DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH FIGHTER WING (ACC)
HOLLOMAN AIR FORCE BASE, NEW MEXICO

OCT 3 2007

MEMORANDUM FOR NEW MEXICO ENVIRONMENT DEPARTMENT
Attn: Mr. James Bearzi
Hazardous Waste Bureau
2905 Rodeo Park Drive East
Santa Fe NM 87505-6303

FROM: 49 CES/CD
550 Tabosa Ave
Holloman AFB NM 88330-8458

Subject: Response to 14 Apr 06 Notice of Deficiency--RCRA Facility Investigation (RFI) for Chemical Agent Disposal Site (DP-64), Holloman Air Force Base, NM

1. The RCRA RFI Work Plan for Chemical Agent Disposal Site (DP-64), Holloman AFB, is hereby submitted for your review and approval.

2. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

3. If you have any questions, please contact Ms. Deborah Hartell or Mr. Will Desmare at 505-572-3931.

A. DAVID BUDAK
Deputy Base Civil Engineer

Attachment:
RCRA RFI Work Plan for Chemical Agent Disposal Site (DP-64)

cc (w/ Atchs):
Mr. David Strasser
Hazardous Waste Bureau
5500 San Antonio Dr. NE
Albuquerque, NM 87109

cc (w/o Atchs):
Mr. Cornelius Amindyas
Hazardous Waste Bureau
5500 San Antonio Drive NE
Albuquerque, NM 87109

cc (w/o Atchs):
Mr. Bob Sturdivant
USEPA, Region 6 (6PD-F)
1445 Ross Ave., Ste 12
Dallas, TX 75202-2733

7001 2510 0005 4337 4907

RCRA FACILITY INVESTIGATION (RFI) WORK PLAN CHEMICAL AGENT DISPOSAL SITE (DP-64) HOLLOMAN AIR FORCE BASE, NEW MEXICO

Subcontract No.: 5020S.01

Under Prime Contract No.: W9128F-04-D-0017

Bhate Project Number: 9070127 01.02

Prepared For:

U.S. Army Corps of Engineers
Omaha District
Omaha, Nebraska

Prepared By:

Bhate Environmental Associates, Inc.
1608 13th Avenue South, Suite 300
Birmingham, Alabama 35205

Under contract to:

North Wind, Inc.
1425 Higham Street
Idaho Falls, Idaho 83402

October 2007

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RCRA FACILITY INVESTIGATION (RFI) WORK PLAN CHEMICAL AGENT DISPOSAL SITE (DP-64) HOLLOMAN AIR FORCE BASE, NEW MEXICO

REVIEW SHEET

This Work Plan has been reviewed and approved by:

John Hymer Bhate Site Manager	Signature	Date
Katherine T. Thompson Bhate Field Team Leader/Geologist	Signature	Date
Doug Jorgensen NWI Project Manager	Signature	Date
Frank Gardner, P.G. Bhate Program Manager	Signature	Date

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RCRA FACILITY INVESTIGATION (RFI) WORK PLAN CHEMICAL AGENT DISPOSAL SITE (DP-64) HOLLOMAN AIR FORCE BASE, NEW MEXICO

TABLE OF CONTENTS

Tables

Figures

Appendixes

ACRONYMS AND ABBREVIATIONS

AAF	Army Air Field
AF Fm	Air Force Form
ANSI	American National Standards Institute
ASTM	American Standards for Testing and Materials
bgs	Below ground surface
Bhate	Bhate Environmental Associates, Inc.
BSOP	Bhate Standard Operating Procedure
CAIS	Chemical Agent Identification Set
CSS	Chemical Safety Submission
DOD	Department of Defense
DPT	Direct push technology
ERP	Environmental Restoration Program
°F	Degrees Fahrenheit
FID	Flame-ionization detector
FOC	Fractional Organic Carbon
ft	Feet
FWEC	Foster Wheeler Environmental Corporation
GPS	Global Positioning System
HAFB	Holloman Air Force Base
HASP	Health and Safety Plan
HSA	Hollow Stem Auger
NWI	North Wind, Inc.
OSHA	Occupational Safety and Health Administration
OVA	Organic vapor analyzer
P.G.	Professional Geologist
PID	Photo-ionization detector

ACRONYMS AND ABBREVIATIONS CONTINUED

PPE	Personal protective equipment
PVC	Polyvinyl chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QSM	Quality Systems Manual
RCRA	Resource Conservation and Recovery Act
RCWM	Recovered Chemical Warfare Material
RFI	RCRA Facility Investigation
SCH	Schedule
SOP	Standard Operating Procedure
SSFR	Site Specific Final Report
SSL	Soil Screening Level
SVOC	Semi-volatile organic compound
SWRI	Southwest Research Institute
TDS	Total dissolved solids
USACE	United States Corps of Engineers
USCS	Unified Soil Classification System
UTL	Upper Tolerance Limit
VOC	Volatile organic compound
WRCC	Western Regional Climate Center
WSMR	White Sands Missile Range
WWTP	Wastewater treatment plant
Zapata	Zapata Engineering, P.A.

1 INTRODUCTION

Bhate Environmental Associates, Inc. (Bhate), is working under Subcontract No. 5020S.01 to North Wind, Inc. (NWI), who has been retained by the U.S. Army Corps of Engineers (USACE), under contract W9128F-04-D-0017, to conduct a Resource Conservation and Recovery (RCRA) Facility Investigation (RFI) at the Chemical Agent Disposal Site (DP-64) at Holloman Air Force Base (HAFB), New Mexico. The RFI includes tasks as outlined in the USACE Scope of Services dated October 25, 2006. This document is to provide a work plan that will serve as the primary working document for the field activities at DP-64.

The RFI Work Plan provides the relevant site specific information and requirements as outlined in the Scope of Services for remedial activities at DP-64. The primary objective of this RFI is to characterize the quantity, concentration, and extent of contamination, if any, and to determine if there is any threat to human health and environment using the Triad approach. During this process, required data will be collected to support the closure of the site based on guidance from the New Mexico Environment Department (NMED). The ultimate objective is to achieve No Further Action (NFA) approval for site closure from NMED.

This document has been written to outline the procedures by which the RFI will be completed in order to provide relevant information on the geologic, hydrologic, and other environmental conditions for HAFB and DP-64. Information is provided for HAFB and its surrounding environment as well as DP-64. This RFI Work Plan includes the process by which soil and groundwater sampling activities are to be conducted.

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 1-1). 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.

The DP-64 site is located in the northeastern portion of HAFB on the north side and adjacent to the former Main Base Landfill (LF-01) (Figure 1-2). The total area of the DP-64 site is approximately 5.5 acres (Figure 1-3).

1.2 Physiography

HAFB is located within the Sacramento Mountains Physiographic Province on the western edge of the Sacramento Mountains. HAFB is approximately 59,600 acres in area, and is located at a mean elevation of 4,093 feet above mean sea level. 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. The Base is located in the Tularosa Sub-basin which is part of the Central Closed Basins. The San Andres 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.

The ground surface at DP-64 consists of gently rolling terrain with some desert vegetation.

1.3 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).

There are no apparent surface water features at DP-64.

1.4 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.

The approximate depth to the water table at DP-64 has not been clearly defined, however, the water table at LF-01, located adjacent to the south of DP-64 is reported at approximately 31.5 feet below ground surface (ft bgs) with groundwater flow direction to the southwest.

1.5 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. 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.

1.6 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 Andres 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.

According to the *Final Site Specific Final Report (SSFR) for Ordnance and Explosive Removal Action,* prepared by Zapata Engineering in June 2005, the DP-64 area consists of well-drained soils and exposed gypsum. The SSFR indicates that the soil has a light brown surface layer of very fine sandy loam from one to 13 inches bgs and white gypsum mixed with brown or pink sandy loam underlies surface soils to a depth greater than 60 inches bgs.

2 HISTORICAL DATA REVIEW

On February 9, 2000, several broken vials and two intact vials filled with a clear to yellowish liquid were discovered by a pedestrian walking north of the closed Main Base Landfill (LF-01) site. During a re-vegetation project at the LF-01 site, the topsoil associated with the landfill had been turned and the pedestrian reported their findings to the 49th Environmental Flight. The 49th Environmental Flight in conjunction with Foster Wheeler Environmental Corporation (FWEC) responded by locating, recovering, and transporting the two intact vials to a laboratory at Brooks AFB, Texas, which was later transferred to the Southwest Research Institute (SWRI) for analysis. The vials were analyzed for chemical warfare agents and three industrial chemical agents. The results of the analyses indicated one vial contained 5 percent distilled mustard (HD) in chloroform and the second vial contained 5 percent Lewisite in chloroform (Zapata Engineering, P.A. [Zapata], June 2005). In addition to the ampoules, three burn areas, remnants of incendiary devices (M69X or M74), and broken glass ampoules were identified across the site during their surface clearance and debris removal activities.

FWEC prepared the Chemical Safety Submission (CSS) for the USACE in October 2003, which was then supplemented by the *Ordnance and Explosive Recovered Chemical Warfare Material Removal Action Work Plan* in April 2004 and the SSFR submitted in June 2005 by Zapata.

The Final SSFR field activities included a detailed search of the surface area of DP-64 and subsurface excavations associated with 123 anomalies. These anomalies were investigated based on the results of the Geophysical Prove Out using an electromagnetic system, magnetometer system, electromagnetic ground conductivity system, and a ground penetrating radar system. Detailed procedures and results were provided in Appendix D of the Final SSFR (Zapata, 2005). Zapata collected soil samples from the excavation site and from two areas where Recovered Chemical Warfare Material (RCWM) was found during the investigation of the surface area. These samples were analyzed for chemical agents. During these activities, Zapata removed all surface debris encountered, which included scrap metal, blasting caps, smoke pot components, and M69 incendiary bomb components. According to the Final SSFR, a total of 15 chemical agent identification set (CAIS) kit components were recovered, packaged, and stored. CAISs were used by military personnel to identify chemical agents. During the 1950s, the Chemical Test Squadron at Edgewood Maryland flew missions to HAFB. However, no documentation has been found to indicate that testing or disposal of any testing items occurred at DP-64.

In a Notice of Deficiency Letter, provided by the NMED, dated April 14, 2006, the NMED, in part, requested additional sampling to be conducted at DP-64. NMED has requested additional soil sampling at five anomalies (104, 105, 109, 112, and 137) associated with previous "burn pit" locations (Figures, tables, and dig sheets from the SSFR are provided in Appendix A of this Work Plan). The NMED is requiring one soil sample from the bottom of the "burn pits" and analysis of the soils for Resource Conservation and Recovery Action (RCRA) metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and explosives.

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3 INVESTIGATION ACTIVITIES

There are five areas of concern (Anomalies 104, 105, 109, 112, and 137) located at DP-64 which require further investigation. These locations were identified during the field activities as described in the Final SSFR submitted by Zapata in June 2005. These anomalies were described as burn pits and debris locations, all detected within two feet of the surface. According to the Final SSFR, all chemical agents were removed from the site.

Work conducted under this RFI Work Plan will be conducted in a TRIAD-like approach. This TRIAD-like approach will utilize dynamic work strategies in order to determine the vertical and horizontal extent of contamination. These strategies include rapid turns on laboratory analytical data and on-site determination of additional soil boring and/or monitoring well locations. This approach is beneficial due to an accelerated site investigation with only one large-scale mobilization. A flow chart for the TRIAD RFI Dynamic Decision Logic is provided as Figure 3-1. All field activities, including soil boring/monitoring well installation, groundwater sampling, and surveying, are to be completed within three weeks.

The first phase of field activities is to collect soil samples, including surface samples to a maximum depth of 2 ft bgs and subsurface samples to a maximum depth of 50 feet, in the five areas of concern shown on Figure 3-2 (Anomalies 104, 105, 109, 112, and 137). In addition, one geotechnical sample will be collected in order to conduct a Risk-Based Evaluation for ecological and human health. Once this has been completed, if results from the soil samples do not indicate concentrations above the reporting limit, additional sampling will not be conducted and the RFI Report will be prepared. However, if soil sampling results indicate concentrations greater than the reporting limit, additional borings will be installed for further delineation. Upon receipt of the additional soil sampling, locations for groundwater monitoring wells will be determined on-site and sampled for the appropriate analytes.

Field activities for DP-64 have been designed as a TRIAD-like approach as outlined in Figure 3-1. The following list of activities may be performed.

- Advance 5 soil borings (1 from each area) from the 5 areas of concern (anomalies 104, 105, 109, 112, and 137) to determine the presence of contamination, if any (Figure 3-3)
- Collect 3 soil samples from each boring including one surface soil sample (0 to 2 feet bgs) and two subsurface samples with the highest headspace reading from each boring
- Analyze the soil samples for VOCs, SVOCs, RCRA metals, and explosives
- Advance additional soil borings (up to 5 borings) based on the initial soil boring analytical results
- Analyze the additional soil samples for VOCs, SVOCs, RCRA metals, and explosives

- Install groundwater monitoring wells (up to 5 monitoring wells) in locations determined on-site based on the soil analytical data
- Install one deep monitoring well nested with one of the monitoring wells in order to determine the vertical extent of contamination in the area with the highest contamination
- Collect one groundwater sample from each monitoring well (including the deep well and well LF01-1W1) and sample for the appropriate analytes (including total dissolved solids [TDS])
- A geotechnical sample will be collected for dry bulk density, fractional organic carbon (FOC), moisture content, and specific gravity
- Perform physical survey of surface soil sample locations and monitoring wells with survey grade Global Positioning System (GPS)

3.1 Pre-Sampling Activities

Prior to the initiation of any sampling activities, Air Force Form (AF Fm) 332 and utility clearance permitting will need to be completed.

3.1.1 AF Form 332

Prior to initiating field activities at the site, a completed and approved AF Fm 332 will be obtained. This form authorizes construction or other work at HAFB and is required for the initiation of any such work. This work order describes what activities will take place at the location.

3.1.2 Dig Permit/Utility Clearances

Prior to the submittal of the dig permit (AF Fm 103), the area of investigation will be clearly delineated with marker flags, stakes, or paint, as appropriate. Utility clearance approvals will be completed by the appropriate HAFB utility office (e.g., telephone, sewer, water, natural gas etc.). Upon receipt of the approved dig permit (AF Form 103) with the utility clearances, the Bhate Site Manager or other authorized project personnel will complete a site walk-through confirming the dig permit authorizations and make any required changes.

3.1.3 Pre-Drilling Screening Activities

Prior to any drilling activities, the surface soil at the soil boring locations and monitoring well locations will be screened for ordnance and munitions as a precautionary measure due to the historical nature of the site. The surface soils will be visually checked for debris, followed by the use of a magnetometer in order to detect any metal debris which may not be visually apparent. If any anomalies are detected, the soil borings/monitoring well location will be shifted

to avoid this area. No other screening process for ordnance/munitions will be conducted during this investigation as the site should be cleared based on the SSFR.

3.2 Soil Assessment

The field work for the RFI will be conducted in accordance with HAFB Standard Operating Procedures (SOPs) provided in the *Basewide Quality Assurance Project Plan* (QAPP) (Bhate, November 2003). These SOPs outline methodologies for soil boring advancement, soil sampling, soil sample description, field screening, sample management, equipment decontamination, and chain-of-custody procedures.

A maximum of 10 soil borings will be advanced at the site to the depth where groundwater is encountered using conventional hollow stem auger (HSA) techniques with a 2-foot stainless steel split spoon sampler. Continuous soil samples will be collected from these borings with lithologic descriptions per HAFB SOP No. 7. A maximum of 37 soil samples, including up to three field duplicate samples and four matrix spike (MS)/matrix spike duplicates (MSD), may be submitted to the laboratory for analysis of VOCs (Method 8260B), SVOCs (Method 8370C), RCRA metals (Method 6010B/7471A), and explosives (Method 8330A). The samples will be placed on ice and shipped under strict chain-of-custody to the laboratory for a 24-hour turn around time. In addition, one geotechnical sample will be collected from the most upgradient soil boring above groundwater. This sample will be analyzed for moisture content by Method 160.3M, specific gravity by American Society for Testing and Materials (ASTM) Method D1429, fractional organic carbon by ASTM Method 2974, and dry bulk density by ASTM Method D2937.

Soils collected from above the water table will be field screened in accordance with HAFB SOP No. 6 using an organic vapor analyzer (OVA) to perform soil-headspace screening techniques. Notation will also be made of any visual (discoloration) and/or aromatic indicative of potential contamination.

Based on headspace screening results, two soil samples from each soil boring with the highest OVA readings and one surface sample (0 to 2 feet, bgs) will be selected for laboratory analyses. Should the screening not identify one or more intervals in which to select, then the lower most interval at the soil-water interface and a mid-range shall be retained for laboratory analysis.

3.3 Groundwater Assessment

3.3.1 Monitoring Well Installation and Development

Six permanent monitoring wells (including one deep well) may be installed at DP-64 based on information obtained from the soil laboratory analytical results discussed in the previous section. The location of these wells will be determined in the field, upon receipt of the soil laboratory analytical results (within 72 hours). These wells will be advanced using HSA drilling technology. The monitoring wells will be constructed of 2-inch Schedule (SCH) 40 polyvinyl chloride (PVC) casing and screen with a slot opening of 0.10 inch in accordance with the Bhate

Standard Operating Procedure (BSOP) No. 10. The wells will be located and elevations taken using GPS.

The deep well will be nested with one of the Type II groundwater monitoring wells. This well will be located in the area with the highest soil concentration in order to determine the vertical extent of contamination.

A geologist or engineer will log each borehole. Each boring will be visually classified and lithologically described in the field according to HAFB SOP No. 7 and the Unified Soil Classification System (USCS) (ASTM D 2487-92 and ASTM D 2488-90). Based upon the adjacent Environmental Restoration Program (ERP) site LF-01 groundwater levels (11.05 to 31.39 feet bgs), the monitoring wells will be installed to a maximum depth of approximately 50 ft bgs. Each monitoring well will be completed with 10 feet of 2-inch diameter 0.010 or 0.020 inch slotted PVC screen. The remaining borehole casing will be comprised of flush threaded 2-inch PVC casing. The annular space surrounding the screen will be backfilled with 10/20 silica sand capped with at least 2 feet of bentonite pellets. The bentonite pellets will be hydrated prior to backfilling the remaining annular space with neat cement. The surface completion will consist either of a lockable and tamper proof 8-inch diameter steel cover or a flush mount well completion with a concrete pad (3 feet square). The deep well will be installed inside the same boring as one of the monitoring wells. This well will be completed with 5 feet of screen at a maximum depth of 80 feet bgs.

The completed wells will be developed to remove fine particulate and improve hydraulic communication with the surrounding saturated material. Well development will begin no sooner than 48 hours after grouting. Monitoring well development will take place by over-pumping each well until at least five well volumes have been removed, and the turbidity, pH, specific conductivity, and temperature have stabilized by +/- 10 percent for a least 3 consecutive readings.

3.3.2 Groundwater Sampling

Groundwater samples will be collected from the six newly installed wells, as well as existing monitoring well 1W1, associated with the adjacent ERP site LF-01. One field duplicate and a matrix spike/matrix spike duplicate (MS/MSD) will be collected along with the samples and submitted to the laboratory for analysis. The samples will be placed on ice and shipped under strict chain-of-custody to the laboratory.

Groundwater samples will be collected using the low-flow sampling techniques with the use of either a peristaltic or submersible pump and polyethylene tubing. The tubing will be placed at mid-screen and purged until field parameters are stabilized. The samples will be collected from mid-screen and analyzed for: VOCs (EPA Method 8260B), SVOCs (EPA Method 8370C), RCRA metals (EPA Method 6010B/7470A), explosives (EPA Method 8330A SW846), and TDS (EPA Method 160.1).

3.4 Laboratory Analysis

During this investigation, a maximum of 37 soil samples (including the field duplicates and MS/MSD) and a maximum of 10 groundwater samples (including the field duplicate and MS/MSD) will be analyzed for VOCs by Method 8260B, SVOCs by Method 8270C, RCRA metals by Method 6010B/7471A (soil)/7470A (groundwater), explosives by Method 8330A SW846, and TDS (groundwater only) by Method 160.1. Each soil and groundwater sample, including the quality control samples, will be analyzed for their respective analytes in accordance with Table 3-1.

Soil samples will be submitted to the laboratory for a 24-hour turn around time to accelerate field activities in order to complete the installation of all soil borings and monitoring wells, if applicable, within one mobilization.

Appendix B details the method detection limits by method for chemical constituents indicated for DP-64.

3.5 Surveying

The five permanent monitoring well locations will be surveyed in accordance with methods described in the Basewide QAPP (Bhate, November 2003). Horizontal locations will be relative to the State Plane Coordinate System, New Mexico Central and surveyed to an accuracy of +/- 1.0 ft. Vertical elevations will be referenced to North American Datum (NAD) 1983. The top of casing (vertical control) will be used to determine the depth and elevation of the groundwater and surveyed to an accuracy of +/-0.01 ft. All DP-64 site maps will include a coordinate system (e.g., latitude/longitude) with the site and pertinent features.

