BHATE ENVIRONMENTAL, INC.

1608 13th Avenue South • Suite 300
Birmingham, AL 35205
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LETTER OF TRANSMITTAL

HAFB 05

DATE: MAY 3, 2005

JOB NO: 9030024.05.05.01

ATTENTION: MR. JOHN HYMER

TO: BHATE
BUILDING 1266
~~1641 VANDERGFIFT~~
HOLLOMAN AFB, NM 88330

RE: SS-61 (AOC 1001)
HOLLOMAN AFB, NEW MEXICO

WE ARE SENDING YOU ☐ Attached ☐ Under separate cover via ________ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ ________

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COPY TO ________ SIGNED: Gardner/D'Auben/Hymer/Niebuhr

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DRAFT

ADDITIONAL GROUNDWATER MONITORING WORK PLAN FOR SS-61 (AOC 1001)

Holloman Air Force Base
New Mexico

May 2005

Contract No.: DACA45-02-D-0012
Task Order No.: 5
Bhate Project No.: 9030024.05.05.01

Headquarters, Air Combat Command
Langley Air Force Base, Virginia

49 CES/CEV
Holloman Air Force Base, New Mexico

DRAFT
ADDITIONAL GROUNDWATER MONITORING WORK PLAN FOR SS-61 (AOC 1001) HOLLOMAN AFB, NEW MEXICO

Prepared For

U.S. Army Corp of Engineers
Omaha, Nebraska
CONTRACT NO. DACA45-02-D-0012
TASK ORDER NO. 5

Prepared By

Bhate Environmental Associates, Inc.
1608 13th Avenue South
Suite 300
Birmingham, Alabama

Bhate Project Number: 9030024.05.05.01

May 2005

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ADDITIONAL GROUNDWATER MONITORING WORK PLAN FOR SS-61 (AOC 1001) HOLLOMAN AFB, NEW MEXICO

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Foster Wheeler Environmental Corporation, *Final Phase II Remedial Investigation Report for SS-61, Holloman Air Force Base, New Mexico*, December 2000.

Appendix D Quality Assurance Project Plan Addendum for SS-61

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ACRONYMS AND ABBREVIATIONS

AAF	Army Air Field
AOC	Area of Concern
ANSI	American National Standards Institute
AST	Aboveground storage tank
bgs	Below ground surface
Bhate	Bhate Environmental Associates, Inc.
BTEX	Benzene, toluene, ethylbenzene, xylenes
CIH	Certified Industrial Hygienist
COC	Chain-of-custody
DA	Drainage Area
EDC	1,2-Dichloroethane
EDB	1,2-Dibromoethane
E_h	Oxidation reduction potential
EPA	U.S. Environmental Protection Agency
ERPIMS	Environmental Restoration Program Information Management System
°F	Degrees Fahrenheit
ft	Feet or foot
ft/ft	Feet per foot
HAFB	Holloman Air Force Base
HASP	Health and Safety Plan
IDW	Investigation derived waste
IRA	Interim Remedial Action
IRP	Installation Restoration Program
LF	Landfill
mg/L	Milligrams per liter
MS/MSD	Matrix spike/matrix spike duplicate
NAP	Natural attenuation parameter
NFA	No Further Action
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMWQCC	New Mexico Water Quality Control Commission
OSHA	Occupational Safety and Health Administration
OWS	Oil Water Separator
PG	Professional Geologist
PPE	Personal Protective Equipment
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RI	Remedial Investigation
SOP	Standard Operating Procedure

ACRONYMS AND ABBREVIATIONS (continued)

SS	Spill Site
SVOC	Semi-volatile organic compounds
SWMU	Solid Waste Management Unit
SWPPP	Storm Water Pollution Prevention Plan
TCE	Trichloroethene
TDS	Total dissolved solids
TNT	2,4,6-Trinitrotoluene
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
TRPH	Total recoverable petroleum hydrocarbons
USACE	United States Army Corps of Engineers
VOC	Volatile organic compounds
WRCC	Western Regional Climate Center
WSMR	White Sands Missile Range

1 INTRODUCTION

Bhate Environmental Associates, Inc., (Bhate) has been retained by the U.S. Army Corps of Engineers (USACE), under contract DACA45-02-D-0012, Task Order No. 5, to prepare an *Additional Groundwater Monitoring Work Plan for SS-61 (AOC 1001)* located at Holloman Air Force Base (HAFB), New Mexico. The objectives of this Work Plan are outlined in correspondence dated February 4, 2005, from the New Mexico Environment Department (NMED), included as Appendix A, and are summarized as follows:

1. A groundwater sampling program must be established. Groundwater samples must be collected from a sufficient number of wells throughout the plume on at least a semi-annual basis.

