and Transport Analysis

A fate and transport analysis was performed to identify refined contaminant migration COCs. A constituent is defined as a refined contaminant migration COC if leachability modeling predicts the constituent will leach to groundwater and exceed MCLs (or PRGs) within 1,000 years. The results of the contaminant migration and conceptual model reveal that the concentrations of the constituents detected in the HFAS OU soils will not exceed their MCLs or PRGs within the 1,000 year modeling period. Hence, no refined contaminant migration COCs are associated with the HFAS OU.

Discussion of Principal Threat Source Material

The concept of PTSM as developed by USEPA (USEPA 1991) was applied to USCs. Wastes that generally will be considered PTSM includes liquids, mobile source material, or highly toxic source materials. No PTSM associated with HFAS OU was identified based on toxicity and mobility.

Conclusion

There are no hazardous substances from the HFAS OU that would present a current or potential future threat to public health, welfare, or the environment (Table 3).

- There are no refined human health COCs in soil. Because no constituents exceeded the COPC screening process, it is concluded that the risk to the current on-unit worker, future industrial worker, and future resident is less than 1.0×10^{-6}.
- There are no refined ecological COCs in soil.
- There are no refined contaminant migration COCs in soil.
- There are no refined ARAR or PTSM COCs in soil.

The HFAS OU poses no current or potential future threat to human health or the environment based on unlimited exposure and unrestricted land use. Therefore, no remedial action is required.

VIII. EXPLANATION OF SIGNIFICANT CHANGES

The remedy selected in this ROD does not contain any significant changes from the preferred alternative(s) presented in the PP (WSRC 2004a). No comments were received during the public comment period.

IX. RESPONSIVENESS SUMMARY

Since no comments were received during the public comment period, no Responsiveness Summary is included in this ROD.

X. POST-ROD DOCUMENT SCHEDULE AND DESCRIPTION

No remedial action will be performed at the HFAS OU; therefore, a schedule for post-ROD cleanup activities is not provided.

XI. REFERENCES

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