3.6 Groundwater Elevations

During the sampling of monitoring wells under this Work Plan, groundwater elevations will be measured. The water level in each well will be gauged to the nearest 0.01 feet using an electronic water level indicator prior to sampling. The depth to water information will be used to prepare a water table contour map and calculate the volume of water to be purged from the well prior to sample collection. Elevations will be measured for each of the five new wells (DP64-MW01, -MW02, -MW03, -MW04, and DMW01) and the existing well from LF-01 (1W1). A potentiometric surface map of DP-64 (including well 1W1 from LF-01) will be developed from the groundwater elevation data collected during this investigation.

3.7 Site Restoration

Upon completion of monitoring well installation, the well locations will be restored to the grading of the surrounding area. Drilling equipment and debris will be removed. The site will be canvassed for trash, debris, etc. Final grade for the wells will allow for positive drainage in accordance with the surrounding area.

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4 RISK BASED CLEAN-UP APPROACH

The objective of this investigation is to determine the presence and quantity of contamination and to determine if there is any threat to human health and the environment. The results from the soil and groundwater sampling activities at the site will be evaluated to determine whether further investigation activities are warranted or if there is an acceptable risk given possible exposure at the site. If the completed Risk-Based Evaluation indicates an acceptable risk, then no further investigation activities will be required and the site can be considered for closure with no further action.

4.1 Evaluation of VOCs and SVOCs

For any VOCs or SVOCs that are detected in soil, the concentration will be evaluated against the Soil Screening Levels (SSLs) provided in Appendix A of the revised NMED guidance document *Technical Background Document for Development of Soil Screening Levels, Revision 4.0*, June 2006 (NMED, 2006). The laboratory data for each collected soil sample will be compared to these SSLs.

For VOCs and SVOCs detected in groundwater, the results will be compared to the New Mexico Water Quality Control Commission (NMWQCC) published groundwater quality standards. The NMWQCC are standards for aquifers with TDS concentrations less than or equal to 10,000 milligrams per liter (mg/L) [20.6.2.3101 New Mexico Administrative Code (NMAC)]. The TDS concentration is a direct measure of the presence of total ions in the aquifer and is one of the primary criteria for classifying the aquifer based on its use as a potential drinking water source. Under the NMWQCC regulations, if TDS in groundwater is more than 10,000 mg/L, the aquifer is classified as non-potable and results will be compared to the EPA maximum contaminant levels (MCLs).

4.2 Evaluation of Metals

Metals detected in soil will be evaluated against the current NMED residential risk-based soil screening levels (NMED, 2006). Groundwater metals concentrations will be compared to the NMWQCC standards.

4.3 Evaluation of Explosives

For any explosives that are detected in soil, the concentration will be evaluated against the screening levels provided in Appendix A of the revised NMED guidance document *Technical Background Document for Development of Soil Screening Levels, Revision 4.0*, June 2006 (NMED, 2006). The laboratory data for each collected soil sample will be compared to these SSLs.

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5 INVESTIGATION DERIVED WASTE MANAGEMENT

Investigation derived waste (IDW) will be managed and characterized according to HAFB SOP No. 9. Whenever possible, waste minimization techniques will be used to reduce the amount of IDW. IDW generated by advancing soil borings, installing the new monitoring wells, and subsequent groundwater sampling activities will be managed and characterized according to the following guidelines. All soil cuttings will be placed in appropriate 55-gallon steel drums and screened with an OVA for the presence of organic vapors. Results from the soil sampling analysis will determine whether the soil can be spread on the ground surrounding the well or if it will need to be placed in the FT-31 Landfarm at HAFB. Purged groundwater will be containerized and maintained by HAFB until disposal, pending laboratory analysis. Other liquid wastes, such as decontamination rinses, are anticipated to be non-hazardous and as such, can be disposed of through the HAFB wastewater treatment plant (WWTP). Personal protective equipment (PPE) and other site non-hazardous debris/waste shall be disposed in standard trash receptacle.

5.1 General Decontamination Procedures

All equipment, both small hand tools and large machinery (such as augers, etc.) will require some level of decontamination dependant upon its contact with the contaminated subsurface. Small hand tools can be decontaminated in five-gallon buckets at the site in accordance with the *Bhate Standard Operating Procedures* (Bhate, 2002) and the Basewide QAPP (Bhate, November 2003).

5.2 Personal Protective Equipment

Prior to disposal, used PPE, disposable items, and the decontamination pad liner 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.

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6 PROJECT QUALITY ASSURANCE

The laboratory performing the chemical sample analysis will follow the *Basewide Quality Assurance Project Plan* (Bhate, November 2003) and the Quality Assurance Project Plan Addendum (Appendix B of this Work Plan).

6.1 Standard Operating Procedures

Applicable HAFB SOPs for completing this investigation are located in Appendix A of the *Basewide QAPP* (Bhate, November 2003).

6.2 Sample Identification

Each environmental sample collected will be identified on the sample label and chain-of-custody records. Table 3-1 provides the sample collection information inclusive of the quantity for the soil and groundwater samples that will be collected during this investigation. Sample documentation, handling, and shipping will be in accordance with HAFB SOP No. 1. The field duplicate samples will appear in sequence with the regular samples.

An example of the sample identification nomenclature for groundwater samples collected from monitoring wells will be as follows:

DP64-MW01-a

Site alpha-numeric identifier: DP64 = Chemical Agent Disposal Site

Sample type identifier: MW = monitoring well

Monitoring well number: 01, 02, etc.

Reserved for quality assurance (QA) sample identifiers: a = field duplicate, TB = trip blank, MS = matrix spike, MSD = matrix spike duplicate

6.3 Project Documentation

The following subsections present the procedures for documenting information that will be collected in the field during this investigation.

6.3.1 Sample Documentation

Sample documentation, identification, and tracking will adhere to the prescribed methods found in the *Basewide QAPP*. All sampling activities will include documentation of significant activities, potential environmental influences during sampling, field variances, and sample identification information. At a minimum, field logbooks will be utilized to record dates and times, sampling protocols, project numbers, and sampler's name. Daily Quality Assurance Reports will be completed and submitted weekly to the HAFB Project Manager. Other pertinent information will include chain-of-custody numbers and air-bill tracking number. Chain-of-

custody forms will be completed and included with each sample shipment; one chain-of-custody per cooler.

At a minimum, the following sample collection information will be logged in the field book:

- Date and time
- Sample identification number
- Project number
- Sampler name
- Preservative (if any)
- Analysis
- Map or schematic of sampling location

If a map of sampling locations is not available prior to sampling, a drawing of the site will be sketched on the left page of the field logbook to provide an illustration of all sampling points. Measured distances from sampling points to a fixed reference point will be recorded.

6.3.2 Field Logbook

Personnel will use only bound field logbooks for the maintenance of field records. The Project Manager will ensure that all field notes can be efficiently traced, filed, and retrieved. All entries will be recorded in indelible, waterproof ink. If errors are made, corrections will be made by crossing a single line through the error, correcting the information, and initialing and dating the correction. Entries will be made in the following format:

Documentation and reporting of events and activities will be made in chronological order on the right page of an open logbook. All entries will be dated and time of entry recorded. At the beginning of each day, the first two entries will be "personnel/contractors on site" and "weather". At the end of each day's entry, the personnel will draw a diagonal line originating from the bottom left corner of the page to the conclusion of the entry and sign along the line indicating the conclusion of the entry or the day's activity. Once completed, the field logbooks become accountable documents and will be maintained as part of the project files.

The following general requirements apply to field logbooks:

- The left page of the logbook will be used for auxiliary reporting such as sketches, tables, etc.
- The date will be recorded at the top of every page in the left-hand corner of the right page.
- The time of entry recordings will be in columnar form down the left-hand side of the right page.

6.3.3 Field Analytical Data

The field analytical data collected at the site will include the field screening readings for selection of PPE, as well as field screening for headspace analysis. The breathing zone of the

site will be screened for VOCs in the field at the time of sample collection utilizing an OVA. If a high humidity condition exists at the time of sample collecting, a flame ionization detector (FID) is recommended since a photo-ionization detector (PID) is not a completely reliable screening instrument under these conditions. The field screening data will be recorded in the field logbook.

6.3.4 Data Reporting

Soil and groundwater data obtained during this investigation will be reported according to the *Basewide QAPP* (Bhate, November 2003). In accordance with Department of Defense (DOD) Quality Systems Manual (QSM) version 3, the investigative data is classified as definitive data. The data will be generated using rigorous, analyte-specific analytical methods where analyte identifiers and quantitations are confirmed and Quality Assurance/Quality Control (QA/QC) requirements have been satisfied. For this project, regular, field duplicate, and MS/MSD samples are to be collected concurrently. The data will meet the objectives of the project for level of accuracy and precision required, intended use of the data, analytical methods, time constraints, and allowable decision errors. Sampling results will be tabulated and summarized in the RFI Report for the site.

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7 HEALTH AND SAFETY REQUIREMENTS

Project Health and Safety practices will adhere to the *Basewide Health and Safety Plan* (HASP) (Bhate, December 2003) and the Site Specific Addendum to the *Basewide HASP*, as included in Appendix B of this Work Plan, for the field investigation activities at DP-64. All work will be conducted in accordance with the USACE *Safety and Health Requirements Manual, EM 385-1-1,* 3 November 2003. It is anticipated that no greater than modified level D PPE will be required to complete the site inspection and sampling 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.

Site security is part of safety at the site for the investigation. Items of concern include the proper designation and demarcation of the investigation boundaries (i.e., Support Zone, Contaminant Reduction Zone, and Exclusion Zone) as appropriate. Likewise, compliance with any intrusive work requirements, posting of potential hazards, and control of un-authorized site personnel will be completed. This is discussed in the *Basewide HASP*.

At a minimum, the site will be secured with caution tape surrounding the perimeter of the site delineating the outer boundary of the Support Zone. This is essential in the utility clearance process and it serves as the demarcation of the site for both project and non-project persons. A Contaminant Reduction Zone and/or Exclusion Zone will be established as guided by the HASP and site prevailing conditions.

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8 ORGANIZATION AND SCHEDULE

During the field activities at DP-64, Mr. Doug Jorgensen from NWI and Ms. Katherine Thompson from Bhate will serve as the Project Manager and the Field Team Leader, respectively, overseeing and directing all investigation sampling activities. Ms. Thompson will also provide on-site management of any sub-contractors 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 8-1. A project schedule is provided as Figure 8-1.

Mr. Doug Jorgensen and Ms. Katherine Thompson will be on-site during field activities. All decisions regarding placement of soil borings and monitoring wells will be determined by the key personnel listed in Table 8-1.

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9 REFERENCES

Bhate Environmental Associates, Inc. August 2002. *Bhate Standard Operating Procedures.*

Bhate Environmental Associates, Inc. December 2003. *Basewide Health and Safety Plan.* Holloman Air Force Base, New Mexico.

Bhate Environmental Associates, Inc. November 2003. *Basewide Quality Assurance Project Plan.* Holloman Air Force Base, New Mexico.

DOD Environmental Data Quality WorkGroup. January 2006. *QSM for Environmental Laboratories Final Version 3.*

New Mexico Environment Department. June 2006. Soil Screening Levels Revision 4.0.

Western Regional Climate Center. 2003. Desert Research Institute State Narrative Web Page, http://www.wrcc.dri.edu/narratives/NEWMEXICO.htm.

White Sands Missile Range. 2003. Public Affairs Office, Site Informational Web Page, http://www.wsmr.army.mil/paopage/Pages/WU%2360.htm.

Zapata Engineering, P.A. April 2004. *Ordnance and Explosive Recovered Chemical Warfare Material Removal Action Final Work Plan.* Holloman Air Force Base, New Mexico.

Zapata Engineering, P.A. June 2005. *Final Site Specific Final Report for Ordnance and Explosive Removal Action.* Holloman Air Force Base, New Mexico.

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TABLES

Table 3-1
Soil and Groundwater Sampling and Analysis
Chemical Agent Disposal Site (DP-64)
RCRA Facility Investigation Work Plan
Holloman AFB, NM
Bhate Project No.: 9070127

Target Areas of Concern	Identification Number	Media	Analysis	Number of Field Samples
104	DP64-SB04	Soil	VOCs by EPA Method 8260B SVOCs by EPA Method 8270C RCRA Metals by EPA Method 6010B/7471A Explosives by EPA Method 8330A	3
	To Be Determined			3
	DP64-MW01	Groundwater	VOCs by EPA Method 8260B SVOCs by EPA Method 8270C RCRA Metals by EPA Method 6010B/7470A Explosives by EPA Method 8330A TDS by EPA Method 160.1	1
105	DP64-SB05	Soil	VOCs by EPA Method 8260B SVOCs by EPA Method 8270C RCRA Metals by EPA Method 6010B/7471A Explosives by EPA Method 8330A	3
	To Be Determined			3
	DP64-MW02	Groundwater	VOCs by EPA Method 8260B SVOCs by EPA Method 8270C RCRA Metals by EPA Method 6010B/7470A Explosives by EPA Method 8330A TDS by EPA Method 160.1	1
109	DP64-SB08	Soil	VOCs by EPA Method 8260B SVOCs by EPA Method 8270C RCRA Metals by EPA Method 6010B/7471A Explosives by EPA Method 8330A	3
	To Be Determined			3
	DP64-MW03	Groundwater	VOCs by EPA Method 8260B SVOCs by EPA Method 8270C RCRA Metals by EPA Method 6010B/7470A Explosives by EPA Method 8330A TDS by EPA Method 160.1	1
112	DP64-SB06	Soil	VOCs by EPA Method 8260B SVOCs by EPA Method 8270C RCRA Metals by EPA Method 6010B/7471A Explosives by EPA Method 8330A	3
	To Be Determined			3
	DP64-MW04	Groundwater	VOCs by EPA Method 8260B SVOCs by EPA Method 8270C RCRA Metals by EPA Method 6010B/7470A Explosives by EPA Method 8330A TDS by EPA Method 160.1	1
137	DP64-SB07	Soil	VOCs by EPA Method 8260B SVOCs by EPA Method 8270C RCRA Metals by EPA Method 6010B/7471A Explosives by EPA Method 8330A	3
	To Be Determined			3
	DP64-MW05	Groundwater	VOCs by EPA Method 8260B SVOCs by EPA Method 8270C RCRA Metals by EPA Method 6010B/7470A Explosives by EPA Method 8330A TDS by EPA Method 160.1	1
To Be Determined	To Be Determined	Soil (Geotechnical Sample)	Moisture Content by Method 160.3M Specific Gravity by Method ASTM D1429 Fractional Organic Carbon by Method ASTM 2974 Dry Bulk Density by Method ASTM D2937	1
Not Determined	DP64-DMW01	Groundwater	VOCs by EPA Method 8260B SVOCs by EPA Method 8270C RCRA Metals by EPA Method 6010B/7470A Explosives by EPA Method 8330A TDS by EPA Method 160.1	1
Field Duplicate		NA	VOCs by EPA Method 8260B SVOCs by EPA Method 8270C RCRA Metals by EPA Method 6010B/7471A/7470A Explosives by EPA Method 8330A TDS by EPA Method 160.1 (groundwater only)	A minimum of one or one per 10 samples collected
MS/MSD		NA	VOCs by EPA Method 8260B SVOCs by EPA Method 8270C RCRA Metals by EPA Method 6010B/7471A/7470A Explosives by EPA Method 8330A TDS by EPA Method 160.1 (groundwater only)	A minimum of one or one per 20 samples collected
Trip Blank		NA	VOCs by EPA Method 8260B	1 per cooler

Notes:
SB = Soil boring
MW = Monitoring well
DMW = Deep monitoring well
MS/MSD = Matrix Spike/Matrix Spike Duplicate
VOCs = Volatile organic compounds
SVOCs = Semi-volatile organic compounds
EPA = Environmental Protection Agency
RCRA = Resource Conservation and Recovery Act
TDS = Total Dissolved Solids
ASTM = American Society for Testing and Materials
NA = Not Applicable

Table 8-1

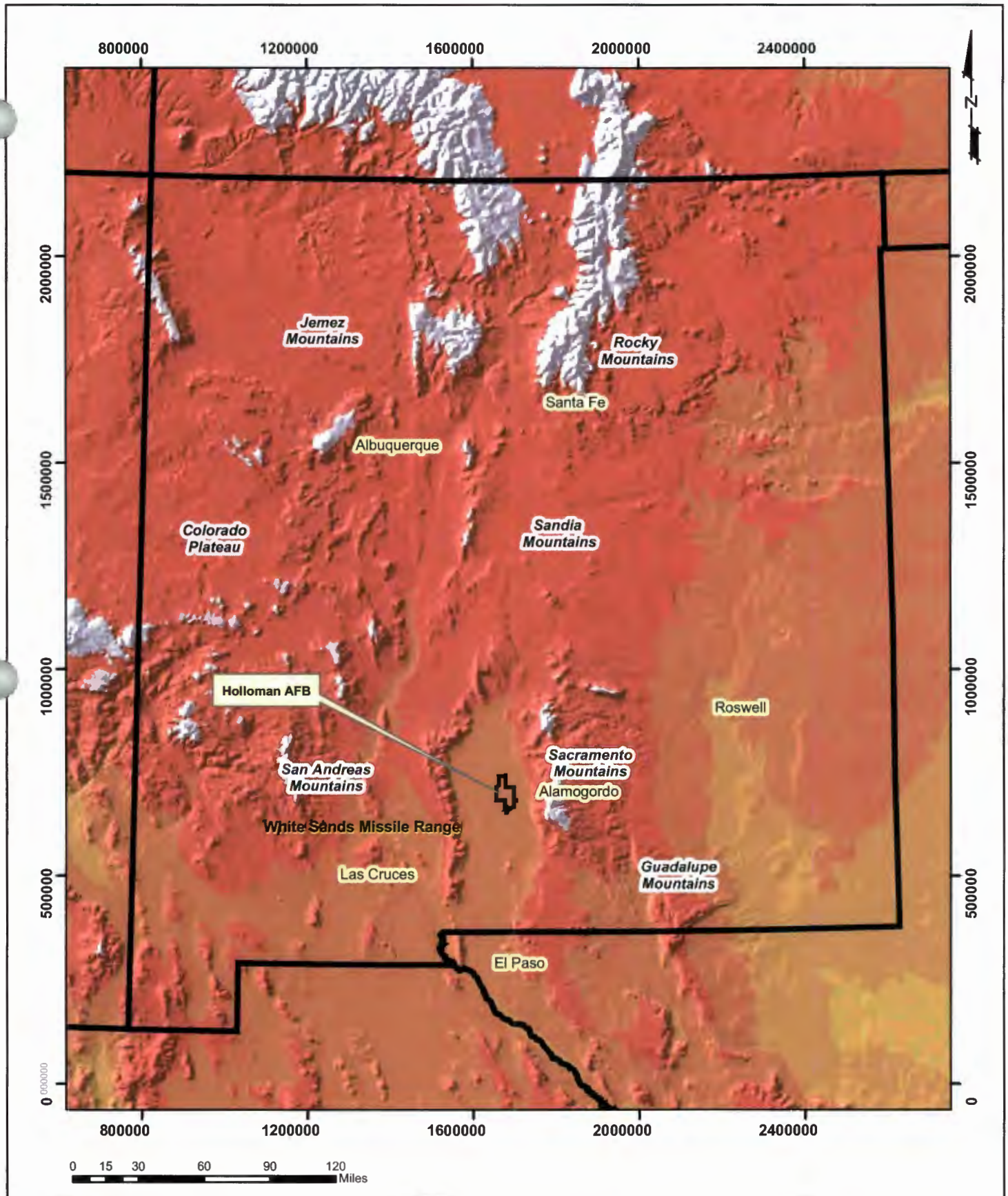
Key Personnel and Responsibilities

Chemical Agent Disposal Site (DP-64)
RCRA Facility Investigation Work Plan
Holloman AFB, New Mexico
Bhate Project No. 9070127

Name	Project Title/Assigned Role	Phone Numbers
Mr. John Hymer	Bhate Site Manager	Work: (505) 491-9171
Ms. Katherine Thompson	Bhate Field Team Leader/SSHO/Geologist	Work: (205) 918-4000
Mr. Mike D'Auben	Bhate Chemist	Work: (205) 918-4000
Ms. Marcia Olive	Bhate Chemist	Work: (303) 386-6454
Mr. Frank Gardner, P.G.	Bhate Program Manager	Work: (303) 386-6454
Mr. Doug Jorgensen	NWI Project Manager	Work: (208) 520-1097
Mr. Brian Muller, CIH, CHMM	Bhate Health and Safety Specialist	Work: (205) 918-4000

Notes:
RCRA = Resource Conservation and Recovery Act
SSHO = Site Safety and Health Officer
CIH = Certified Industrial Hygienist
CHMM = Certified Hazardous Materials Manager
P.G. = Professional Geologist
NWI = North Wind, Inc.