2. Groundwater samples shall be analyzed for volatile organic compounds (VOCs) [including benzene, toluene, ethylbenzene, and xylenes (BTEX); naphthalene; 1,2-dichloroethane (EDC); and 1,2-dibromoethane (EDB)], semi-volatile organic compounds (SVOCs), and metals [including lead]. Samples from two wells, MW-02 and MW-05, shall also be analyzed for trichloroethene (TCE).

3. Groundwater elevations should be collected from all Spill Site 61 (SS-61) and Landfill 29 (LF-29) wells for the development of groundwater potentiometric surface maps.

In addition, the February 4, 2005, letter from NMED requested two additional items that will be addressed separately from this Work Plan. First, that the natural attenuation data and discussion related to the approved *Feasibility Study Work Plan Spill Site 61* submitted by Bhate and dated November 2003, as presented in the *Interim Final Focused Feasibility Study Spill Site 61*, Bhate, September 2004, be recompiled and the two documents submitted separately. This request will be completed under separate cover. Second, NMED requested an additional investigation of the TCE plume, located to the east and southeast of MW-02. This TCE plume will be designated as a separate Area of Concern (AOC), be set up as an additional site, and receive separate funding. Therefore, additional wells and the TCE plume will not be addressed in this Work Plan.

This Work Plan will serve as the primary working document for the groundwater monitoring at SS-61, and provide the relevant site specific information as it pertains to the requirements as outlined in aforementioned correspondence. The primary objective of this Work Plan is to review available information and to collect groundwater data to fulfill the requirements identified by NMED. The ultimate objective is to achieve approval for site closure from NMED.

This document has been prepared to provide relevant information on the geologic, hydrologic, and other environmental conditions for HAFB and at the site. Information is provided for the entire Base and its surrounding environ as well as SS-61, specifically. Likewise, the procedures encompassing the sampling and waste management are presented.

1.1 HAFB Site Description

HAFB is located in southeastern New Mexico in Otero County, New Mexico, approximately 100 miles north-northeast of El Paso, Texas and six miles west of Alamogordo, New Mexico (Figure 1). HAFB was first established in 1942 as Alamogordo Army Air Field (AAF). From 1942 through 1945, Alamogordo AAF served as the training grounds for over 20 different flight groups, flying primarily B-17s, B-24s, and B-29s. After World War II, most operations had ceased at the base. In 1947, Air Material Command announced the air field would be its primary site for the testing and development of un-manned aircraft, guided missiles, and other research programs. On January 13, 1948, the Alamogordo installation was renamed Holloman Air Force Base, in honor of the late Col. George V. Holloman; a pioneer in guided missile research. In 1968, the 49th Tactical Fighter Wing arrived at HAFB and has remained since. Today, HAFB also serves as the training center for the German Air Force's Tactical Training Center.

1.2 SS-61 Site Description

SS-61 is located in an industrial area in the central part of HAFB. The site is located north of two hangars, Buildings 1079 and 1080, and is divided into two study sections by DeZonia Drive (Figure 2). The northern section of the site consists of a concrete pad, located east of Building 1001, which may have been used for dispensing fuel. North of this pad was a debris pile that covered approximately 1,500 square feet. The pile contained concrete pieces, asphalt rubble, and some piping. Northeast of the concrete pad and debris pile were two aboveground storage tanks (ASTs) that had been removed. The ground surface rises approximately 10 feet toward the former AST area. A partial outline of the containment berm in the area of the northern AST is still visible. The circular berm is approximately 180 feet in diameter, rising approximately 8 feet above grade, and approximately 10 feet wide at the base. No remnant of a berm is visible for the southern AST. A 12-inch diameter steel pipe emerges from the ground at a 45° angle, oriented north to south. The piping was traced to an apparent T-junction located 450 feet south of the AST area. A geophysical survey, conducted during the Phase I Remedial Investigation (RI), traced one branch of the piping west from the junction to an area directly north of the concrete pad to two concrete valving vaults (Foster Wheeler and Groundwater Technology Government Services, December 1997). The other piping branch runs south toward the hangar area.