FIGURES



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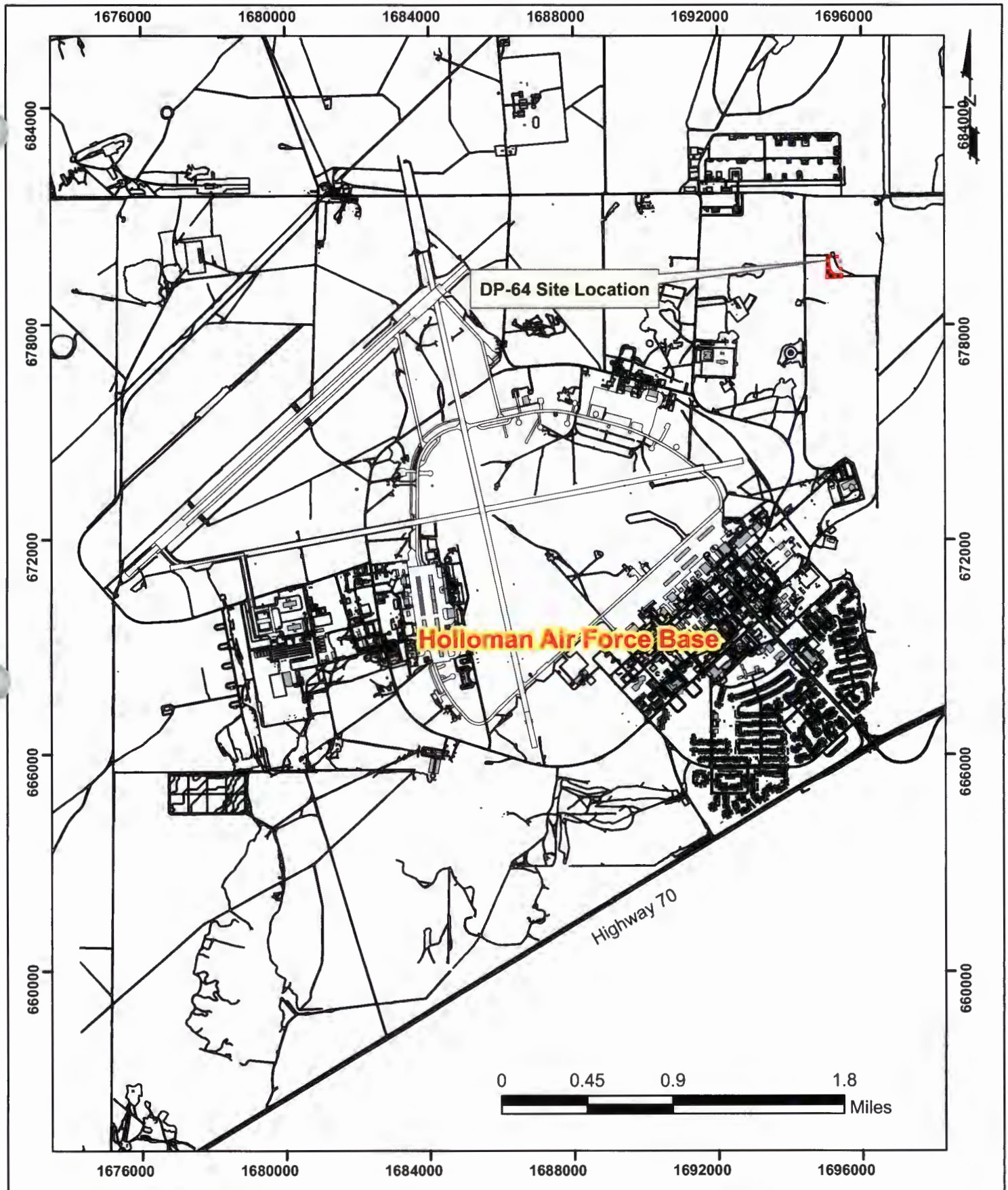
Holloman Air Force Base, New Mexico
Location Map

PROJECT NO.	SCALE	DATE	DRAWN BY:
9070127	Shown	9/28/07	cm

DRAWING NO: Figure 1-1

DP-64
RFI Work Plan
Holloman Air Force Base, New Mexico

Figure 1-1



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Site Location Map

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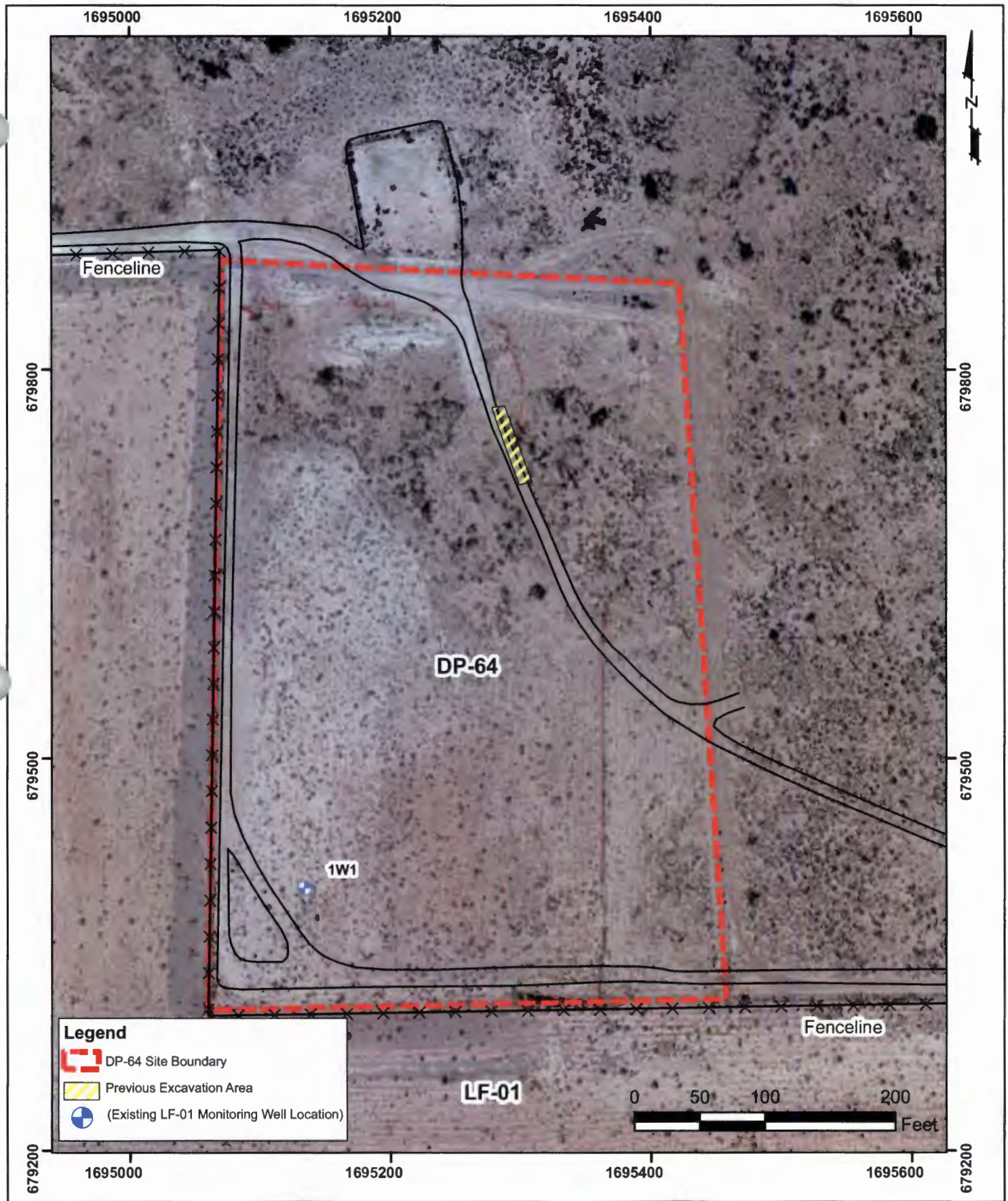
DP-64
RFI Work Plan
Holloman Air Force Base, New Mexico

Figure 1-2



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DP-64 Site Location Map

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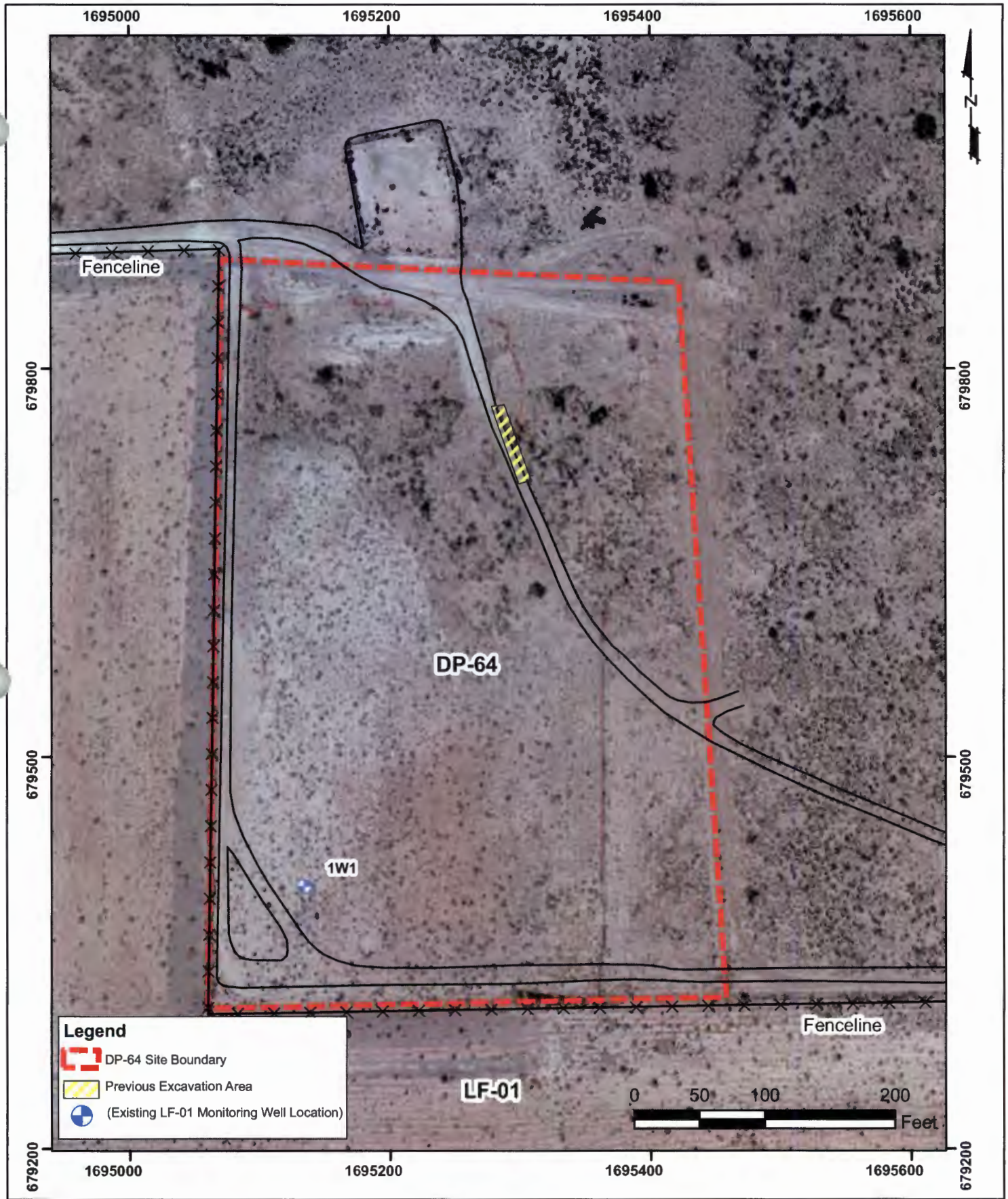
DP-64
RFI Work Plan
Holloman Air Force Base, New Mexico

Figure 1-3



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DP-64 Site Location Map

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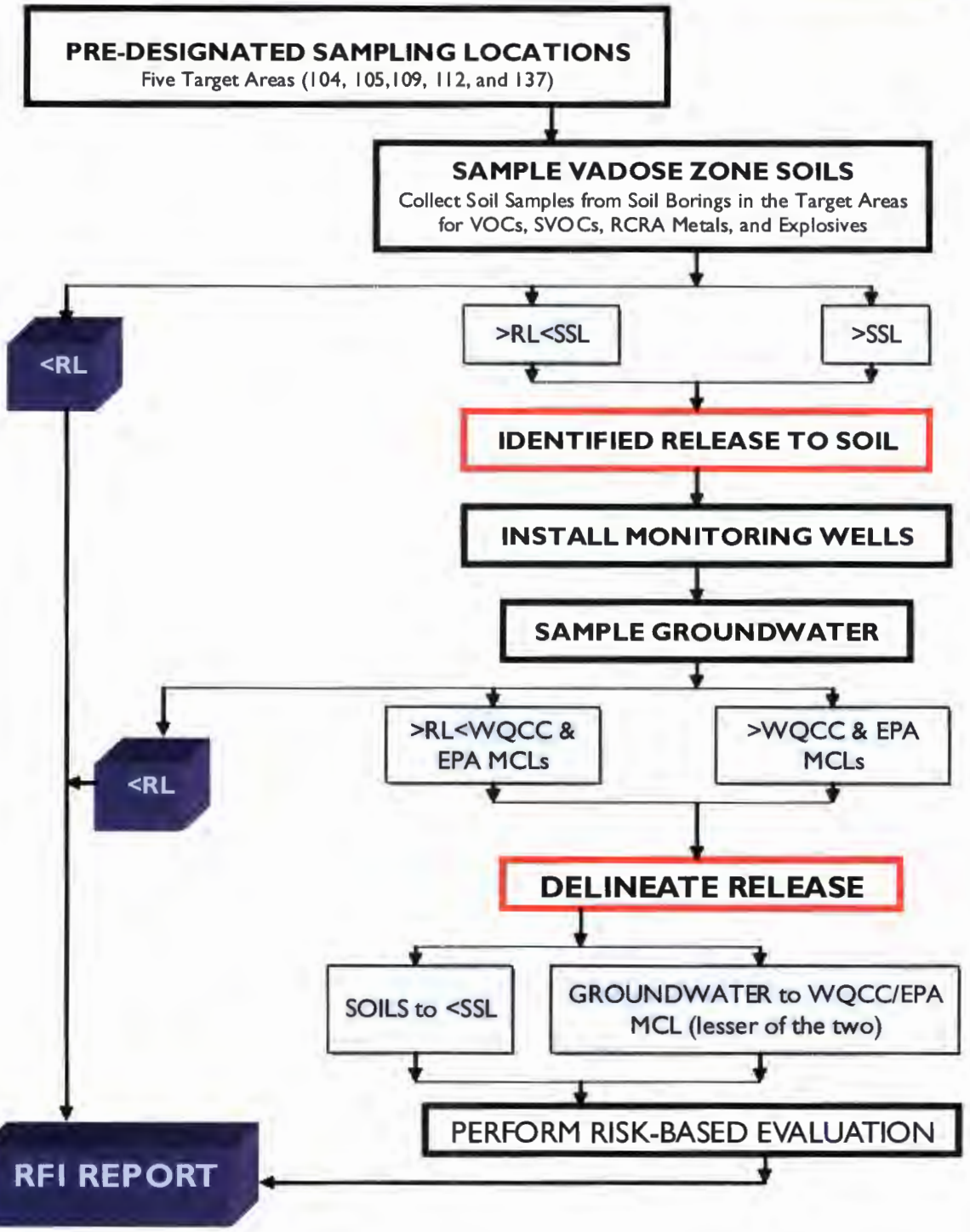
DP-64
RI Work Plan
Holloman Air Force Base, New Mexico

Figure 2-1

DP-64 TRIAD RFI DYNAMIC DECISION LOGIC CHART



LEGEND

VOCs = Volatile Organic Compounds
SVOCs = Semi-Volatile Organic Compounds
RCRA = Resource Conservation and Recovery Act
EPA MCL = Environmental Protection Agency Maximum Contaminant Level
RFI = Resource Conservation and Recovery Act Facility Act
RL = Reporting Limit
SSL = Soil Screening Level
WQCC = Water Quality Control Commission Standards

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DP-64 TRIAD RFI Dynamic Decision Logic Chart

PROJECT NO.	SCALE	DATE	DRAWN BY:	cm
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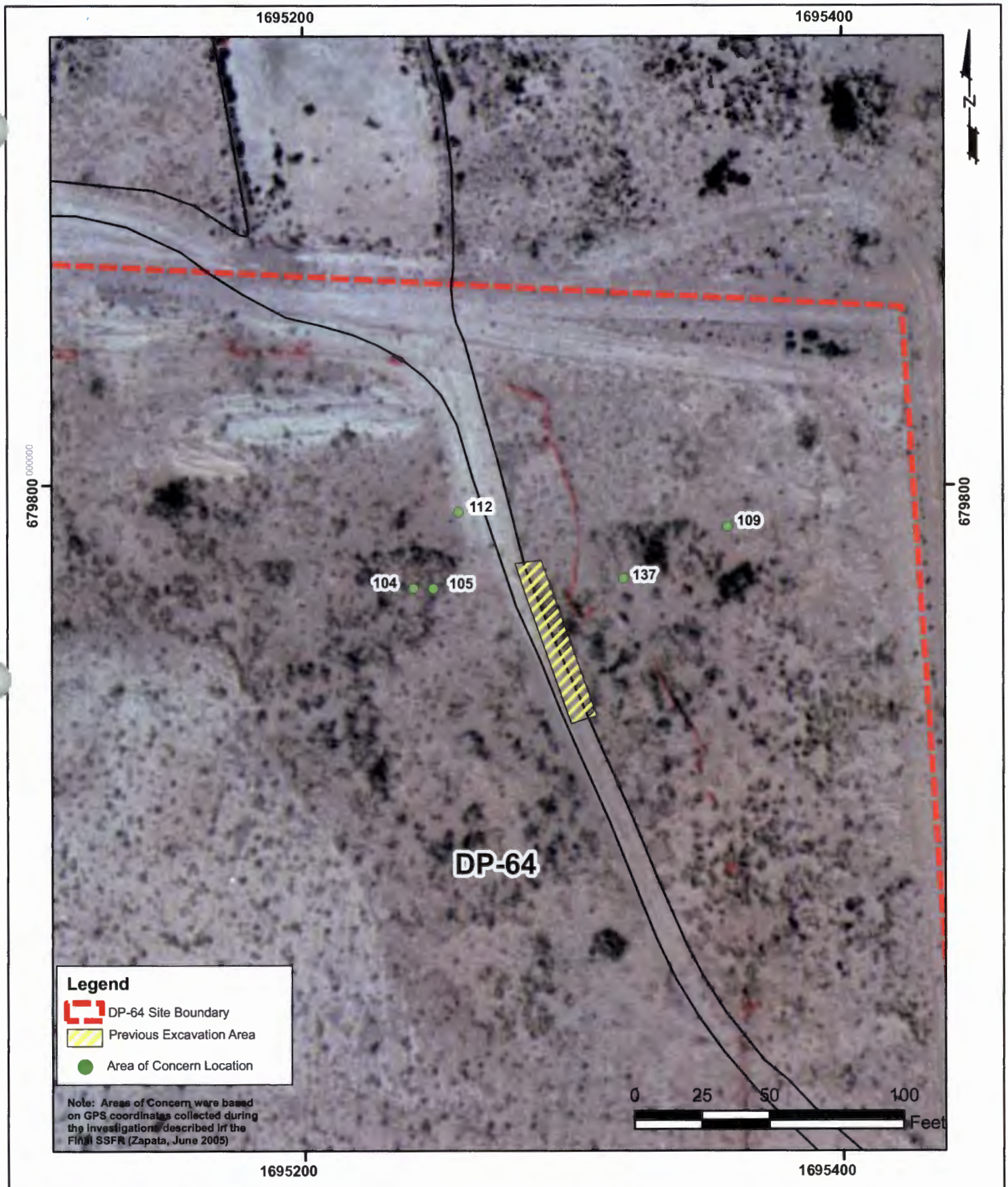
DP-64
RFI Work Plan
Holloman Air Force Base, New Mexico