The southern portion of SS-61, south of DeZonia Drive, consists of two hangars, Building 1079 and Building 1080. South of the hangars is the tarmac. The eastern hangar, Building 1080, is the newer of the two buildings. The western hangar, Building 1079, dates to the 1940s. A concrete sump is located outside the northwest entrance to the hangar. A shallow surface depression, approximately 100 feet (ft) x 70 ft by 3 ft deep, is located in the north parking lot to Building 1079. It was used as a stormwater collection basin. The piping traced from the former ASTs is located underneath Building 1087, east of Building 1079.

1.3 Summary of Previous Investigations

In 1994, during a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) of Solid Waste Management Unit (SWMU) 104, the Former Army Landfill used for the disposal of waste munitions, contamination was detected in samples collected from monitoring well MW-29-05 (Foster Wheeler Environmental Corporation (Foster Wheeler) and Radian Corporation (Radian), July 1994). VOCs detected in the groundwater included benzene, EDC, 2,4,6-trinitrotoluene (TNT), and 1,3,5-trinitrobenzene. Water levels collected from SWMU 104, also designated as Installation Restoration Program (IRP) Site LF-29, indicated a hydraulic gradient to the north-northwest. Monitoring well MW-29-05 was determined as being upgradient of the former landfill; therefore, the source of the contamination was located south-southeast of the former landfill. Based on the results of MW-29-05, a No Further Action (NFA) status was requested for SWMU 104. The area south-southeast of IRP Site LF-29 was designated AOC 1001, due to its location in the vicinity of Building 1001.

1.3.1 Phase I RI

A Phase I and Phase II RFI were conducted at AOC 1001 in 1996 and 1997 (Foster Wheeler and Groundwater Technology Government Services, December 1997). Soil vapor samples, soil samples, and groundwater samples were collected across the area. At this time, results from the investigations designated this area as SS-61.

A Phase I RI was conducted at SS-61 in 1999 (Foster Wheeler, August 1999). The investigation area included two former ASTs, underground piping, debris pile, and a concrete pad that may have been a fuel dispensing area. These are located north of DeZonia Drive. Information of the area is limited because part of the area was used for classified operations conducted by the Strategic Air Command. Aerial photographs indicated that operations at the concrete pad and ASTs began after 1945 and had ended by 1972. Soil samples collected during the Phase I RI indicated the presence of total recoverable petroleum hydrocarbons (TRPH), BTEX, and two explosive constituents (tetryl and trinitrotoluene) immediately above the water table, in the capillary fringe, at the northeast corner of the concrete pad. Groundwater samples collected indicated elevated levels of BTEX, north of the concrete pad, with lower levels of BTEX, EDC, TCE, and explosives to the south and east of the pad. Free product was not observed in the wells sampled. The Phase I RI confirmed that past releases in the vicinity of the concrete pad resulted in elevated concentrations of groundwater contaminants in a plume that extends north toward SWMU 104. Soil sampling showed that there was no continuing source of groundwater contamination. The risk assessment conducted indicated that there was no unacceptable risk to either human or ecological receptors; therefore, the Phase I RI concluded that no remediation was required in the northern section of SS-61.

1.3.2 Phase II RI

The Phase II RI was conducted in 2000 and investigated the southern portion of SS-61, in the vicinity of two hangars, Building 1079 and 1080 (Foster Wheeler, December 2000). Phase II investigated the area of the two hangars, the outlying areas around the two hangars, an area southeast of Building 1080 where suspected fuel spills occurred during past operations, and in the former stormwater overflow basin north of Building 1079, directly south and upgradient of the concrete pad. Soil sampling results from Phase II indicated the same as results from the Phase I study. There did not appear to be a continuing source of groundwater contamination. An elevated level of TRPH was detected in one soil sample, collected from 1 foot to 2 feet below ground surface (bgs), at the southwest corner of Building 1079. Groundwater sampling results indicated the presence of low-level cross-gradient and upgradient contamination that the Phase II RI report attributed to multiple sources in the vicinity of Building 1079. It was reported that Building 1079 had an oil/water separator (OWS) formerly located at the southeast corner of the building. BTEX constituents were not as prevalent in the samples collected in the southern portion of SS-61; however, low concentrations of chloroform, EDC, and TCE were detected in samples collected from the eastern and western boundaries. The Phase II report attributed these solvents to likely released cleaning fluids used in aircraft maintenance in the area. The Phase II RI presented a discussion of the extent of contamination. For reference purposes, Sections 1.2, 5.0, and the data summary tables of the Phase II RI (Foster Wheeler, December 2000) are attached as Appendix B. Based in the results, no significant risk to human or ecological receptors was found and the Phase II RI recommended NFA.

1.4 Physiography

HAFB is located within the Sacramento Mountains Physiographic Province on the western edge of the Sacramento Mountains (Figure 3). The region is characterized by high tablelands with rolling summit plains; cuesta-formed mountains dipping eastward and of west-facing escarpments with the wide bracketed basin forming the basin and range complex. HAFB is approximately 59,600 acres in area, and is located at a mean elevation of 4,093 feet above sea level. The Base is located in the Tularosa Sub-basin which is part of the Central Closed Basins. The San Andreas Mountains bound the basin to the west (about 30 miles) with the Sacramento Mountains approximately 10 miles to the east. At its widest, the basin is about 60 miles east to west and stretches approximately 150 miles north to south.

SS-61 is located north of the main base area straddling DeZonia Drive. Except for a former stormwater retention pond located north of Building 1079, the surface of SS-61 slopes gently to the southwest. The primary area of the northern portion of SS-61 is a sparsely vegetated area. The southern portion of the site is primarily paved.

1.5 Surface Water

The Tularosa Basin contains all of the surface flow in its boundaries. The nearest inflow of surface waters to the Base comes from the Lost River, located in the north-central region of the Base. The upper reaches of the Three Rivers and the Sacramento River are perennial in the basin. HAFB is dissected by several southwest trending arroyos that control the surface drainage. Hay Draw arroyo is located in the far north. Malone and Rita's Draw, which drain into the Lost River, and Dillard Draw arroyos are located along the eastern perimeter of the Base. Approximately 10,000 years ago, indications are of a much wetter climate. The present day Lake Otero encompassed a much larger area, possibly upwards of several hundred square miles. Its remains are the Alkali Flat and Lake Lucero. Lake Lucero is a temporary feature of merely a few inches in depth during the rainy season.

Ancient lakes and streams deposited water bearing deposits over the older bedrock basement material. Fractures, cracks, and fissures in the Permian and Pennsylvanian bedrock yield small quantities of relatively good quality water in the deeper peripheral. Potable water is only found from a handful of wells near the edges of the basin with more saline water towards the center. Two of the principal sources of potable water are a long narrow area on the upslope sides of Tularosa and Alamogordo with the other in the far southwestern part of the basin. Alamogordo's water, as well as the Base's, is supplied from Lake Bonito (which is in the Pecos River Basin).

SS-61 is located within Drainage Area 12 (DA-012), as described in the *Draft Storm Water Pollution Prevention Plan* (SWPPP), prepared by CH_2M Hill and dated September 2003. Storm water flow in this 79-acre DA is generally to the southwest (Bhate, January 2005).

1.6 Groundwater

The predominance of the groundwater occurs as an unconfined aquifer in the unconsolidated deposits of the central basin, with the primary source of recharge as rainfall percolation and minor amounts of stream run-off along the western edge of the Sacramento Mountains. Surface water/rainfall migrates downward into the alluvial sediments at the edge of the shallow aquifer near the ranges, and flows downgradient through progressively finer-grained sediments towards the central basin. Because the Tularosa Basin is a closed system, water that enters the area only leaves either through evaporation or percolation. This elevated amount of percolation results in a fairly high water table. Beneath HAFB, groundwater ranges from 5 to 50 feet. Flow for the Base is generally towards the southwest with localized influences from the variations in the topography of the Base. Near the arroyos, groundwater flows directly toward the surface drainage feature.

At SS-61, the hydraulic gradient varies from approximately 0.0071 feet per foot (ft/ft) to 0.002 ft/ft. Localized groundwater flow is to the west-northwest (Figures 4 and 5), which is different than the general flow direction for HAFB. Groundwater was encountered at SS-61 during drilling activities conducted during the RI and Phase II RI at depths ranging from 11 to 30 feet bgs. Well completion logs from the RI and Phase II RI are included in Appendix C.