Figure 3-1



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DP-64 Site Location Map

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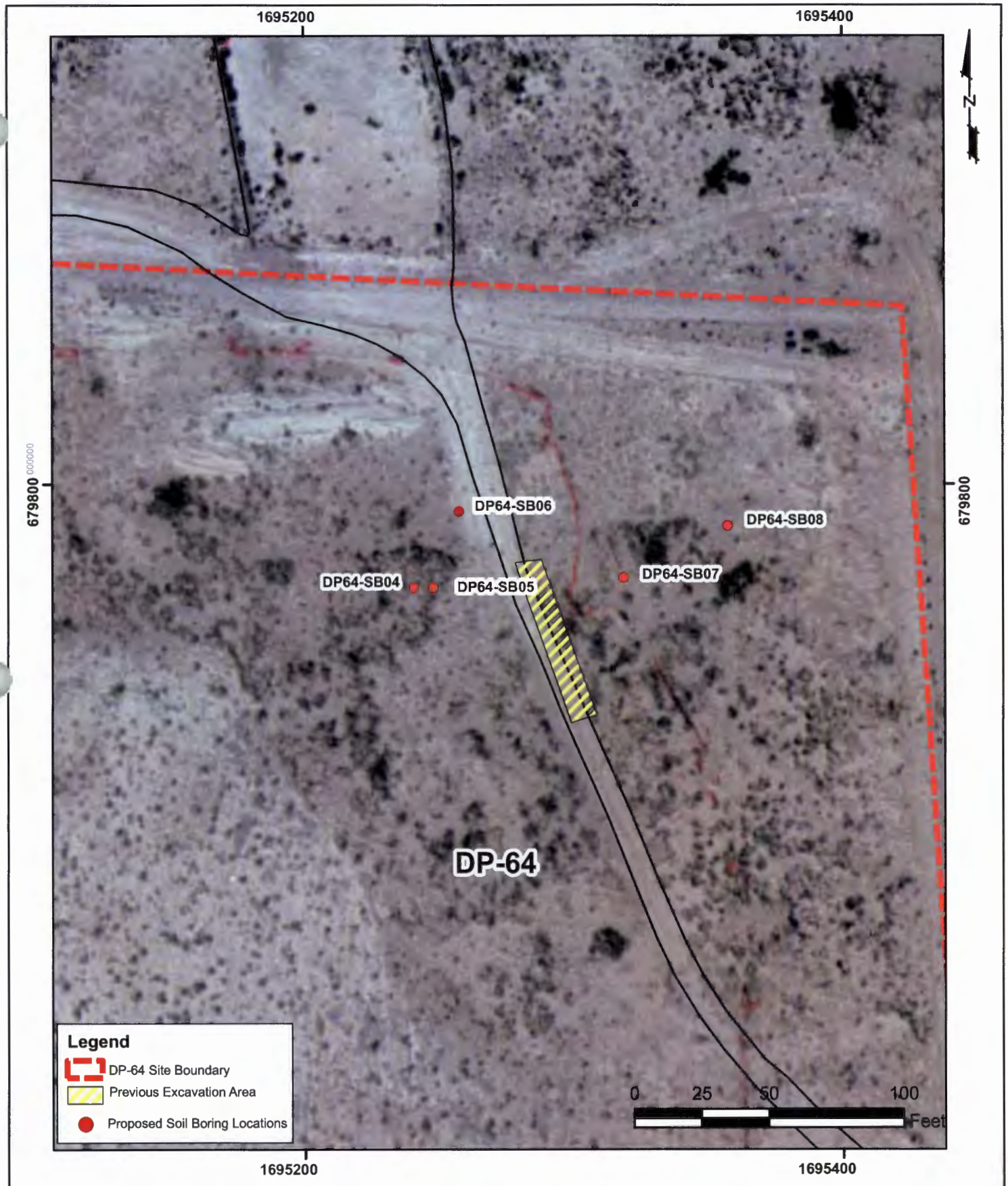
DP-64
RFI Work Plan
Holloman Air Force Base, New Mexico

Figure 3-2



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DP-64 Soil Boring Location Map

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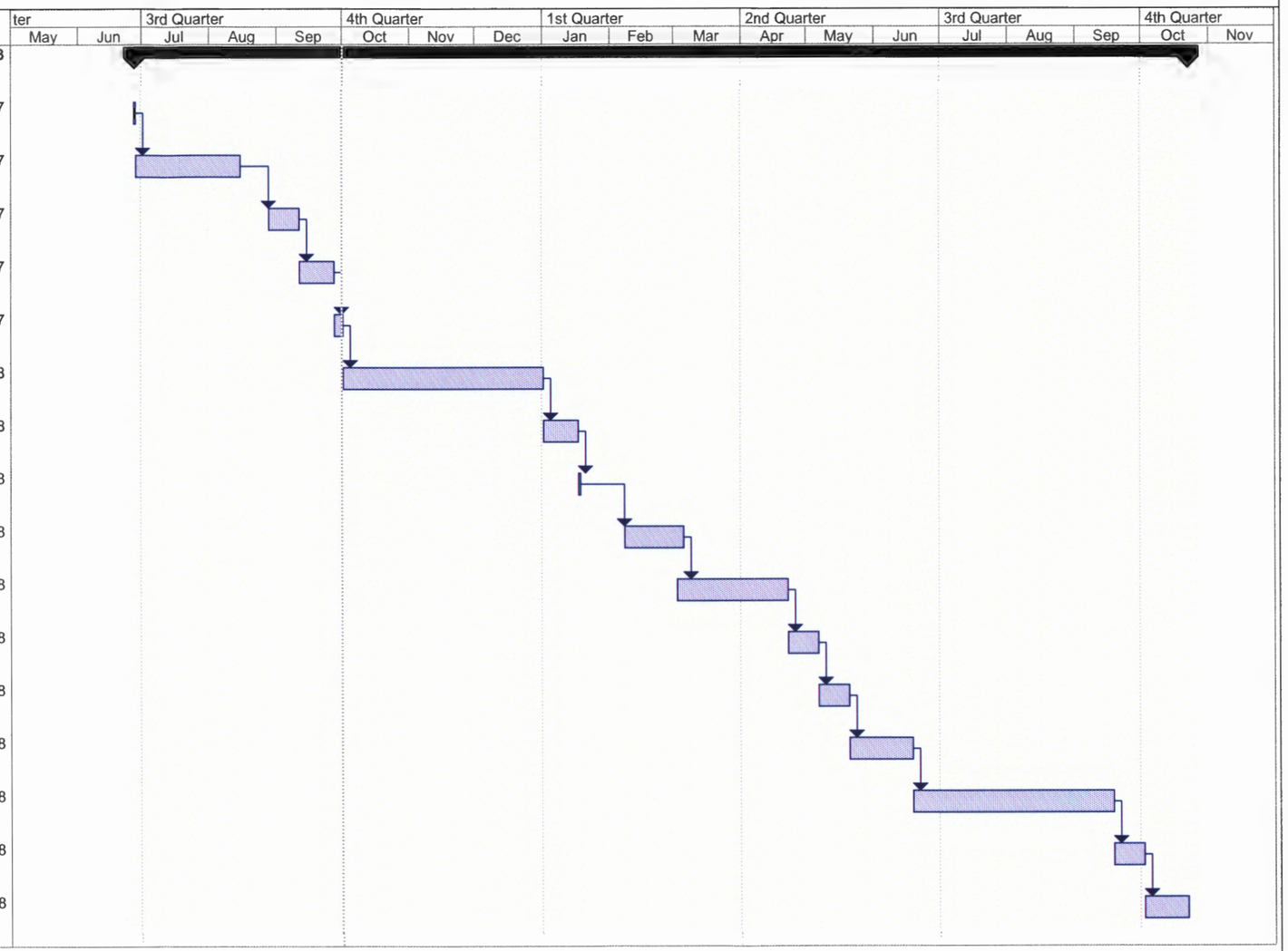
DP-64
RFI Work Plan
Holloman Air Force Base, New Mexico

Figure 3-3

Figure 8-1
Project Schedule
DP-64 RCRA Facility Investigation Work Plan
October 2007

ID	Task Name	Duration	Start	Finish
1	**DP-64 Schedule**	**345 days?**	**Thu 6/28/07**	**Wed 10/22/08**
2	Kick Off Meeting	1 day?	Thu 6/28/07	Thu 6/28/07
3	Prepare & Submit Internal Draft RFI WP to North Wind	34 days	Fri 6/29/07	Wed 8/15/07
4	North Wind & USACE Review	10 days	Wed 8/29/07	Tue 9/11/07
5	USACE Comment Resolution	12 days	Wed 9/12/07	Thu 9/27/07
6	Prepare & Submit Final WP to NMED	2 days	Fri 9/28/07	Mon 10/1/07
7	NMED Review	66 days	Tue 10/2/07	Tue 1/1/08
8	NMED Comment Resolution	12 days	Wed 1/2/08	Thu 1/17/08
9	Receive NTP from NMED	1 day?	Fri 1/18/08	Fri 1/18/08
10	Perform Field Work	19 days	Fri 2/8/08	Wed 3/5/08
11	Prepare & Submit Internal Draft RFI to North Wind	37 days	Mon 3/3/08	Tue 4/22/08
12	North Wind & USACE Review	10 days	Wed 4/23/08	Tue 5/6/08
13	USACE Comment Resolution	10 days	Wed 5/7/08	Tue 5/20/08
14	Prepare & Submit Final RFI to NMED	21 days	Wed 5/21/08	Wed 6/18/08
15	NMED Review	66 days	Thu 6/19/08	Thu 9/18/08
16	NMED Comment Resolution	10 days	Fri 9/19/08	Thu 10/2/08
17	Prepare & Submit Final RFI to NMED	14 days	Fri 10/3/08	Wed 10/22/08



Project: Figure 8-1 DP-64 RFI Schedule Update 092707
Date: Mon 10/1/07

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

APPENDIX A

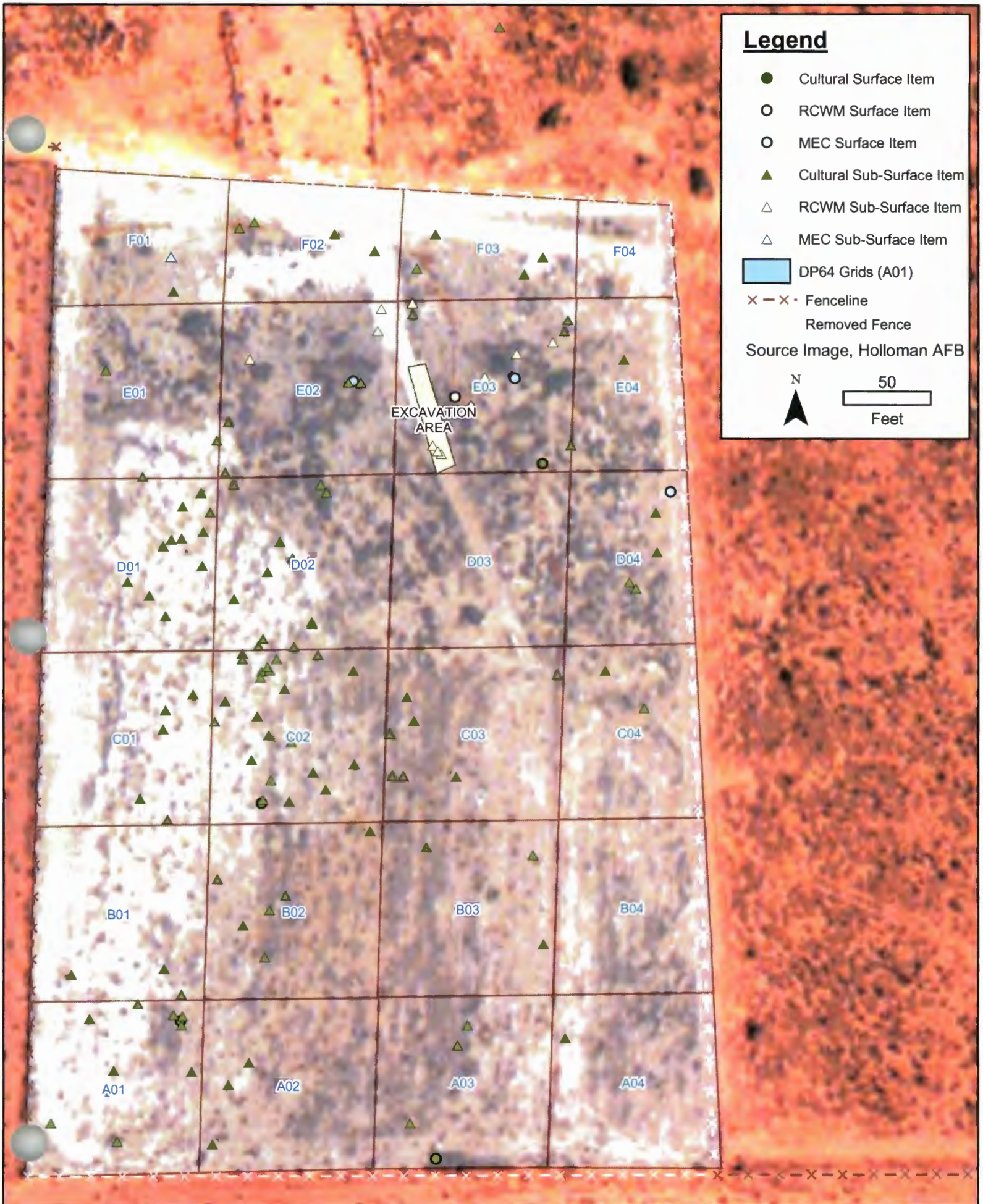
HISTORICAL DATA FROM PREVIOUS INVESTIGATIONS

ZAPATAENGINEERING P.A.
1100 KENILWORTH AVENUE PHONE 704/358.8240
CHARLOTTE, NC 28204 FAX 704/358.8342
ZAPATA@ZAPENG.COM WWW.ZAPENG.COM
TRUST • INTEGRITY • QUALITY

U.S. ARMY ENGINEERING AND SUPPORT CENTER
HUNTSVILLE, ALABAMA

Hollowman Air Force Base, NM
Site Layout

PROJECT #: 2623 PAGE #: B-3 DATE: OCTOBER 2004 DRAWN BY: ATD CHECKED BY: DRA FIGURE: B-2



ZAPATA ENGINEERING P.A.
1100 KENILWORTH AVENUE PHONE: 704/358.8240
CHARLOTTE, NC 28204 FAX: 704/358.8342
ZAPATA@ZAPENG.COM WWW.ZAPENG.COM
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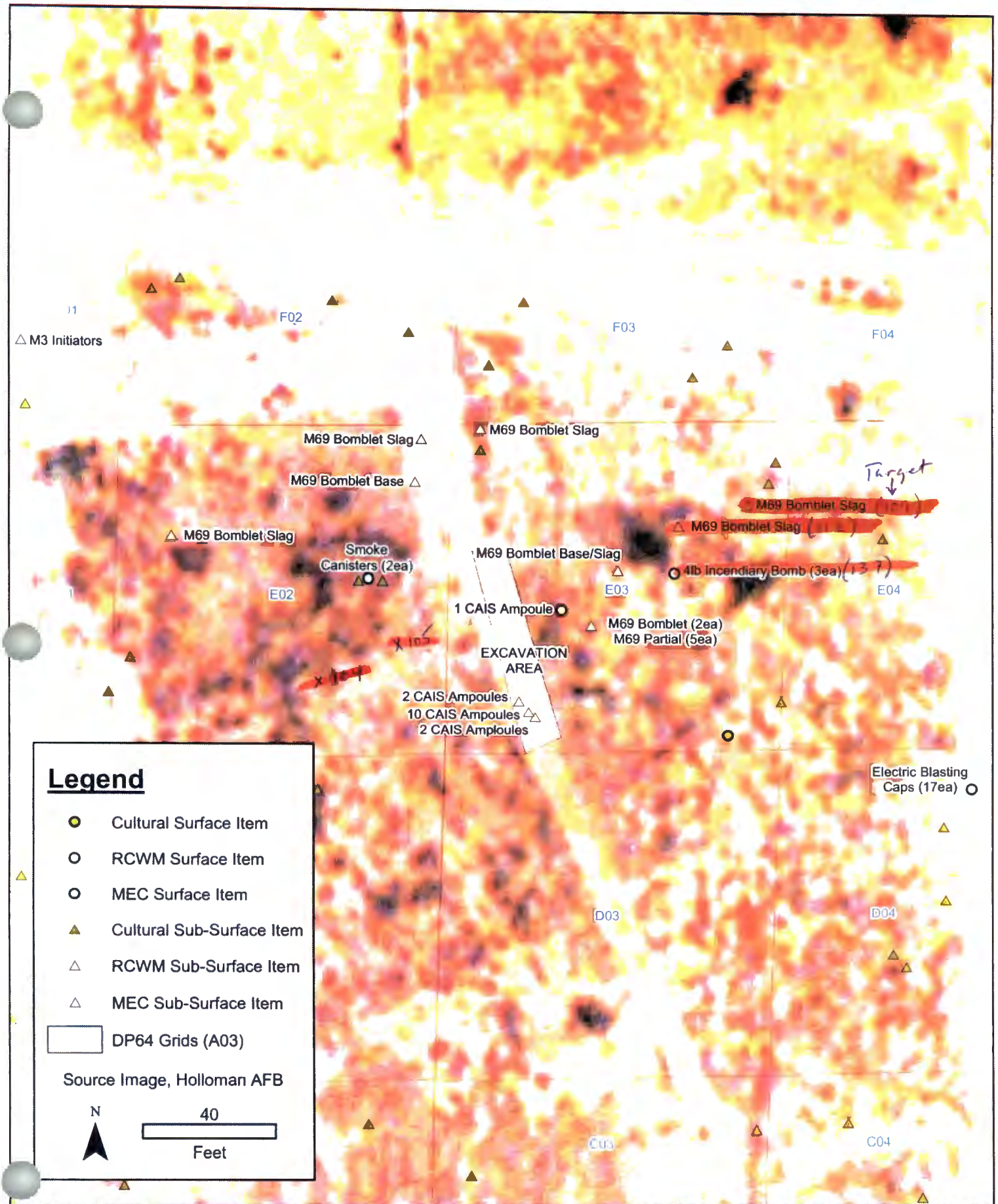
HUNTSVILLE, ALABAMA

Hollowman Air Force Base, NM
DP64 Grid Layout

PROJECT #: 2623 | PAGE #: B-5 | DATE: OCTOBER 2004 | DRAWN BY: ATD | CHECKED BY: DRA | FIGURE: B-4



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U.S. ARMY ENGINEERING AND SUPPORT CENTER
HUNTSVILLE, ALABAMA

Hollowman Air Force Base, NM
DP-64 RCWM and MEC Items

PROJECT #: 2623 | PAGE #: B-6 | DATE: OCTOBER 2004 | DRAWN BY: ATD | CHECKED BY: DRA | FIGURE: B-5

ZAPATA ENIGNEERING
Geophysical Dig Sheet and Target History

Project Name: Holloman AFB
Geophysical Contractor: Zapata Engineering
Project Geophysicist: David Smith
Field Team: Pfeiffer, Meglich, Vierkorn
Survey Area ID: Grid DP 64
Sector: NA

Project Location: Alamogordo, NM
Design Center POC: Sherri Hudgins
COE Site Geophysicist: Walker / Selfridge
Date: June 2004
Coordinate System: UTM meters
Grid: NA

Unique Target ID	Original Data				Dig Results											Post-Dig Excavation QC Results		
	Easting	Northing	Max Amplitude	Priority	Anomaly Type*	# of contacts	Offset		Item Azimuth long axis	Inclination long axis - degrees	Depth (in/cm)		Description & Conclusion	Digital Photo File Name**	Date	Team Leader Initials	Excavation Hole Cleared?	QC Initials	Date
							Distance - inches	Direction (N, etc.)			to top	Center of Mass							
85	399734.51	3637206.62	71.8	17	OT	2	0		0	30	6"		Steel Pipe 4"x3" Lineman Pliers	D01-085	6/18/2004	MM	Y	SDB	6/18/2004
96	399738.72	3637210.22	126.6	15	OT	1	0		V		4"		Drain Cap 4" Diam 0.5"	D02-096	6/18/2004	MM	Y	SDB	6/18/2004
97	399740.32	3637207.62	30.2	18	OT	1	0		275	0	24"		4" X 1" Steel Pipe	D02-097	6/18/2004	MM	y	SDB	6/18/2004
98	399724.31	3637209.42	23.7	106	OT	1	0		50	30	3"		6" Wire	D01-98	6/18/2004	MM	Y	SDB	6/18/2004
99	399775.94	3637214.42	72.0	4	CWM	12	0		0	V	6"		12.1" X 3" Metal part of CAIS Can	E03-099	7/7/2004	VV	Y	SDB	7/7/2004
100	399737.31	3637215.82	276.9	14	OT	2	0		225	0	3"		Steel Rebar 0.75"x14"	E01.100	6/18/2004	MM	Y	SDB	6/18/2004
102	399739.32	3637218.63	80.7	13	OT	1	0		90	10	16"		Barbed Wire	E02-101	6/22/2004	MM	Y	SDB	6/22/2004
103	399781.74	3637222.43	273.3	2	UXO	7	0		80	0	6"		2-Full/5- Partial 4lb Incendiary Bomblets	E03.102	6/23/2004	MM	Y	SDB	6/23/2004
104	399780.33	3637226.03	341.2	10	OT	4	0		V	0	18"		Burnpit debris, slag pieces	E02-104	6/22/2004	MM	Y	SDB	6/22/2004
105	399762.53	3637226.03	27.9	9	OT	3	0		V	0	2"		0.5" X 3" X 2" Burnpit Debris	E02.105	6/22/2004	MM	Y	SDB	6/22/2004
106	399717.80	3637228.04	27.0	101	OT	1	0		V		1"		Aluminum Pie Plate	E01.106	6/18/2004	MM	Y	SDB	6/18/2004
107	399808.38	3637230.44	219.1	49	OT	1	0		V	0	8"		3' Barrel Ring	E04-107	6/23/2004	WH	Y	SDB	6/23/2004
108	399743.12	3637230.24	27.3	23	ORS	1	0		210	0	1"		2.5" X 2.5" X 2" Octagon M69 Incendiary Base	E02-108	6/22/2004	MM	Y	SDB	6/22/2004
109	399795.95	3637232.84	403.4	35	ORS	15	0		45	0	14"		Bomblet bases, 1" X 4" Slag pieces	E03-109	6/23/2004	WH	Y	SDB	6/23/2004
110	399798.55	3637237.04	258.9	7	OT	1	0		180	10	8"		2' X 1.5' Part of Rusted Barrel	E04.110	6/23/2004	WH	Y	SDB	6/23/2004
111	399797.95	3637235.44	50.2	22	OT	20	0		V	0	10"		Rusted Metal Barrel Parts	E04-111	6/23/2004	WH	Y	SDB	6/23/2004
112	399765.53	3637234.64	322.2	21	ORS	3	0		V	0	4"		M69 Bases	E02-112	6/22/2004	MM	Y	SDB	6/22/2004
113	399771.53	3637238.05	101.8	8	OT	1	0		90	0	2"		3" X 5" Steel Plate	E03-113	6/22/2004	WH	Y	SDB	6/22/2004
114	399771.53	3637240.45	31.8	11	OT	1	0		90	0	4"		Bomblet base (No Filler)	E03.114	6/22/2004	WH	Y	SDB	6/22/2004
116	399729.71	3637241.65	22.2	109	OT	1	0		65	45	10"		0.5" X 1" X 12" Steel strap with nails	F01.116	6/22/2004	MM	Y	SDB	6/22/2004
117	399790.95	3637245.45	37.7	87	OT	1	0		V	0	4"		Slag	F03-117	6/22/2004	WH	Y	SDB	6/22/2004
118	399772.34	3637245.85	135.8	24	OT	3	0		V	0	2"		1" X 3" Multiple Slag Scrap	F03-118	6/22/2004	WH	Y	SDB	6/22/2004

ZAPATA ENIGNEERING
Geophysical Dig Sheet and Target History

Project Name: Holloman AFB
Geophysical Contractor: Zapata Engineering
Project Geophysicist: David Smith
Field Team: Pfeiffe, Meilich, Vierkorn
Survey Area ID: Grid SP 64
Sector: NA

Project Location: Alamogordo, NM
Design Center POC: Sherri Hudgins
COE Site Geophysicist: Walker / Selfridge
Date: June 2004
Coordinate System: UTM meters
Grid: NA

Unique Target ID	Original Data				Dig Results											Post-Dig Excavation QC Results		
	Easting	Northing	Max Amplitude	Priority	Anomaly Type *	# of contacts	Offset		Item Azimuth long axis	Inclination long axis - degrees	Depth (in/cm)		Description & Conclusion	Digital Photo File Name**	Date	Team Leader Initials	Excavation Hole Cleared?	QC Initials	Date
							Distance - inches	Direction (N, etc.)			to top	Center of Mass							
120	399729.31	3637247.86	24.4	105	ORS	7	0		290	10	8"		M3 Improvised Napalm Operable Initiator	F01-120	6/22/2004	WH	Y	SDB	6/22/2004
121	399794.15	3637247.65	19.9	111	OT	6	0		V	0	2"		2.5" X 1.5" Buckles/Buttons	F03-121	6/22/2004	WH	Y	SDB	6/22/2004
122	399764.93	3637248.88	40.2	85	OT	1	0		280	5	2"		1" X 2" X 3" Metal	F02-122	6/22/2004	MM	Y	SDB	6/22/2004
123	399757.93	3637252.46	230.9	40	OT	1	0		V	0	3"		1" X 8" Fence post	F02-123	6/22/2004	MM	Y	SDB	6/22/2004
124	399775.54	3637252.48	94.2	36	OT	2	0		V	0	2"		2.16" wire strands	F03-124	6/22/2004	WH	Y	SDB	6/22/2004
125	399743.92	3637254.46	72.4	68	OT	1	0		V	0	1"		1" X 2" X 2" Steel	F02-125	6/22/2004	MM	Y	SDB	6/22/2004
126	399741.32	3637253.06	53.5	37	OT	1	0		V	0	8"		0.5" X 1" X 2" Metal fences	F02-126	6/22/2004	MM	Y	SDB	6/22/2004
136	399788.69	3637230.69	8.0	121	OT	1	0		25	0	2"		5" X 2" X 0.5" Metal Slag	E03-136	6/23/2004	WH	Y	SDB	6/23/2004
137	399784.09	3637226.89	4854.7	5	ORS	150	0		V	0	24"		Burn Pit, 4lb Incendiary Bomblet	E03-137	6/23/2004	MM	Y	SDB	6/23/2004
138	399786.69	3637227.69	53.3	1	OT	3	0		75	0	24"		1" X 1.5" Nails	E03-138	6/23/2004	WH	Y	SDB	6/23/2004
139	399799.09	3637215.09	4.1	3	NC	0	0		0	0	>36"		No contact, Dug to 36"	E04-139	6/23/2004	WH	Y	SDB	6/23/2004
140	399756.49	3637208.69	14.6	8	OT	1	0		V	0	2"		Hose Clamp 1"x0.5"x0.5"	D02-140	6/18/2004	MM	Y	SDB	6/18/2004
141	399755.49	3637208.09	10.1	120	OT	1	0		270	0	2"		0.25" X 8" Valve Stem	D02-141	6/18/2004	MM	Y	SDB	6/18/2004
142	399766.09	3637239.09	4.4	122	ORS	1	0		270	5	4"		2.5" X 2.5" X 2" Octagon M69 Incendiary Base	E02-142	6/22/2004	MM	Y	SDB	6/22/2004

Note * For ***Anomaly type***, use UXO for UXO, F for frag, ORS for ordnance related scrap, OT for other, OE for ordnance non-UXO, SA for small arms ammunition, NC for no contact, FP for false positive, CWM for Chemical Warfare Material
** Optional Fields - refer to SOW for applicability to Specific Project

ZAPATAENGINEERING **DIG Sheet Record**

Work Area DP 64	Grid # E02	Flag # 104	Date 6/22/04

Team 1 (Team 2)

Photo: E02-104

Item Description: Burn Pit Debris

Condition:

Depth: Surface – 18"

GPS Coordinates:

Y: 3637226

X: 399760.3

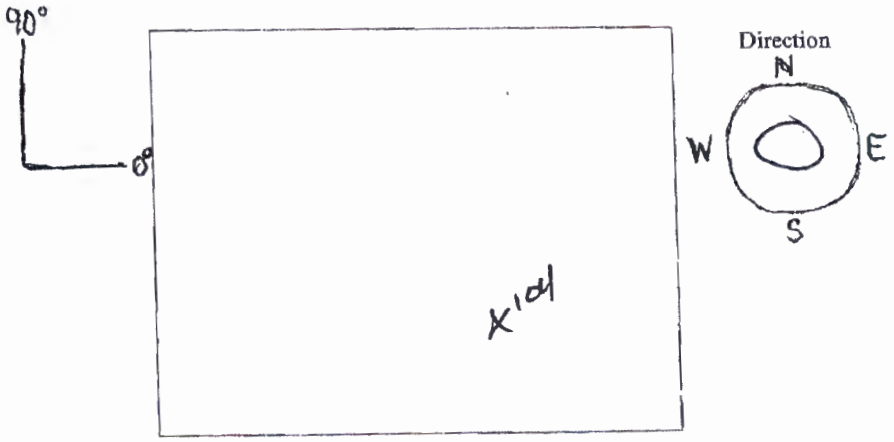
Quality Control Results

Item	Yes	No	Qty
OEW Encountered		X	
Anomalies Detected	X		4

Passed Inspection: Yes/dms/TXB

Remarks: SLAG Pieces 4X4, 1X6, ~~1X2~~ 1X3 12X10"

Draw the approximate location(s) of above items where answered Yes



QC Officer: Steven D. Burhans | Signature

ZAPATA ENGINEERING **DIG Sheet Record**

Work Area DP 64	Grid # E02	Flag # 105	Date 6/22/04

Team 1 / Team 2

Photo: E02-105

Item Description: Burn Pit Debris 1/2 x 3 x 2 3465

Condition:

Depth: 2"

GPS Coordinates:

Y: 3637226

X: 399762.5

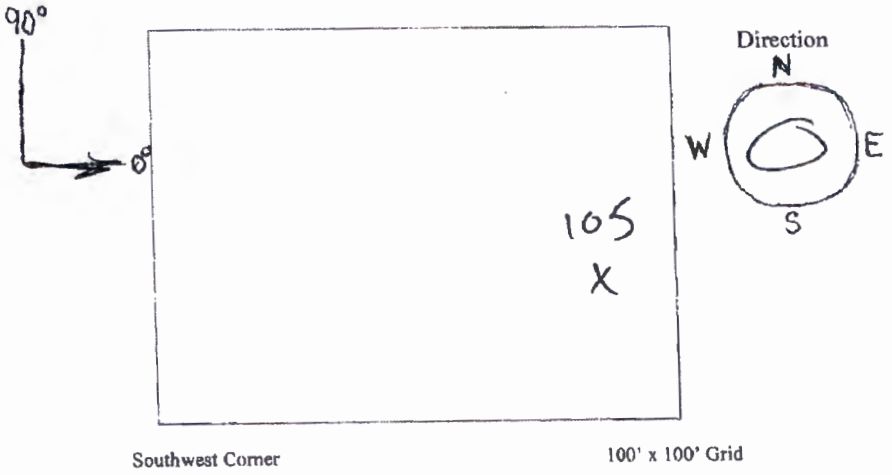
Quality Control Results

Item	Yes	No	Qty
OEW Encountered		X	
Anomalies Detected	X		3

Passed Inspection: Yes / ~~No~~ RKB

Remarks: Burn Debris multiple small pieces

Draw the approximate location(s) of above items where answered Yes



QC Officer: Steven D. Burhans | Signature

ZAPATA ENGINEERING **DIG Sheet Record**

Work Area DP 64	Grid # E03	Flag # 109	Date 6-23-04

Team (1) / Team 2

Photo: E03-109

Item Description: Bomlet bases (Burn Pit) & Slag

Condition: 1" to 4" diameter

Depth: 14 inches

GPS Coordinates:

Y: 3637233

X: 399792

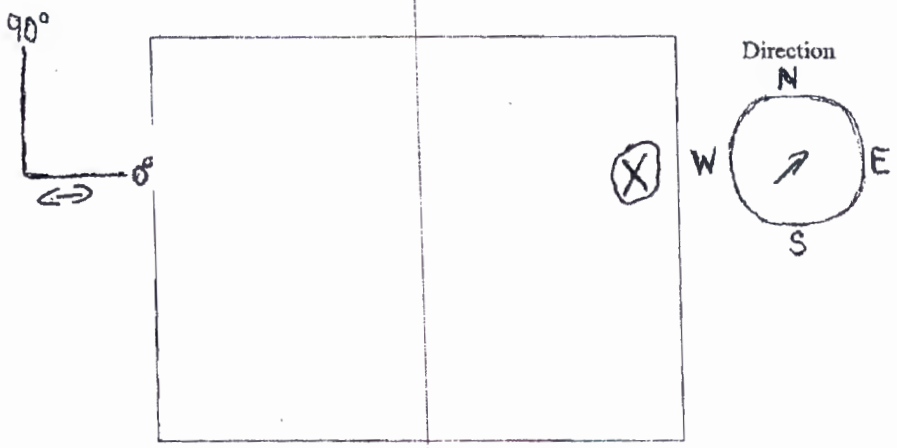
Quality Control Results

Item	Yes	No	Qty
OEW Encountered	✓		15+
Anomalies Detected	✓		

Passed Inspection: Yes / DS / RB

Remarks:

Draw the approximate location(s) of above items where answered Yes



QC Officer: Steven D. Burhans Signature

ZAPATA ENGINEERING **DIG Sheet Record**

Work Area DP 64	Grid # E02	Flag # 112	Date 6/22/04

Team 1 / (Team 2)

Photo: E02-112

Item Description: Burn Pit Debris

Condition: 4 lbs. Metal strap 1/2 x 4 x 1/16

Depth: 4" 3 MEC (4)

GPS Coordinates:

Y: 3637235

X: 399765.5

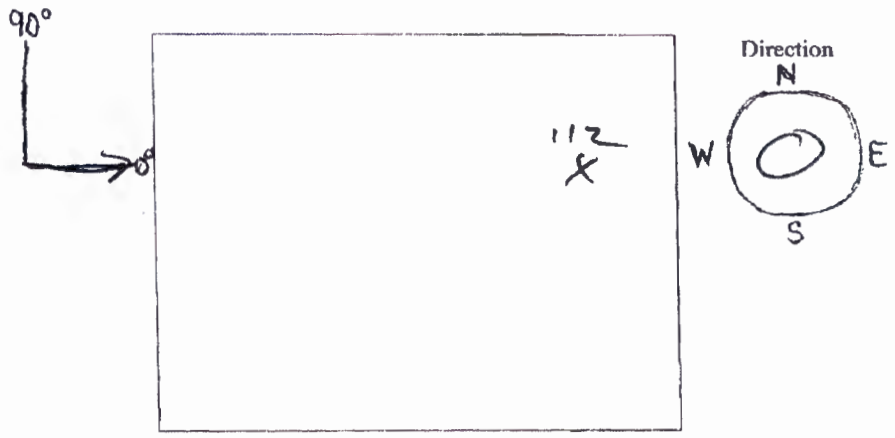
Quality Control Results

Item	Yes	No	Qty
OEW Encountered	✓		
Anomalies Detected	X		3

Passed Inspection: Yes / BB / RLB

Remarks: (3) MEC Basic 2 strap bundle

Draw the approximate location(s) of above items where answered Yes



Southwest Corner 100' x 100' Grid

QC Officer: Steven D. Burhans | Signature

ZAPATA ENGINEERING **DIG Sheet Record**

Work Area DP 64	Grid # E03	Flag # 137	Date 6/23/04

Team 1 (Team 2)

Photo: E03-137

Item Description: Burn Pit approx 150 yds. incen. Buses

Condition:

Depth: 1"-24"

GPS Coordinates:

Y: 3637227

X: 399784.1

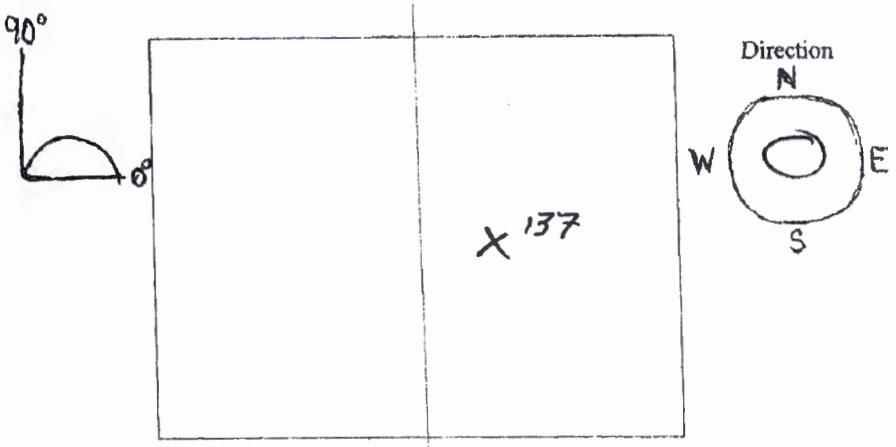
Quality Control Results

Item	Yes	No	Qty
OEW Encountered	X		150
Anomalies Detected	X		

Passed Inspection: Yes/ AB/BCB

Remarks:

Draw the approximate location(s) of above items where answered Yes



QC Officer: Steven D. Burhans | Signature

APPENDIX B

QUALITY ASSURANCE PROJECT PLAN ADDENDUM

QUALITY ASSURANCE PROJECT PLAN ADDENDUM
RCRA FACILITY INVESTIGATION
CHEMICAL AGENT DISPOSAL SITE (DP-64)
HOLLOMAN AIR FORCE BASE
NEW MEXICO

Subcontract No.: 5020S.01
Under Prime Contract No.: W9128F-04-D-0017

Bhate Project Number: 9070127 01.02

Prepared For:

U.S. Army Corps of Engineers
Omaha District
Omaha, Nebraska

Prepared By:

Bhate Environmental Associates, Inc.
1608 13th Avenue South, Suite 300
Birmingham, Alabama 35205

Under contract to:

North Wind, Inc.
1425 Higham Street
Idaho Falls, Idaho 83402

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QUALITY ASSURANCE PROJECT PLAN ADDENDUM
RCRA FACILITY INVESTIGATION
CHEMICAL AGENT DISPOSAL SITE (DP-64)
HOLLOMAN AIR FORCE BASE, NEW MEXICO

REVIEW SHEET

COMMITMENT TO IMPLEMENT THIS QUALITY ASSURANCE PROJECT PLAN ADDENDUM

John Hymer Bhate Site Manager	Signature	10.1.2007 Date
Katherine T. Thompson Bhate Field Team Leader/Geologist	Signature	10.1.2007 Date
Doug Jorgensen NWI Project Manager	Signature	10.1.2007 Date
Frank Gardner, P.G. Bhate Program Manager	Signature	10.1.2007 Date
Mike D'Auben Bhate Project Chemist	Signature	10/1/07 Date

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QUALITY ASSURANCE PROJECT PLAN ADDENDUM
RCRA FACILITY INVESTIGATION
CHEMICAL AGENT DISPOSAL SITE (DP-64)
HOLLOMAN AIR FORCE BASE
NEW MEXICO

TABLE OF CONTENTS

Tables

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LIST OF ACRONYMS

Bhate	Bhate Environmental Associates
DO	Dissolved Oxygen
EDD	Electronic Data Deliverable
ERP	Environmental Restoration Program
ERPIMS	Environmental Resources Program Information Management System
HAFB	Holloman Air Force Base
LCL	Lower Control Limit
LCS	Laboratory Control Sample
MDL	Method Detection Limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NELAC	National Environmental Laboratory Accreditation Conference
NMED	New Mexico Environment Department
ORP	Oxidation Reduction Potential
QA	Quality Assurance
QAM	Quality Assurance Manual
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RPD	Relative Percent Difference
SOPs	Standard Operating Procedures
SVOC	Semivolatile Organic Compounds
UCL	Upper Control Limit
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
WP	Work Plan

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PREFACE

This Quality Assurance Project Plan Addendum (QAPP Addendum) has been developed to assure that sample collection, analyses, and evaluations are legally and scientifically defensible for the Chemical Agent Disposal Site (DP-64) at Holloman Air Force Base (HAFB). This document is an addendum to the *Basewide Quality Assurance Project Plan, Holloman Air Force Base, New Mexico* (Bhate, November 2003) (Basewide QAPP) and must be used in conjunction with that document. This document contains the site specific information for the work at DP-64 outlined in the *RCRA Facility Investigation Work Plan, Chemical Agent Disposal Site (DP-64), Holloman Air Force Base, New Mexico* (Bhate, October 2007) (DP-64 Work Plan).

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1 INTRODUCTION

The U.S. Army Corps of Engineers, Omaha District (USACE) has retained Bhate Environmental Associates, Inc. (Bhate) to perform a Resource Conservation and Recovery (RCRA) Facility Investigation (RFI) on behalf of Holloman Air Force Base (HAFB) Environmental Restoration Program (ERP) for the New Mexico Environment Department (NMED). This RFI addresses site DP-64 at HAFB, New Mexico. Bhate is performing this work under Subcontract No. 5020S.01 on behalf of North Wind, Inc. who has been retained by the U.S. Army Corps of Engineers (USACE), under contract W9128F-04-D-0017.

See the Basewide QAPP and DP-64 Work Plan for additional information on HAFB and DP-64.

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2 PROJECT LABORATORY

The analytical work for this project will be preformed by Accutest Southeast of Orlando, Florida (Accutest). The contact information for the laboratory is:

Accutest Southeast
4405 Vineland Rd., Suite C-15
Orlando, FL 32811
407.425.6700

The laboratory personnel who will be responsible this project includes:

Harry Behzadi, Accutest Laboratory Director / General Manager

Jean Dent-Smith, Accutest Project Manager

Svetlana Izosimova, Accutest Quality Assurance Manager

Accutest is certified by the National Environmental Laboratory Accreditation Council (NELAC) and has extensive previous experience in working on USACE and United States Air Force (USAF) projects. The Accutest Laboratory Quality Assurance Manual (QAM) and Standard Operating Procedures (SOPs) have been reviewed by Bhate and found to meet all the requirements for this project. The QAM and SOPs are available for further review if required.