The New Mexico Water Quality Control Commission (NMWQCC) Regulations are published groundwater quality standards for aquifers with total dissolved solids (TDS) concentrations less than or equal to 10,000 milligrams per liter (mg/L) [20.6.2.3101 New Mexico Administrative Code (NMAC)]. TDS concentrations in samples collected in January 2005 from MW-01, MW-03, and MW-06 were above 10,000 mg/L; however, concentrations in samples collected from MW-04 and MW-08 had TDS concentrations below 10,000 mg/L. These samples were collected under the Feasibility Study Work Plan (Bhate, November 2003b).

1.7 Climate

As a whole, New Mexico has a mild, arid to semi-arid continental climate characterized by light precipitation totals, abundant sunshine, relatively low humidity, and relatively large annual and diurnal temperature range (Western Regional Climate Center (WRCC), 2003). The climate of the Central Closed Basins varies with elevation. The Base is found in the low areas and is characterized by warm temperatures and dry air. Daytime temperatures often exceed 100 degrees Fahrenheit (°F) in the summer months and are in the middle 50s in the winter. A preponderance of clear skies and relatively low humidity permits rapid night time cooling resulting in average diurnal temperature ranges of 25 to 35°F. Potential evapotranspiration, at 67 inches per year, significantly exceeds annual precipitation, usually less than 10 inches (Foster Wheeler/Radian, 1995). The very low rainfall amounts resulting in the arid conditions, which with the topographically induced wind patterns combining with the sparse vegetation, tend to cause localized "dust devils". Much of the precipitation falls during the mid-summer monsoonal period (July and August) as brief, yet frequent, intense thunderstorms culminating to 30 – 40% of the annual total rainfall.

1.8 Geology

The sedimentary rocks which make up the adjacent mountain ranges are between 500 and 250 million years old (White Sands Missile Range (WSMR), 2003). During the period when the area was submerged under the shallow intra-continental sea, the layers of limestone, shale, gypsum, and sandstone were deposited. In time, these layers were pushed upward through various tectonic forces forming a large bulge on the surface. Approximately 10 million years ago the center began to subside resulting in a vertical drop of thousands of feet leaving the edges still standing (the present day Sacramento and San Andreas mountain ranges). In the millions of years following, rainfall, snowmelt, and wind eroded the mountain sediments depositing them in the valley (i.e. Tularosa Basin). Water carrying eroded gypsum, gravel, and other matter continues to flow into the basin.

As the Tularosa Basin is a bolson, which is a basin with no surface drainage outlet, sediments carried by surface water into a closed basin are bolson deposits. The overlying alluvium generally consists of unconsolidated gravels, sands, and clays. Soils in the basin are derived from the adjacent ranges as erosional deposits of limestone, dolomite, and gypsum. A fining sequence from the ranges towards the basin's center characterizes the area with the near surface soils as alluvial, eolian, and lacustrine deposits. The alluvial fan deposits are laterally discontinuous units of interbedded sand, silt, and clay while the eolian deposits consist primarily of gypsum sands. The eolian and alluvial deposits are usually indistinguishable due to the reworking of the alluvial sediment by eolian processes. The playa, or lacustrine deposits, consist of clay containing gypsum and are contiguous with the alluvial fan and eolian deposits throughout HAFB. There has been the identification of stiff caliche layers, varying in thickness, at different areas of the Base. At the site, soils are predominantly silty sands and interbedded clays.

Based on review of boring logs from previous investigations, the SS-61 area is primarily underlain by silts, silty sands, silty clays, and clays with gypsum present. It should be noted that previous subsurface investigations conducted in the vicinity of SS-61 reported a caliche layer at depths ranging from approximately 11 to 13 feet below ground surface (bgs). Soil boring logs and well construction diagrams from the RI (Foster Wheeler, August 1999) and Phase II RI (Foster Wheeler, December 2000) are included in Appendix C.

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2 GROUNDWATER MONITORING ACTIVITIES

The objective of the groundwater monitoring activities at SS-61 is to fill data gaps identified by NMED in correspondence dated February 4, 2005 (Appendix A). Specifically, groundwater samples will be collected from selected wells on a semi-annual basis. The groundwater monitoring will be conducted in accordance with State of New Mexico requirements. Upon conclusion of the monitoring activities, a report will be developed in accordance with Section 3 of this Work Plan.