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3 DATA CATEGORIES

The data use determines the required levels of data quality. The two levels of data quality established by the USACE are screening and definitive. Under this QAPP Addendum, the data to be generated under each level in this investigation are presented in Table 3-1 (Screening) and Table 3-2 (Definitive). The screening data will be generated in the field using field instruments. The Definitive data generated by the laboratory will be presented with limited data deliverables (i.e. Level II data packages), using a 21 day turn-around-time. All definitive data produced by the laboratory will also be presented in an Environmental Resources Program Information Management System (ERPIMS) format electronic data deliverable (EDD).

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4 DATA QUALITY ASSURANCE AND QUALITY CONTROL

The general data quality assurance (QA) and quality control (QC) requirements for HAFB are presented in the Basewide QAPP. The field QC requirements for this project are presented in Table 4-1. The project specific laboratory QC limits are listed in Table 4-2.

All final definitive data will be reviewed and validated by a Bhate Senior Chemist, based on the guidelines of the United States Environmental Protection Agency (USEPA) National Functional Guidelines for Data Validation and the site specific laboratory QC limits.

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5 REFERENCES

Bhate, November 2003. *Final Basewide Quality Assurance Project Plan, Holloman Air Force Base, New Mexico.*

Bhate, October 2007. *RCRA Facility Investigation Work Plan, Chemical Agent Disposal Site (DP-64), Holloman Air Force Base, New Mexico.*

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TABLES

Table 3-1
Summary of Screening Data

Parameter	Matrix	Testing Method
pH	Water	multi-parameter sonde and a flow-through cell
Oxidation Reduction Potential	Water	multi-parameter sonde and a flow-through cell
Conductivity	Water	multi-parameter sonde and a flow-through cell
Dissolved Oxygen	Water	multi-parameter sonde and a flow-through cell
Temperature	Water	multi-parameter sonde and a flow-through cell
Volatile Headspace	Soil	Organic Vapor Analyzer (Flame Ionization Detector)

Table 3-2
Summary of Definitive Data

Parameter	Matrix	Prepatory Method	Testing Method
Volatile Organic Compounds (VOCs)	Soil	USEPA SW-846 Method 5035B	USEPA SW-846 Method 8260B
Semivolatile Organic Compounds (SVOCs)	Soil	USEPA SW-846 Method 3550B	USEPA SW-846 Method 8270C
RCRA Metals	Soil	USEPA SW-846 Method 3050B	USEPA SW-846 Methods 6010B and 7471A
Explosives	Soil	USEPA SW-846 Method 8330A*	USEPA SW-846 Method 8330A
Volatile Organic Compounds (VOCs)	Groundwater	USEPA SW-846 Method 5030B	USEPA SW-846 Method 8260B
Semivolatile Organic Compounds (SVOCs)	Groundwater	USEPA SW-846 Method 3510C	USEPA SW-846 Method 8270C
RCRA Metals	Groundwater	USEPA SW-846 Method 3010A	USEPA SW-846 Methods 6010B and 7470A
Explosives	Groundwater	USEPA SW-846 Method 8330A*	USEPA SW-846 Method 8330A
TDS	Groundwater	USEPA Method 160.1*	USEPA Method 160.1

Notes:
USEPA = United States Environmental Protection Agency
TDS = Total Dissolved Solids
RCRA = Resource Conservation and Recovery Act
* Preparatory Method is included in Testing Method write-up

Table 4-1
Summary of Field QC Samples

Matrix	Analysis	Number of Field Samples	Equipment Blanks	Trip Blanks*	Field Duplicates	Field Splits	MS	MSD	Total
Soil	VOCs per EPA Method 8260B	30	0	8	3	0	2	2	45
	SVOCs per EPA Method 8270C	30	0	0	3	0	2	2	37
	RCRA Metals by EPA 6010B/7471A	30	0	0	3	0	2	2	37
	Explosives by EPA 8330A	30	0	0	3	0	2	2	37
Groundwater	VOCs per EPA Method 8260B	7	0	2	1	0	1	1	12
	SVOCs per EPA Method 8270C	7	0	0	1	0	1	1	10
	RCRA Metals by EPA 6010B/7470A	7	0	0	1	0	1	1	10
	Explosives by EPA 8330A	7	0	0	1	0	1	1	10
	Total Disolved solids by EPA 160.1	7	0	0	1	0	1	1	10

Notes:
EPA = Environmental Protection Agency
VOCs = Volatile Organic Compounds
SVOCs = Semi-volatile Organic Compounds
RCRA = Resource Conservation and Recovery Act
*Estimated, one trip blank will accompany every shipment of volatile samples

Table 4-2
Summary of Laboratory QC Limits

Parameter	MDL		LCS				Matrix Spike Water			Matrix Spike Soil		
			Water		Soil		Recovery		MSD	Recovery		MSD
	Water	Soil	LCL	UCL	LCL	UCL	LCL	UCL	RPD	LCL	UCL	RPD
VOCs per EPA Method 8260B	µg/L	µg/kg	%	%	%	%	%	%	%	%	%	%
Acetone	5	5	51	157	50	150	51	157	20	50	150	20
Benzene	1	1	70	125	71	123	70	125	20	71	123	20
Bromodichloromethane	1	1	70	130	71	130	70	130	20	71	130	20
Bromoform	2	1	72	136	62	141	72	136	20	62	141	20
Bromomethane	2	2	35	153	57	153	35	153	20	57	153	20
2-Butanone (MEK)	10	10	45	150	50	150	45	150	20	50	150	20
Carbon disulfide	1	1	74	123	64	123	74	123	20	64	123	20
Carbon tetrachloride	1	1	71	132	69	132	71	132	20	69	132	20
Chlorobenzene	1	1	78	114	69	118	78	114	20	69	118	20
Chloroethane	2	3	72	129	62	140	72	129	20	62	140	20
Chloroform	1	1	74	127	75	132	74	127	20	75	132	20
Chloromethane	2	2	58	135	50	150	58	135	20	50	150	20
Dibromochloromethane	1	1	74	145	61	147	74	145	20	61	147	20
1,2-Dichlorobenzene	1	1	73	120	75	132	73	120	20	75	132	20
1,3-Dichlorobenzene	1	1	73	120	75	122	73	120	20	75	122	20
1,4-Dichlorobenzene	1	1	74	123	74	126	74	123	20	74	126	20
1,1-Dichloroethane	1	1	75	133	80	126	75	133	20	80	126	20
1,2-Dichloroethane	1	1	67	132	75	121	67	132	20	75	121	20
1,1-Dichloroethene	1	1	74	133	57	142	74	133	20	57	142	20
cis-1,2-Dichloroethene	1	1	73	133	70	129	73	133	20	70	129	20
trans-1,2-Dichloroethen	1	1	75	134	75	123	75	134	20	75	123	20
1,2-Dichloropropane	1	1	75	133	72	124	75	133	20	72	124	20
cis-1,3-Dichloropropene	1	1	73	132	72	132	73	132	20	72	132	20
trans-1,3-Dichloroprope	1	1	74	131	69	131	74	131	20	69	131	20
Ethylbenzene	1	1	75	120	75	120	75	120	20	75	120	20
2-Hexanone	3	2	53	139	55	144	53	139	20	55	144	20
Methylene chloride	2	3	69	118	66	131	69	118	20	66	131	20
4-Methyl-2-pentanone	2	2	59	150	50	150	59	150	20	50	150	20
Styrene	1	1	75	130	75	130	75	130	20	75	130	20
1,1,2,2-Tetrachloroetha	1	1	68	129	68	144	68	129	20	68	144	20
Tetrachloroethene	1	1	75	129	75	129	75	129	20	75	129	20
Toluene	1	1	73	119	63	128	73	119	20	63	128	20
1,2,4-Trichlorobenzene	2	1	75	130	69	139	75	130	20	69	139	20
1,1,1-Trichloroethane	1	1	70	127	75	133	70	127	20	75	133	20
1,1,2-Trichloroethane	1	1	75	136	71	129	75	136	20	71	129	20
Trichloroethene	1	1	74	118	69	120	74	118	20	69	120	20
Vinyl chloride	2	2	73	134	75	134	73	134	20	75	134	20
Xylene (total)	1	1	75	122	75	125	75	122	20	75	125	20
1,2,4-Trimethylbenzene	2	2	75	125	75	125	75	125	20	75	125	20

Table 4-2
Summary of Laboratory QC Limits

Parameter	MDL		LCS				Matrix Spike Water			Matrix Spike Soil		
			Water		Soil		Recovery		MSD	Recovery		MSD
	Water	Soil	LCL	UCL	LCL	UCL	LCL	UCL	RPD	LCL	UCL	RPD
1,3,5-Trimethylbenzene	2	2	75	125	75	125	75	125	20	75	125	20
1,2-Dichloroethane-d4 (surr)	--	--	74	131	70	125	--	--	--	--	--	--
4-Bromofluorobenzene (surr)	--	--	76	128	75	116	--	--	--	--	--	--
Dibromofluoromethane (surr)	--	--	80	129	64	131	--	--	--	--	--	--
Toluene-d8 (surr)	--	--	85	115	70	123	--	--	--	--	--	--
SVOCs by EPA Method 8270C	µg/L	µg/kg	%	%	%	%	%	%	%	%	%	%
Acenaphthene	2	100	40	112	27	116	40	112	20	27	116	20
Acenaphthylene	2	100	37	115	33	120	37	115	20	33	120	20
Anthracene	2	100	45	118	35	122	45	118	20	35	122	20
Benzoic acid	2	100	30	136	30	160	30	136	20	30	160	20
Benzo(a)anthracene	2	100	43	138	33	139	43	138	20	33	139	20
Benzo(b)fluoranthene	2	100	31	146	30	140	31	146	20	30	140	20
Benzo(k)fluoranthene	2	100	40	127	30	150	40	127	20	30	150	20
Benzo(g,h,i)perylene	2	100	35	129	30	146	35	129	20	30	146	20
Benzo(a)pyrene	2	100	38	144	30	144	38	144	20	30	144	20
bis(2-Chloroethoxy)meth	1	100	30	115	30	126	30	115	20	30	126	20
bis(2-Chloroethyl)ether	2	100	30	115	30	121	30	115	20	30	121	20
bis(2-Chloroisopropyl)e	1	100	50	150	30	131	50	150	20	30	131	20
Bis(2-ethylhexyl)phthal	2	1300	30	154	34	149	30	154	20	34	149	20
4-Bromophenyl-phenyleth	2	100	43	118	34	120	43	118	20	34	120	20
Butylbenzylphthalate	2	100	37	136	30	153	37	136	20	30	153	20
4-Chloroaniline	1	100	30	115	30	110	30	115	20	30	110	20
4-Chloro-3-methylphenol	2	100	32	110	18	111	32	110	20	18	111	20
2-Chloronaphthalene	2	100	35	115	32	115	35	115	20	32	115	20
2-Chlorophenol	2	100	29	110	10	110	29	110	20	10	110	20
4-Chlorophenyl-phenylet	2	100	40	115	33	118	40	115	20	33	118	20
Chrysene	1	100	42	142	33	142	42	142	20	33	142	20
Dibenz(a,h)anthracene	2	100	38	130	34	148	38	130	20	34	148	20
Dibenzofuran	2	100	40	115	30	110	40	115	20	30	110	20
3,3'-Dichlorobenzidine	2	500	30	160	31	137	30	160	20	31	137	20
2,4-Dichlorophenol	2	100	34	115	32	121	34	115	20	32	121	20
Diethylphthalate	1	100	43	132	32	126	43	132	20	32	126	20
2,4-Dimethylphenol	2	100	31	120	33	119	31	120	20	33	119	20
Dimethylphthalate	2	100	42	116	36	124	42	116	20	36	124	20
Di-n-butylphthalate	2	100	46	123	36	135	46	123	20	36	135	20
4,6-Dinitro-2-methylphe	4	100	42	144	30	160	42	144	20	30	160	20
2,4-Dinitrophenol	7	700	29	146	34	160	29	146	20	34	160	20
2,4-Dinitrotoluene	2	100	46	122	34	110	46	122	20	34	110	20
2,6-Dinitrotoluene	1	100	43	122	32	133	43	122	20	32	133	20
Di-n-octylphthalate	2	100	36	151	50	160	36	151	20	50	160	20

Table 4-2
Summary of Laboratory QC Limits

Parameter	MDL		LCS				Matrix Spike Water			Matrix Spike Soil		
			Water		Soil		Recovery		MSD	Recovery		MSD
	Water	Soil	LCL	UCL	LCL	UCL	LCL	UCL	RPD	LCL	UCL	RPD
Fluoranthene	2	100	47	132	32	122	47	132	20	32	122	20
Fluorene	1	100	41	115	32	127	41	115	20	32	127	20
Hexachlorobenzene	2	100	42	123	32	127	42	123	20	32	127	20
Hexachlorobutadiene	2	100	30	120	30	118	30	120	20	30	118	20
Hexachlorocyclopentadiene	1	100	30	115	30	123	30	115	20	30	123	20
Hexachloroethane	1	100	30	120	30	115	30	120	20	30	115	20
Indeno(1,2,3-cd)pyrene	2	100	37	130	34	147	37	130	20	34	147	20
Isophorone	2	100	33	115	34	115	33	115	20	34	115	20
2-Methylnaphthalene	2	100	32	115	30	120	32	115	20	30	120	20
2-Methylphenol	2	100	30	116	30	123	30	116	20	30	123	20
4-Methylphenol	4	100	31	115	30	127	31	115	20	30	127	20
Naphthalene	2	100	30	119	30	115	30	119	20	30	115	20
2-Nitroaniline	2	100	30	115	30	148	30	115	20	30	148	20
3-Nitroaniline	2	100	30	115	30	110	30	115	20	30	110	20
4-Nitroaniline	2	100	30	115	30	110	30	115	20	30	110	20
Nitrobenzene	1	100	31	115	30	115	31	115	20	30	115	20
2-Nitrophenol	1	100	33	115	30	126	33	115	20	30	126	20
4-Nitrophenol	3	100	21	110	24	120	21	110	20	24	120	20
N-Nitrosodiphenylamine	2	100	35	124	50	134	35	124	20	50	134	20
N-Nitroso-di-n-propylamine	2	100	39	110	24	112	39	110	20	24	112	20
Pentachlorophenol	5	500	32	133	10	114	32	133	20	10	114	20
Phenanthrene	2	100	45	117	35	119	45	117	20	35	119	20
Phenol	1	100	10	110	10	110	10	110	20	10	110	20
Pyrene	2	100	51	137	33	150	51	137	20	33	150	20
2,4,5-Trichlorophenol	2	100	36	135	34	128	36	135	20	34	128	20
2,4,6-Trichlorophenol	2	100	39	115	35	120	39	115	20	35	120	20
2,4,6-Tribromophenol (surr)	--	--	34	129	38	121	--	--	--	--	--	--
2-Fluorobiphenyl (surr)	--	--	30	103	31	100	--	--	--	--	--	--
2-Fluorophenol (surr)	--	--	14	100	21	100	--	--	--	--	--	--
Nitrobenzene-d5 (surr)	--	--	32	107	27	100	--	--	--	--	--	--
Phenol-d5 (surr)	--	--	15	100	19	106	--	--	--	--	--	--
Terphenyl-d14 (surr)	--	--	28	154	35	123	--	--	--	--	--	--
RCRA Metals by EPA Method 6010B/7470A/7471A	**µg/L**	**mg/kg**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Arsenic	5	0.25	80	120	80	120	75	125	20	75	125	20
Barrium	5	0.25	80	120	80	120	75	125	20	75	125	20
Chromium	5	0.25	80	120	80	120	75	125	20	75	125	20
Cadmium	1	0.05	80	120	80	120	75	125	20	75	125	20
Lead	50	2.5	80	120	80	120	75	125	20	75	125	20
Mercury	0.2	0.05	80	120	80	120	75	125	20	75	125	20
Selenium	5	0.25	80	120	80	120	75	125	20	75	125	20

Table 4-2
Summary of Laboratory QC Limits

Parameter	MDL		LCS				Matrix Spike Water			Matrix Spike Soil		
			Water		Soil		Recovery		MSD	Recovery		MSD
	Water	Soil	LCL	UCL	LCL	UCL	LCL	UCL	RPD	LCL	UCL	RPD
Silver	1	0.05	80	120	80	120	75	125	20	75	125	20
Total Dissolved Solids by EPA Method 160.1	**mg/L**	**mg/kg**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
TDS	6	--	90	110	--	--	--	--	--	--	--	--
Explosives by EPA Method 8330A	**µg/L**	**µg/kg**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
HMX	0.075	100	79	119	74	131	73	123	13	67	138	24
RDX	0.075	100	73	119	77	125	65	126	13	59	146	23
1,3-Dinitrobenzene	0.05	100	77	117	80	124	77	117	12	71	134	17
2,6-Dinitrotoluene	0.05	130	77	123	83	125	77	122	16	65	146	18
2,4-Dinitrotoluene	0.05	100	74	119	79	129	72	121	15	62	145	18
2-amino-4,6-Dinitrotoluene	0.05	100	77	121	88	122	68	128	17	70	137	22
4-amino-2,6-Dinitrotoluene	0.05	100	76	121	81	132	67	127	16	63	145	23
Nitrobenzene	0.05	100	66	122	78	132	73	121	15	71	140	17
o-Nitrotoluene	0.06	100	68	120	84	131	75	119	17	75	142	18
m-Nitrotoluene	0.05	100	69	120	84	132	66	129	16	76	139	19
p-Nitrotoluene	0.05	100	75	118	83	131	75	122	18	71	146	21
Tetryl	0.075	100	63	122	63	128	42	135	15	39	143	26
1,3,5-Trinitrobenzene	0.05	100	77	115	80	122	72	116	12	61	136	18
2,4,6-Trinitrotoluene	0.05	100	76	113	79	121	70	117	14	59	138	27
3,4-Dinitrotoluene (surr)	--	--	61	124	71	130	--	--	--	--	--	--

Notes:

µg/kg = Micrograms per kilogram
µg/L = Micrograms per liter
EPA = Environmental Protection Agency
LCL = Lower Control Limit
LCS = Laboratory Control Sample
MDL = Method Detection Limit
mg/kg = Milligrams per kilogram
mg/L = Milligrams per liter
MSD = Matrix Spike Duplicate
RPD = Relative Percent Difference
surr = Surrogate
UCL = Upper Control Limit
VOC = Volatile Organic Compounds
SVOC = Semi-volatile Organic Compounds

APPENDIX C

SITE-SPECIFIC ADDENDUM TO THE BASEWIDE HEALTH AND SAFETY PLAN

SITE-SPECIFIC ADDENDUM TO THE BASEWIDE HEALTH AND SAFETY PLAN

CHEMICAL AGENT DISPOSAL SITE (DP-64)

HOLLOMAN AIR FORCE BASE, NEW MEXICO

Subcontract No.: 5020S.01

Under Prime Contract No.: W9128F-04-D-0017

Bhate Project Number: 9070127 01.02

Prepared For:

U.S. Army Corps of Engineers
Omaha District
Omaha, Nebraska

Prepared By:

Bhate Environmental Associates, Inc.
1608 13th Avenue South, Suite 300
Birmingham, Alabama 35205

Under contract to:

North Wind, Inc.
1425 Higham Street
Idaho Falls, Idaho 83402

October 2007

Bhate Project No. 9070127

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SITE-SPECIFIC ADDENDUM TO THE BASEWIDE HEALTH AND SAFETY PLAN CHEMICAL AGENT DISPOSAL SITE (DP-64) HOLLOMAN AIR FORCE BASE, NEW MEXICO

TABLE OF CONTENTS

Figures

Tables

Attachments

ACRONYMS AND ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
Bhate	Bhate Environmental Associates, Inc.
BRA	Baseline Risk Assessment
CAIS	Chemical agent identification sets
CGI	Combustible gas indicator
CHMM	Certified Hazardous Materials Manager
CIH	Certified Industrial Hygienist
CFR	Code of Federal Regulations
CPR	Cardiopulmonary Resuscitation
CSP	Certified Safety Professional
dBA	decibels on an A-weighted average
DP	Disposal pit
EM	Engineering manual
FID	Flame ionization detector
GFCI	Ground fault circuit interrupter
HASP	Health and Safety Plan
HEPA	High Efficiency Particulate Air filter
HSM	Health and Safety Manager
MEC	Munitions and Explosives of Concern
MSDS	Material Safety Data Sheet
MSPH	Master of Science in Public Health
mg/m^3	Milligrams per cubic meter of air
NFA	No Further Action
NFPA	National Fire Protection Association
NMED	New Mexico Environment Department
OSHA	Occupational Safety and Health Administration

ACRONYMS AND ABBREVIATIONS (CONTINUED)

OVA	Organic vapor analyzer
PAN	Preliminary Accident Notification form
PEL	Permissible Exposure Limit
PID	Photoionization detector
P.G.	Professional Geologist
PPE	Personal protective equipment
ppm	Parts per million
RI	Remedial Investigation
SCBA	Self-contained breathing apparatus
SLM	Sound level meter
SPF	Sun protection factor
SSHO	Site Safety and Health Officer
TWA	Time weighted average
TLV	Threshold Limit Value
USACE	United States Army Corps of Engineers
VOCs	Volatile Organic Compounds

1 PROJECT SAFETY COORDINATION

The Bhate Environmental Associates, Inc., (Bhate) personnel who are responsible for safety and health issues at the Chemical Agent Disposal (DP-64) project site are identified in Table 1-1. A signature below indicates that the respective personnel have reviewed and approved this *Site-Specific Addendum to the Basewide Health and Safety Plan* (HASP) submitted by Bhate for implementation of this Scope of Services. The requirements of this site-specific addendum are applicable to Bhate employees, their subcontractors, and site visitors.

Table 1-1. Project Personnel and Health and Safety Responsibilities

Title	Name	Office Telephone
Bhate Field Team Leader/SSHO	Ms. Katherine Thompson	(205) 918-4026
Bhate Site Manager	Mr. John Hymer	(505) 679-2100
Bhate Health and Safety Director	Mr. Brian Muller, MSPH, CIH, CSP, CHMM	(205) 918-4032
NWI Project Manager	Mr. Doug Jorgensen	(208) 520-1097
Bhate Program Manager	Mr. Frank Gardner, P.G.	(303) 815-1762

SSHO – Site Safety and Health Officer
CIH – Certified Industrial Hygienist
CSP – Certified Safety Professional
CHMM – Certified Hazardous Materials Manager
MSPH – Master of Science in Public Health
P.G. – Professional Geologist

COMMITMENT TO IMPLEMENT THE SITE-SPECIFIC SAFETY AND HEALTH PLAN

Frank Gardner, P.G.
Bhate Program Manager
10.1.2007
Date

Doug Jorgensen
NWI Project Manager
KT
10.1.2007
Date

Brian Muller, MSPH, CIH, CSP, CHMM
Health and Safety Manager/Plan Preparer
10-1-07
Date

John Hymer
Bhate Site Manager

10.1.2007
Date

Katherine Thompson
Bhate Field Team Leader/Site Safety and Health Officer

10.1.2007
Date

2 PROJECT BACKGROUND AND SCOPE

2.1 Purpose

The purpose of this project is to conduct a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) utilizing the Triad approach that will characterize the quantity, concentration, and extent of contamination at DP-64 (Chemical Agent Disposal Site). The RFI will determine if there is any threat to human health and the environment, and will provide a basis for determining the types of response actions to be considered. In addition a baseline risk assessment (BRA) for ecological and human health will be conducted.

2.2 Background and Scope of Work

In March 2000, a Base resident discovered one dilute ampoule of Levinstein mustard gas and one ampoule of lewisite north of site LF-01 the closed Main Base Landfill. The site was investigated by Air Force personnel familiar with the historic use of Chemical Agent Identification Sets (CAIS). In addition to the ampoules, three burn areas, remnants of incendiary devices (M69X or M74), and broken glass ampoules were identified at DP-64. All surface agents were removed from the site.

CAIS was used by the military personnel in identifying chemical agents. During the 1950s, the Chemical Test Squadron at Edgewood Maryland flew missions to HAFB. However, no documentation has been found to indicate that testing or disposal of any testing items occurred at DP-64. No other ordinance is known to be associated with DP-64 other than the incendiary munitions and ampoules discovered in March 2000.

In 2004, chemical weapons specialists from the Huntsville U.S. Army Corps of Engineers (USACE) investigated DP-64. The geophysical tools used by the Team identified five target areas for further investigation including excavation.

In June 2005 Zapata submitted the final Site Specific Final Report (SSFR) following field activities to identify and remove all incendiary bomb components and chemical agents at the site. According to the final SSFR which was approved by the Army Corps of Engineers, all explosive and chemical agents were removed from the site.

The five target areas are 104, 105, 109, H2, and 137 which will be further investigated in the RI process. Groundwater monitoring wells will be installed and sampled to collect data for the risk based site closeout and request for No Further Action (NFA). In the USACE investigation no samples to characterize the presence of hazardous constituents were collected either. NMED reviewed the report and required an investigation that will collect and analyze soil and groundwater samples from the site for hazardous constituents before the site can be considered for NFA status and site close out.

The anticipated activities for the project include:

- Preparation of a draft and final work plan to direct the investigation at DP-64;
- Mobilization and demobilization of various equipment;
- Installation of 10 soil borings;
- Collect and analyze 3 soil samples from each boring for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), Resource Conservation and Recovery Act (RCRA) metals, and explosives;
- Installation, as necessary, of 4 groundwater monitoring wells, and 1 deep groundwater monitoring well;
- Collection of groundwater samples from the newly installed wells;
- Analyze groundwater samples for VOCs, SVOCs, RCRA metals, explosives, and Total Dissolved Solids (TDS); and
- Preparation of a comprehensive RI report including a risk based assessment of contamination to soil and groundwater in accordance with the Base's RCRA permit.

3 HAZARD ASSESSMENT AND CONTROLS

3.1 Task Hazard(s) Summary

The potential health and safety hazards of this task are summarized below in Table 3-1. The potential for encountering these hazards is ranked (high, moderate, or low) based on the work to be performed and the hazard control measures to be used.

Table 3-1. Task Hazards Summary

Summary	Hazard Potential [High, Moderate, Or Low]	Description of Potential Hazards
_√_Safety (i.e. Walking and working surfaces, heavy equipment, traffic, falls, excavations, power and hand tools, materials handling, confined spaces, electrical safety, etc.)	• Moderate All tasks and their control measures are addressed in Task Specific Activity Hazard Analyses (AHAs)	• Walking and working surfaces • Heavy equipment and vehicular traffic • Materials handling • Slips, trips, and falls • Excavating • Boring/Drilling
_√_Utilities	• Moderate	• Buried • Over head • Building Although these hazards should not be associated with this particular scope of work, it is necessary to verify that the hazards can be controlled.
_√_Chemical	• Moderate Site was previously cleared of all explosive and chemical agents by Zapata in June 2005 as reported in the final SSFR approved by the Army Corps of Engineers.	• Potential for exposure to neat products should be limited to equipment fluids (fuel, lubricants, coolant, etc.) • Petroleum Hydrocarbons • It should be noted that although materials were previously removed as indicated in the SSFR submitted by Zapata in 2005, explosives, mustard agent, and lewisite (and associated arsenic) were previously present at the subject site.
_√_Physical	• Moderate	• Thermal stressors • Equipment noise • Sun exposure
_√_Biological (i.e. Plants, animals, insects, spiders, infectious waste)	• Moderate	• Potential for contact should be minimal • Insects • Plant life • Snakes

3.2 Hazard Control Measures

General safe work practices and control measures are identified and summarized in the Basewide HASP. Additional task-specific hazards and control measures are identified for non-routine tasks as part of the AHA process. AHAs have been developed for each of the following activities listed in Table 3-2 and are included in Attachment A.

Table 3-2. Task-Specific Hazard Control Measures by AHA

Activities with an AHA	
General Site Activities/Mobilization and Demobilization	Soil and groundwater sampling
Soil Boring and Monitoring Well Installation	

3.3 Written Safety Procedures and Programs

Table 3-3 provides a summary of the existing safety procedures and programs which will be used for this task or site. Copies of applicable procedures and programs are included in Basewide HASP, as indicated.

Table 3-3. Written Safety Procedures and Programs

Reference Procedure or Program	Applicable Section(s)
Bhate Hazard Communication Program	All (Refer to Basewide HASP)
Bhate Respiratory Protection Program	All (Refer to Basewide HASP)
Bhate Hearing Conservation Program	All (Refer to Basewide HASP)

3.4 Permits

Table 3-4 summarizes the required work permits that must be completed prior to the start of field work. No Bhate work permits are anticipated for this project.

Table 3-4. Required Work Permits

Permit	Notes and comments (reference activities, procedures, and coordination with appropriate organizations)
HAFB Excavation Permit	Site Manager will arrange for AF Form 332 to be completed and obtain a dig permit/utility clearance through the HAFB Infrastructure Organization

4 PERSONAL PROTECTIVE EQUIPMENT

4.1 Purpose

The purpose of this program is to ensure that personal protective equipment (PPE) is selected in accordance with 29 Code of Federal Regulations (CFR) Section 1910.132, properly used and maintained, and that Bhate personnel are properly trained in the inspection, use, and maintenance of PPE.

4.2 Scope

This program applies to all Bhate operations including the activities of contractors on Bhate-managed projects.

4.3 Definition

4.3.1 Personal Protective Equipment

Items which are worn and are designed to protect the health and safety of an employee. This includes, but it is not limited to, chemical resistant shoes, boots, gloves, chemical protective clothing, hard hats, safety glasses, hearing protection, cooling/heating vests, life-lines and harnesses, and respirators. Additional program requirements for respirators are provided in the Respiratory Protection Program in the Basewide HASP.

4.4 Responsibilities

4.4.1 All Bhate Personnel

All personnel required to use PPE are responsible for wearing the appropriate PPE when required, inspecting the PPE prior to use, properly wearing the PPE, and as necessary, properly maintaining the PPE.

4.4.2 Project Management Personnel

The Site Manager is responsible for understanding the specific PPE requirements for each project task and ensuring that PPE is provided and worn when required and in the intended manner.

4.4.3 Site Safety and Health Officer

The SSHO is responsible for:

- Monitoring PPE usage;
- Recommending modifications to PPE requirements to project management and the Health and Safety Manager (HSM), as necessary;
- Ensuring that project personnel have the proper training on the PPE which they are required to use, and performing training and retraining, as necessary.

The following PPE as presented in Table 4-1 will be used for the identified activities:

Table 4-1. Personal Protective Equipment by Activity

Activity	Head/Face	Foot	Hands	Respiratory	Clothing
Mobilization / Demobilization	Hard Hat (for overhead hazards), Safety Glasses[1] with rigid side shields.	Steel toed boots	Leather gloves as needed	None[3, 4]	Minimum of long pants and shirts with a minimum 4-inch sleeve, reflective vest
General Site Labor	Hard Hat (for overhead hazards), Safety Glasses[1] with rigid side shields.	Steel toed boots	Leather gloves as needed	None[3, 4]	Minimum of long pants and shirts with a minimum 4-inch sleeve, reflective vest
Equipment Operation and Well Installation	Hard Hat[2] (for overhead hazards), Safety Glasses[1] with rigid side shields.	Steel toed boots. Boot covers for entering and exiting equipment.	Leather gloves as needed	As required [3, 4] Air Purifying Respirator with Organic vapor and High Efficiency Particulate Air filter (HEPA) cartridges based on monitoring	Minimum of long pants and shirts with a minimum 4-inch sleeve, reflective vest Hearing protection Highly visible safety vest in high traffic areas and/or around heavy machinery operation
Equipment Decontamination	Hard Hat[2] (for overhead hazards), Safety Glasses[1] with rigid side shields.	Steel toed boots. Boot covers.	Chemical resistant gloves	As Required[3, 4] Air Purifying Respirator with Organic vapor and HEPA cartridges based on monitoring	Minimum of long pants and shirts with a minimum 4-inch sleeve, reflective vest Tyvek coveralls may be worn as recommended by the SSHO

Activity	Head/Face	Foot	Hands	Respiratory	Clothing
Soil and Groundwater Sampling	Hard Hat[2] (for overhead hazards), Safety Glasses[1] with rigid side shields.	Steel toed boots	Chemical resistant gloves (nitrile inner and neoprene outer)	As required [3, 4] Air Purifying Respirator with Organic vapor and HEPA cartridges based on monitoring	Minimum of long pants and shirts with a minimum 4-inch sleeve Tyvek coveralls may be worn as recommended by the SSHO
Supervision of Work	Hard Hat (for overhead hazards), Safety Glasses[1] with rigid side shields.	Steel toed boots	Leather gloves as needed	As required [3, 4] Air Purifying Respirator with Organic vapor and HEPA cartridges based on monitoring	Minimum of long pants and shirts with a minimum 4-inch sleeve, reflective vest

Note:

[1] Safety Glasses with rigid side shields approved by American National Standards Institute (ANSI) Z-87 required at all times.

[2] Hard hats are not required inside fully enclosed equipment cabs.

[3] Voluntary use of respirators is authorized for comfort from nuisance dusts and odors, provided they are issued and used in accordance with established respiratory protection program procedures. Respirators are required as specified by the action levels outlined in Table 5-1.

[4] Cartridge change out will occur at the following conditions:

- Damage to cartridge
- Cartridge is wet, restriction in breathing, unusual odors
- Cartridge is visibly clogged with dust, restriction in breathing
- After 8 hours of use
- Changes that may be otherwise identified in 29 CFR Section 1910.120.

The following qualified person certifies that the selection of PPE is based on best available information about the work requirements and anticipated hazards.

Printed Name:	**Signature:**	**Date:**
Brian Muller, CIH, CSP, CHMM, MSPH **Bhate Health and Safety Director**		**October 1, 2007**

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5 SITE MONITORING

Site monitoring shall be performed as necessary for site remediation work. This section covers general site monitoring for employee exposure to physical and chemical hazards including air contaminants (dust, metals, VOCs, and other specific compounds).

Minimum site monitoring requirements are determined during the project design stage, and are specified in this site-specific addendum to the HASP. Site monitoring shall be performed by, or under the direction of a SSHO.

5.1 Required Site Monitoring

Site monitoring is required under the following conditions:

- When required by the contract, or site-specific addendum to the HASP
- When required by specific Occupational Safety and Health Administration (OSHA) standards (e.g., 29 CFR Section 1910.120, hearing conservation, asbestos, benzene, cadmium, inorganic arsenic, lead, formaldehyde, vinyl chloride, etc.)
- When worker exposure is reasonably anticipated to be greater than 50% of the OSHA Permissible Exposure Limit (PEL), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), or other recognized occupational exposure limit
- When necessary to verify the adequacy of hazard control measures and/or PPE, including respiratory protection
- When necessary to assess and evaluate worker exposure, or to resolve worker complaints or concerns

With the concurrence of the HSM, site monitoring may be discontinued after representative initial monitoring is conducted and worker exposures are shown to be adequately controlled through the use of engineering, work practice, or PPE control measures. If work activities change so that the initial monitoring is no longer representative of worker exposure, monitoring must be reinitiated.

5.2 Monitoring Strategy

The site monitoring program considers the factors that may affect worker exposure and the following elements:

- Monitoring requirements, contaminants, and monitoring equipment limitations
- Specific work locations (DP-64), work activities, work practices, personnel, and equipment to be used onsite
- Health and safety program requirements for site monitoring

In addition, all site personnel will be positioned up wind from any activity causing disturbance to the soil (soil borings, well installation) in order to minimize exposure to any chemicals which may be encountered. However, if at any time, chemicals are encountered, all work will stop immediately and the site will be evacuated and closed to the public.

5.3 Direct Reading Exposure Monitoring

Direct reading instruments for exposure monitoring are extremely useful on construction and hazardous waste sites. The primary advantages include ease of use, ability to monitor constantly changing conditions, and the rapid detection of flammable atmospheres, oxygen deficiency, certain gases and vapors, and physical hazards including noise and radiation.

The following are some of the instruments that may be used for exposure monitoring:

- Photoionization detector (PID)
- Flame ionization detector (FID)
- Combustible gas indicator (CGI)
- Specific gas monitors (e.g., oxygen, carbon monoxide, hydrogen sulfide)
- Colorimetric indicating tubes (e.g., Draeger tubes)
- Specialized air monitors
- Noise dosimeter
- Sound level meter (SLM)

Routine direct reading monitoring results (date/time, calibration information, results, and activities monitored) shall be recorded on the Air Monitoring Data Sheet (Real-Time Air Monitoring) or an equivalent form if approved by the Health and Safety Manager. Monitoring results shall be recorded initially and periodically throughout the monitoring period (e.g., every 15 minutes, when results are above background levels, when site operations or locations change, or when unexpected site conditions arise). When direct reading air monitoring results at the work location equal or exceed the action levels specified in the site-specific addendum to the HASP, the SSHO shall conduct exclusion zone perimeter air monitoring. If the air concentrations at the perimeter of the exclusion zone equal or exceed the action level(s), the boundaries of the exclusion zone shall be expanded as necessary to maintain exclusion zone air contaminant concentrations below the action level(s).

Site monitoring will be conducted using direct-reading instruments primarily in the workers' breathing zone. To the extent feasible, site operations will be conducted and modified as needed to ensure that personnel are situated upwind of the excavation activities. Initial upwind background and work-zone readings will be obtained before the initiation of activities. Readings of breathing zones (unless location is otherwise specified) will be taken periodically during all activities. The SSHO has the authority to modify the level of protection required for work at this site as well as halt operations as deemed necessary to control personal exposures. Monitoring results will be recorded on an Atmospheric Monitoring Log Field Health and Safety form maintained by the SSHO. Monitoring, calibrating, and maintaining instruments are the

responsibility of the SSHO. Table 5-1 summarizes the site monitoring parameters and action levels applicable for direct reading exposure monitoring.

Table 5-1. Direct Reading Exposure Monitoring

Activity(s)	Instrument	Action Level(s) and Frequency	Actions
Boring, Drilling, and Well Installation Soil and Groundwater Sampling	TVA 1000B Oorganic vapor analyzer (OVA) Photoionization detector (PID)/ Flame ionization detector (FID) ToxiRae Personal PID	0 - 5 ppm Every 15 minutes during intrusive activities	Continue work in required PPE and continue monitoring.
		≥ 5 and <10 ppm (Sustained for more than 5 minutes)	Monitor for VOCs. Cease work and ensure personnel are upwind, notify the Site Manager. SSHO will upgrade PPE to Level C respiratory protection with organic vapor and HEPA cartridges. Monitor for Benzene. Monitor for Chloroform.
		>10 ppm	Cease work and ensure personnel are upwind, notify the Site Manager and consult with the HSM for further upgrades in PPE.
	Draeger Air Monitor w/ Chloroform chips (By colorimetric tube or similar) Where indicted by PID readings	No detection	Continue work in required PPE and continue monitoring.
		Detection 1ppm or greater	Evacuate area, notify Site Manager and HAFB UXO personnel.
	Draeger Air Monitor w/ Benzene chips (By colorimetric tube or similar) Where indicted by PID readings	No detection up to 0.2 ppm benzene	Continue work activities in required protective equipment.
		> 0.2 ppm and < 5 ppm benzene	Cease work, exit the area to upwind location and notify the Site Manager. SSHO will upgrade PPE to Level C respiratory protection with organic vapor and HEPA cartridges.
		> 5 ppm and < 10 ppm benzene	Cease work, exit the area to upwind location and notify the site manager. SSHO will upgrade respiratory protection to Powered Air Purifying respirator with organic vapor and HEPA cartridges.

Activity(s)	Instrument	Action Level(s) and Frequency	Actions
		>10 ppm benzene	Cease work , exit the area to upwind location and notify the Site Manager SSHO will upgrade PPE to Self-contained breathing apparatus (SCBA).
	Personal DataRam or similar particulate monitor where visible dust exists Visible Dust (Respirable and Total by Particulate Air Monitor)	0 – 1.5 mg/m^3 (respirable) 1 - 5 mg/m^3 (inhalable/total) Every 15 minutes during intrusive activities	Continue work in required PPE and continue monitoring.
		> 1.5 and < 3 mg/m^3 (respirable) > 5 and < 10 mg/m^3 (inhalable/total) Sustained for more than 5 minutes	Cease work and ensure personnel are upwind, notify the Site Manager. SSHO shall upgrade PPE to air purifying respiratory protection with HEPA cartridges. Perform personnel exposure monitoring using integrated timel weighted average (TWA) monitoring.
		> 3 x < 30 mg/m^3 (respirable) > 10 x < 100 mg/m^3 (total inhalable) Sustained for more than 5 minutes	Cease work and ensure personnel are upwind, notify the Site Manager. SSHO shall upgrade PPE to powered air purifying respiratory protection with HEPA cartridges. Perform personnel exposure monitoring using integrated TWA monitoring.

Notes:
ppm = parts per million
mg/m^3 – Milligrams per cubic meter

In order to minimize potential exposure, all personnel will be positioned up wind of the drilling rig in case any chemicals are encountered.

6 SITE CONTROL

Site-specific site control measures will be used to control access to the work area. Table 6-1 and Table 6-2 summarize the site control requirements applicable for both general work areas and work areas with potentially contaminated soils, respectively.

Table 6-1. Site Control for General Work Area(s)

Location	Site Control Procedure (discuss important elements such as signs, barricades, fencing, briefings, sign-in/out logs, etc.)
General Work Area	Due to the location of the project site, access will be coordinated with the Site Manager and HAFB Operations. Access will be made via a specified route.

Table 6-2. Site Control for Potentially Contaminated Area(s)

Location	Site Control Procedure (discuss important elements such as signs, barricades, briefings, qualifications, required supplies and equipment, sign-in/out logs, etc.)
Support Zone	Located outside of contaminated areas, access will be from clean areas or from the Exclusion Zone through the Contamination Reduction Zone.
Contamination Reduction Zone	The Contamination Reduction Zone will be demarcated with caution tape or temporary construction fencing. Decontamination stations will be located here.
Exclusion Zone	Exclusion Zone work areas will be clearly demarcated with caution tape or temporary construction fencing. All access to this area will require the use of a sign-in/out log.