2.1 Groundwater Sampling

Eleven existing monitoring wells will be sampled under this Work Plan. These wells include MW-02, MW-03, MW-05, MW-06, MW-08, MW-09, MW-29-02, MW-29-04, MW-20-05, and MW-29-08 and are shown on Figure 5. Monitoring well MW-04 was not on the NMED list, but will be added to the monitoring program. The monitoring wells will be sampled twice per year for a period of 2 years. A total of 13 groundwater samples, including two field duplicate samples and a matrix spike/matrix spike duplicate (MS/MSD), will be submitted to the laboratory for analysis from each sampling event. All samples for VOC analysis will require a trip blank. The samples will be placed on ice and shipped under strict chain-of-custody to Associated Labs in Orange, California.

2.2 Groundwater Elevations

During the sampling of monitoring wells under this Work Plan, groundwater elevations will be measured. Elevations will be measured for those wells listed in Section 2.1, and also from monitoring wells MW-01, MW-07, MW-10, MW-12, MW-29-01, MW-29-03, MW-29-06, and MW-29-07.

2.3 Laboratory Analyses

Each groundwater sample (including the field duplicates) will be analyzed for their respective analytes in accordance with Table 2-1. Groundwater samples will be analyzed for VOCs by Environmental Protection Agency (EPA) Method 8260B, SVOCs by EPA Method 8270C, and RCRA metals (arsenic, barium, chromium, cadmium, lead, mercury, selenium, and silver) by EPA Method 6010B, with the exception of mercury which will be analyzed by EPA Method 7470A. Field filtration will be performed for the fraction of groundwater samples submitted for metals analysis.

Groundwater samples will additionally be analyzed for TDS by Method 160.1 and natural attenuation parameters (NAPs). Those parameters that are analyzed by the laboratory are also listed in Table 2-1.

Table 2-1. Sample Analytes and Methodologies

Parameters	Method
VOCs	EPA Method 8260B
SVOCs	EPA Method 8270C
RCRA Metals	EPA Methods 6010B/7470A
Total Dissolved Solids	EPA Method 160.1
Methane, ethene, and ethane	EPA Method RSK 175
Chloride	EPA Method 300.0
Total Organic Carbon (TOC)	EPA Method 9060
Alkalinity	EPA Method 310.1

Appendix D details the method detection limits by method for chemical constituents indicated for SS-61. Table 2-2 is a matrix indicating the analytical requirements for SS-61.

Table 2-2. Summary of Analytical Parameters for SS-61

Analytical Constituents	Water Samples
Volatile Organic Compounds EPA Method 8260B	15 samples (including 2 duplicates, 2 Trip blanks and 1 MS/MSD)
Semi-Volatile Organic Compounds EPA Method 8270C	13 samples (including 2 duplicates and 1 MS/MSD)
RCRA Metals EPA Methods 6010B and 7470A (mercury)	13 samples (including 2 duplicates and 1 MS/MSD)
Total Dissolved Solids EPA Method 160.1	13 samples (including 2 duplicates and 1 MS/MSD)
Methane, ethane, and ethane EPA Method RSK 175	12 samples (including 2 duplicates)
Chloride EPA Method 300.0	13 samples (including 2 duplicates and 1 MS/MSD)
Total Organic Carbon EPA Method 9060	13 samples (including 2 duplicates and 1 MS/MSD)
Alkalinity EPA Method 310.1	13 samples (including 2 duplicates and 1 MS/MSD)

2.4 Field Analyses

In addition to the laboratory analyses, some NAPs will be field analyzed. Along with pH, temperature, oxidation reduction potential (E_h), dissolved oxygen, and conductivity, the parameters listed in Table 2-3 will be measured and recorded.

Table 2-3. Field Parameters and Methodologies

Parameters	Method
Nitrate	HACH Method 8039
Ferrous Iron	HACH Method 8146
Total Iron	HACH Method 8008
Sulfate	HACH Method 8051

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3 GROUNDWATER MONITORING REPORT

A summary report of the work conducted under this Work Plan for SS-61 will be submitted that will summarize the field activities, sample analyses, and other pertinent information.

The report will present a discussion of field activities and summarize field measurements. Analytical data will be presented in discussion, table, and figure format. A potentiometric surface map indicating the direction of groundwater flow will also be included.

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4 HEALTH AND SAFETY REQUIREMENTS

Health and safety practices during the monitoring activities at SS-61 will adhere to the *Basewide Health and Safety Plan* (HASP) (Bhate, December 2003). It is anticipated that no greater than modified Level D personal protective equipment (PPE) will be required to complete the monitoring activities. This includes: Occupational Safety and Health Administration (OSHA) approved safety shoes, American National Standards Institute (ANSI) approved safety glasses (Z87.1) and hard hat (Z89.1-1997: Type I), sleeved shirt and long pants, and as required, hearing protection, leather work gloves, and/or nitrile gloves during sampling.

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5 DECONTAMINATION AND IDW MANAGEMENT

Investigation derived waste (IDW) generated by the activities of this monitoring program (Table 5-1) will be managed and characterized according to the following guidelines. Liquid wastes, such as decontamination rinses, are anticipated to be non-hazardous and as such, can be disposed of through the Base wastewater treatment facility. PPE and other site non-hazardous debris/waste shall be disposed in standard trash receptacles.

Table 5-1. Proposed Waste Streams for SS-61

Activity	Waste Stream	
	PPE	Water
Equipment Decontamination	X	X
Purged Groundwater	X	X

5.1 General Decontamination Procedures

All equipment, inclusive of small hand and sampling tools and downhole tooling will require decontamination. Small items can be decontaminated in five-gallon buckets and the like at the site (Bhate, November 2003a). The larger equipment will be decontaminated at the subcontractor staging area using high temperature – high pressure water cleaner and scrub brushes.

5.2 PPE

Prior to disposal, used PPE and other disposable items will be rinsed clean with tap water and diluted detergent solution. Cleaned PPE and presumed clean, based upon non-contact with contaminated soils, water or equipment, and other disposable clean items will be contained in trash bags and disposed of at the applicable receptacle.

5.3 Hazardous and Special Waste

There is not expected to be any hazardous or special waste generated during the completion of this project.

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6 QAPP ADDENDUM

The laboratory performing the groundwater sample analysis will follow the *Final Quality Assurance Project Plan* (QAPP) *Addendum* provided as Appendix D to this Work Plan.

6.1 Sample Identification

Each environmental sample will be identified on the sample label and chain-of-custody (COC) records, regardless of type. USACE duplicates will be paired with another random sample and will be blind samples. The duplicate samples will appear in sequence with the regular samples. The identifier nomenclature will adhere to the procedures and guidelines established in the *Basewide Quality Assurance Project Plan* (Bhate, November 2003a).

6.2 Standard Operating Procedures

Applicable Standard Operating Procedures (SOPs) for completing this sampling are located in Appendix A of the Basewide QAPP (Bhate, November 2003a).

6.3 Sample Documentation

Sample documentation, identification, and tracking will adhere to the prescribed methods found in the Basewide QAPP and/or its respective project specific addendum. All sampling activities will include documentation of significant activities, sampling activities, and sample identification information. At a minimum, field log books will be utilized to record dates and times, sampling protocols, project numbers, and sampler's name. Other pertinent information will include COC numbers and air-bill tracking number. COC forms will be completed and included with each sample shipment; one COC per cooler.

6.4 Data Reporting

Data obtained during the sample collection will be reported according to the Basewide QAPP and/or its respective project specific addendum. An Environmental Restoration Program Information Management System (ERPIMS) submittal is not required for this project.

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7 ORGANIZATION

During the monitoring activities at SS-61, Mr. John Hymer will serve as the Bhate Site Manager overseeing and directing all sampling activities. Mr. Hymer will also provide on-site management of any sub-contractor for the project. Mr. Frank Gardner is the Bhate Program Manager and will ensure required project documents, permits, contractual agreements and other program tasks are completed. Key project personnel and their responsibilities are listed in Table 7-1.

Table 7-1. Key Personnel and Responsibilities

Name	Project Title/ Assigned Role	Phone Numbers
Mr. John Hymer	Field Team Leader/SHSO	Work: (505) 679-2100
To Be Determined	Field Samplers	To Be Determined
Mr. John Hymer	First Aid Personnel (Note-all onsite personnel are required to be trained in CPR and first aid)	Work: (505) 679-2100
Other Project Personnel		
Mr. Frank Gardner, PG	Bhate Program Manager	Work: (970) 216-7819
Mr. Eric Lehnertz, CIH	Health and Safety Specialist	Work: (205) 918-4000
Mr. Michael D'Auben	Data Quality Control Analyst	Work: (205) 918-4000

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FIGURES