Required decontamination procedures are described below in Table 6-3.

Table 6-3. Decontamination Procedures by Location

Type of Decontamination	Decontamination Methods
Personnel decontamination	Personnel will be required to thoroughly wash hands and face upon leaving the Contamination Reduction Zone, and especially prior to eating, drinking or smoking. Disposable PPE (from potential sampling events) will be collected for proper disposal. Additional decontamination procedures will be developed by the SSHO as needed.
Equipment decontamination	Work efforts will be made to minimize equipment contact with contaminated materials. Prior to leaving the work area and land-farm following placement of contaminated soils, equipment (tires, excavator/loader buckets, hand tools) will be dry decontaminated. Soils from the dry decontamination process will be disposed with the excavated materials. Decontamination tools may include brooms and shovels.

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7 COMMUNICATIONS

Cellular telephones will be available to contact emergency services as required. Refer to Sections 10, 11, and 12 of this site-specific HASP addendum for emergency situations and appropriate actions. Site communication amongst employees shall be a combination of audio, equipment/air horns, and/or line of sight hand communications. Some common hand communication signals include the following:

- Hand gripping throat: Can't breath
- Grip partner's wrist or both hands at waist: Leave area immediately
- Hands on top of head: Need assistance
- Thumbs up: OK, I'm all right, I understand
- Thumbs down: No, negative

Cellular telephone use is not permitted while operating equipment.

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8 MEDICAL SURVEILLANCE AND TRAINING

The medical surveillance and training requirements for Bhate's on-site employees working at DP-64 will follow the requirements outlined in the Basewide HASP Sections 5 and 7.4.

8.1 On-site Training Requirements

All personnel performing on-site work activities, wherein they may be exposed to hazards resulting from field activities, will have completed applicable training in compliance with 29 CFR Part 1910/29 CFR Part 1926 and Engineering Manual (EM) 385-1-1. Table 8-1 provides a summary of the minimum training requirements for site project personnel.

Table 8-1. Required Worker Training and Site-Specific Training

Required Worker Training	Site-Specific Training Requirements
√ 40-hour General Site Worker (Site Worker) √ 8-hour Supervisor (Site Supervisor/Field Team Leader) √ 8-hour Refresher (All field personnel) No retraining requirements are anticipated during the project.	All personnel working on site shall attend site-specific orientation/training prior to starting on site project work. This training will be facilitated by the SSHO. All personnel working on site shall review and sign off on this addendum to the base wide HASP. At least two individuals on site will have current First Aid and CPR training.

8.2 Additional Training Requirements

Additionally, at a minimum, two persons certified in First Aid and Cardiopulmonary Resuscitation (CPR) will be continuously present during site operations.

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9 HAZARDOUS CHEMICALS

Hazardous chemicals (as defined in 29 CFR Section 1910.1200) to be brought or used on-site are identified below. This chemical inventory and Material Safety Data Sheet (MSDSs) will be maintained by the SSHO.

Table 9-1. Sample Chemical Identification

Chemical Name	Amount	Location	Purpose
Assorted fuels, lubricants, coolants, etc. necessary for equipment operation	No storage planned. Quantities limited to immediate use requirements of on-site equipment.	No storage planned. Materials to be brought on-site by vendor's maintenance vehicle.	Equipment Servicing and Operation
Calibration gases for air monitoring equipment, if required for the particular instruments in use	One small aluminum cylinder of each required gas. (Each contains approximately 35 L of gas mixture).	Storage with monitoring equipment in trailer.	Calibration of air monitoring equipment
Groundwater sample preservative	2 mL/vial	Minimal quantities will be required for groundwater sampling.	Groundwater sampling

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10 EMERGENCY ACTION AND RESPONSE

Personnel responsible for coordinating emergency response actions during the DP-64 site investigation activities are identified below in Table 10-1. A map showing directions to the authorized medical facility is attached in Figure 12-1.

Table 10-1. Emergency Coordinator

Responsibility	Name	Phone Number(s)
Task Emergency Coordinator	Mr. John Hymer	Office (505) 679-2100 Cell (505) 491-9171

If an emergency situation develops which requires evacuation of the work area, the evacuation procedures in Table 10-2 shall be followed.

Table 10-2. Evacuation Procedures

Evacuation Step	Methods and Comments
Notify affected workers	Use of site communication methods as applicable
Evacuate to safe location	Assemble at the primary evacuation site (support area outside of the exclusion zone)
Assemble and account for workers	Emergency Coordinator shall account for personnel using site Sign in/Sign out sheet
Notify Fire and Emergency Services	Notification as needed
Notify USACE	Notification as needed
Complete incident report and Preliminary Accident Notification (PAN) form	Follow the Incident Reporting and Investigation Procedure and complete the PAN form and submit to the USACE

Table 10-3 summarizes potential emergency situations and response actions that are applicable for the DP-64 project site.

Table 10-3. Potential Emergency Situations

In Case Of	Response Actions
Munitions and Explosives of Concern	If any munitions or explosives are encountered, all personnel must retreat 300 feet, and immediately contact the Site Manager and HAFB UXO personnel.
Injury or illness	Treat injury with applicable First Aid. All work related injuries beyond first aid will result in notification of Emergency Services and notification of the employee supervisor. Any employee requiring advanced medical treatment will be accompanied by a knowledgeable company employee that can answer potential questions on job duties and hazards. Make notifications in accordance with the Incident Reporting and Investigation Procedure.
Chemical exposure	First Aid shall be provided such as but not limited to: move victim to fresh air, remove contaminated clothing, flush affected skin with water, and seek medical attention.
Fire or explosion	Notify emergency services immediately. All personnel shall evacuate the immediate area of the fire and move to an upwind location. Personnel shall not engage in fire fighting activities use of fire extinguisher) unless trained to do so and only in the incipient stages of fire.
Adverse weather	Tornados, lightning or other threatening weather conditions will result in an immediate shut down of operations and evacuation of personnel. Lightning proximity will be determined by measuring the time interval between the visually observed lightning flash and the subsequent sound of thunder. An interval less than 30 seconds will prompt the shut down. Operations will be shut down for the period of the storm passing plus an additional 20 minutes.
Material spill or release	Vehicles and equipment will be maintained and inspected so as to prevent fluid leaks. Should any vehicle fluid leaks occur the equipment will be taken out of service to make necessary repairs and any contaminated material will be clean-up and disposed of properly. Spill kits will be available to facilitate prompt containment and clean-up of spills. Notification will be made in accordance with the Incident Reporting and Investigation Procedure. Storage areas will be designed to have secondary containment as required, work plans executed to accommodate stormwater runoff and minimize the potential for contamination spread.

11 EMERGENCY CONTACTS

In the event of an emergency, the following contacts should be made, as appropriate:

HAFB Emergency Number (using HAFB phone system).....9-911
Operators will assist with Medical, Fire, and Police emergencies

HAFB Security Force.....(505) 572-5037

HAFB Fire Protection.....(505) 572-1117

HAFB Hospital – 49th Medical Group (Main switchboard).....(505) 572-2778

49th DES/CED EOD Unit.....(505) 572-5141

USACE (TOM Zink) ..... (402) 221-7666

Civilian Hospital (Alamogordo) Gerald Champion Regional Medical Center.....(505) 439-6100

After initial contacts have been made and the situation has stabilized, notify the Site Manager/SSHO, Senior Project Manager, and/or HSM, as appropriate.

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12 HOSPITAL DIRECTIONS

In the event of a true medical emergency ("life or limb"), HAFB Emergency Services should be used. Notification of any injury must be made to HAFB Emergency Services. Bhate personnel and subcontractors should not transport injured personnel to the HAFB Hospital without prior authorization from HAFB Emergency Services.

Other injuries should be treated as necessary at Gerald Champion Regional Medical Center at 2669 Scenic Drive, Alamogordo, NM 88330. From HAFB, exit the Main Gate and proceed east on US-70 onto US-54, continue north on US-54 to Indian Wells Road, turn right heading east to Scenic Drive, and turn left on Scenic proceed to the medical center. A map to this hospital is presented in Figure 12-1.

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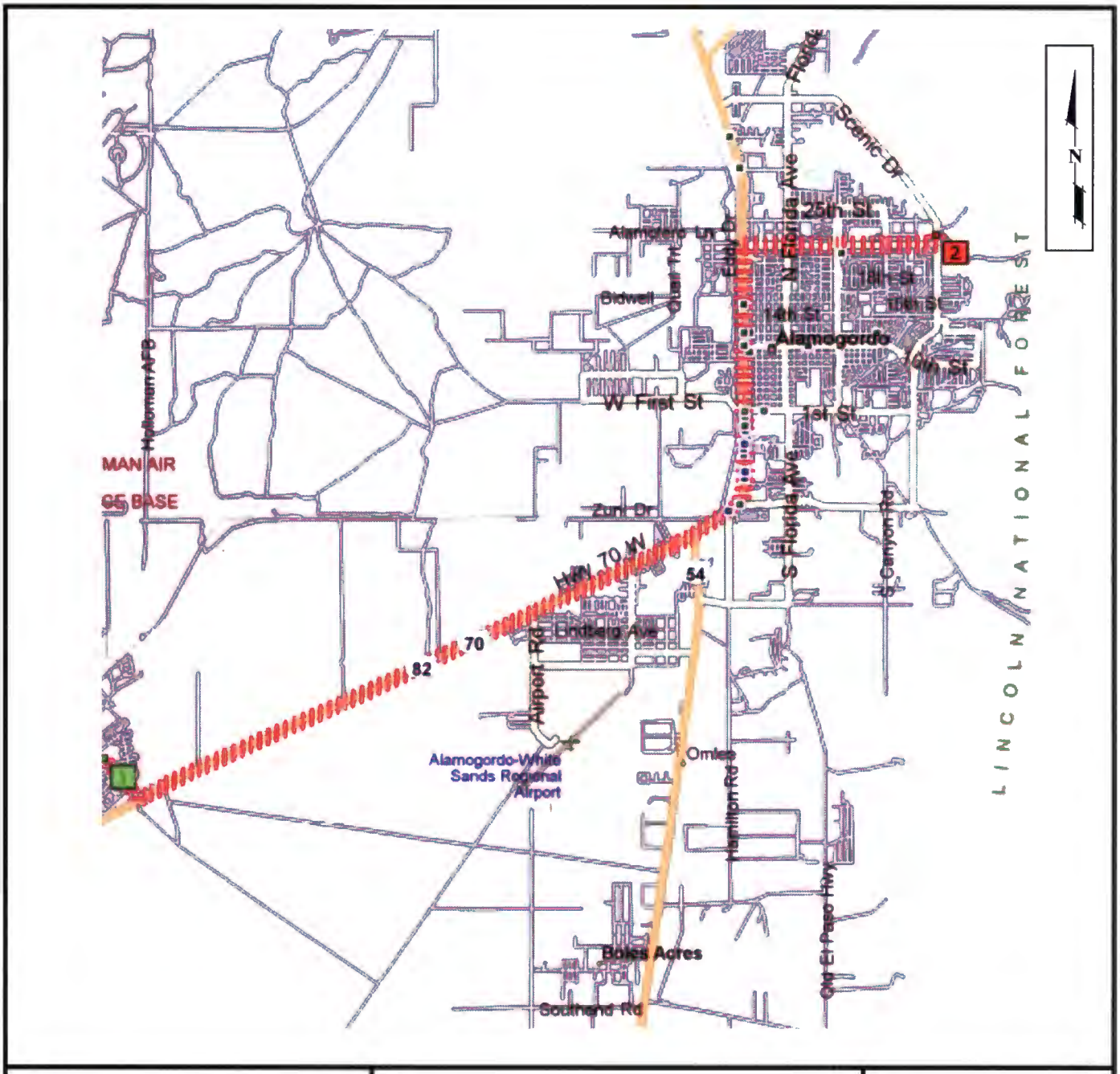
FIGURES



bhate associates ENGINEERING, SCIENCE AND CONSTRUCTION	Source: Microsoft Expedia Street Maps HOSPITAL ROUTE MAP Gerald Champion Regional Hospital	Holloman Air Force Base Health and Safety Plan Figure 12-1
	Not to Scale / Date: 9/13/07	

ATTACHMENTS

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ATTACHMENTS

ATTACHMENT A

ACTIVITY HAZARD ANALYSES (AHAS)

AHA No.	AHA Title
AHA - 1	General Site Activities/Mobilization and Demobilization
AHA - 2	Soil Boring and Monitoring Well Installation

Activity Hazard Analysis (AHA) – 1

Task: General Site Activities/Mobilization and Demobilization		**Project:** Chemical Agent Disposal Site (DP-64)
Minimum Personal Protective Equipment (PPE): Level D PPE		**Location:** Holloman Air Force Base, New Mexico
Activity	**Potential Hazard(s)**	**Control Measures**
General site activities Mobilization and Demobilization Note: Each workday shall begin with a mandatory daily safety meeting for all on-site workers	Slips, trips, or falls on walking and working surfaces	• Maintain clean work areas by following good housekeeping procedures • Be alert for uneven terrain and steep slopes • Wear slip resistant footwear when walking/working on slippery surface • Keep work area free of dirt, grease, slippery materials, debris, and tools • Provide adequate lighting in all work areas • Flag or cover work areas to protect against falls
	Exposure to high noise from heavy equipment and power tools	• Hearing protection will be worn with a noise reduction rating capable of maintaining personal exposure below 85 decibels on an A weighted average (dBA) (ear muffs or plugs) • SSHO will determine the need for hearing protection (e.g. difficulty with voice communication at a distance of 3 feet or less) • All equipment will be equipped with manufacturer's required mufflers
	Eye injury	• Use approved safety glasses with rigid side shields.
	Overhead hazards	• Personnel will be required to wear hard hats that meet ANSI Standard Z89.1 in all construction areas, and areas with overhead hazards
	Dropped objects	• Steel toe boots meeting ANSI Standard Z41 will be worn in all construction areas
	Back injury from lifting heavy loads	• Site personnel will be instructed on proper lifting techniques • Mechanical devices should be used to reduce manual handling of materials • Team lifting should be utilized if mechanical devices are not available
	Thermal Stressors (i.e. heat stress, cold stress)	• Employees will have appropriate clothing for variable weather • Wear long sleeves and long pants, sunscreen with a high sun protection factor (SPF) on exposed skin • Employees will take breaks and drink plenty of fluids, as necessary, to prevent heat stress • Refer to the Basewide HASP for detailed information on heat and cold stress

AHA – 1 (continued)

Activity	Potential Hazard(s)	Control Measures
General site activities Mobilization and Demobilization (continued)	Spills/Fire	• Fuel cans will be National Fire Protection Association (NFPA) approved and used with pouring spout or funnel • Equipment shall be conducted in approved locations • Spill and absorbent materials will be readily available • Smoking and open flames are not permitted in fueling/greasing areas • All heavy equipment will be equipped with a ABC type fire extinguishers which will be inspected monthly and documented
	Vehicular traffic in work area and heavy equipment operation	• Maintain awareness of vehicle movement in work area • Exercise caution when approaching heavy equipment • Equipment will be equipped with functioning back-up alarms, signal lamps and alerting horns; operators are required to use seat belts
	Inclement weather (Thunderstorms and tornadoes)	• Halt activities immediately and take cover during thunderstorm or tornado warnings, shelter in a building if possible, and stay away from windows • If outdoors, crouch close to ground and limit body surface in contact with ground by staying on feet • Listen to radio or TV announcements for pending weather information • Do not try to outrun a tornado on foot or in a vehicle
	Extension cords/electrical	• Extension cords shall be inspected daily • Extension cords that have faulty plugs, damaged insulation, or are unsafe in any way shall be removed from service • Cords shall be protected from damage from sharp edges, projection, pinch points (doorways), and vehicular traffic • Cords shall be designed for heavy duty use • Ground fault circuit interrupter (GFCI) will be used in all outdoor applications

AHA – 1 (continued)

Equipment Used	Inspection Requirements	Training Requirements
Level D PPE First Aid Kits Portable Eyewash Fire Extinguishers Mobilization Equipment	Weekly inspections will be performed on fire extinguishers. Weekly inspections will be performed on first aid kits. Portable eye wash will be inspected weekly. Informal daily and formal weekly health and safety inspections to be performed.	Personnel have read and understand the work plan and AHA Site specific briefing At least two individuals on-site will have current CPR and First aid training

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Activity Hazard Analysis (AHA) – 2

Task: Soil boring and monitoring well installation		**Project:** Chemical Agent Disposal Site (DP-64)
Minimum Personal Protective Equipment (PPE): Level D PPE		**Location:** Holloman Air Force Base, New Mexico
Activity	**Potential Hazard(s)**	**Control Measures**
Soil Boring and Sampling Hazards and recommended controls from AHA – 1 apply	Drill Rig Hazards Including but not limited to: Flying debris, falling objects, noise, hydraulic failures, unguarded machinery, equipment rollover, movement of large, heavy drilling tools, etc.	• Drill rig is to be operated and maintained by qualified operators • A Drill Rig Inspection Checklist should be completed daily to ensure that the rig is operating properly (the inspection will include fittings, cables, pins, connections, lubrication points, controls, emergency stops, etc.) • To the extent possible, the terrain should be level and the condition of the ground such that unexpected movement of the rig is unlikely • Stabilize the rig prior to boring • Wear required PPE (hard hat, safety glasses, work gloves, ear muffs or plugs, steel toe work boots), ensure loose clothing is secured • Maintain good housekeeping on and around drill rig
	Overhead/buried utilities	• Conduct a utility locate to identify the location of underground utilities in boring locations and complete any required dig permits • Overhead utilities should be considered live until determined otherwise • Maintain a minimum distance of 15 feet from overhead utilities • All underground utilities must be clearly marked before beginning work • No borings shall be made within a 4 foot "Buffer Zone" of any utility marking
	Exposure to soil contaminants	• To the extent feasible, limit contact with subsurface materials • Wear required PPE when conducting intrusive activities • SSHO shall conduct breathing zone monitoring for VOCs with a PID in accordance with requirements for site monitoring; SSHO may require an upgrade in PPE or modification to work based on monitoring results • Use appropriate decontamination methods
	Explosives and chemicals previously used on site	• To the extent possible, a magnetometer will be used at the soil surfaces where borings/monitoring wells will be installed, in order to avoid anomalies. • If site employees encounter items, articles, or foreign objects (including broken glass or metal components resembling MEC) that cannot be easily identified, work shall cease immediately; all employees must evacuate the work area to a minimum of 300 feet and the appropriate military contact personnel will be notified

AHA – 2 (Continued)

Activity	Potential Hazards	Recommended Controls
Monitoring Well Installation	Pinch points	• Utilize appropriate PPE (leather gloves) when handling well casings and tools
	Dust	• Use care when installing well materials (sand, bentonite, Portland cement) into monitoring well to prevent dust generation; position body in an upwind location
Well Development / Groundwater depth measurement and sampling	Exposure to groundwater contaminants	• Position body upwind from monitoring well prior to opening cap • Wear appropriate PPE including chemical resistant gloves and Tyvek coveralls to minimize potential contact with groundwater, as appropriate • Conduct work activities in a manner that minimizes potential contact with groundwater • Collect all PPE and disposable sampling equipment and dispose of properly • Wash hands and face prior to eating, drinking, or smoking
Safety Equipment Used	**Inspection Requirements**	**Training Requirements**
Level D PPE First Aid Kit Fire Extinguisher	Informal daily work area inspections to be conducted by the SSHO and formal inspections to be conducted on a weekly basis	• Site personnel have read and understand the site-specific addendum to the HASP • Site personnel possess all of the required training as specified in the site-specific addendum to the HASP • Site personnel received site specific safety indoctrination • At least two individuals on-site will have current CPR and First aid training • Personnel have read and understand the work plan and AHA • Training in PPE inspection, use, and maintenance is conducted as part of the initial hazardous waste 40-hour training. This training provides personnel with an understanding of the inspection, use (including donning, doffing, adjusting, and wearing), limitations, care, and maintenance of PPE.

ATTACHMENT B
GENERAL WORK AND SAFETY RULES

ATTACHMENT B

GENERAL WORK AND SAFETY RULES

All site personnel will adhere to the following general safety rules. These precautionary measures are designed to reduce the risks of inadvertent or accidental injury or chemical exposure during onsite operations.

1. All site personnel must attend each day's Daily Safety Briefing.
2. Be familiar with standard operating procedures and adhere to all instructions and requirements in the Corporate Health and Safety Plan or site-specific addendum to the HASP.
3. Any individual taking prescribed drugs shall inform the SSHO of the type of medication. The SSHO will review the matter with the HSM, as necessary, who will decide if the employee can safely work onsite while taking the medication.
4. Medicine and alcohol can exacerbate the effects from exposure to toxic chemicals. While field operations are in effect, alcoholic beverage intake should be minimized or avoided during off-work hours. Personnel performing onsite operations should not take prescribed drugs where the potential for absorption, inhalation, or ingestion of toxic substances exists unless specifically approved by a qualified physician. Do not work when ill.
5. The personal protective equipment specified by the Corporate Health and Safety Plan or site-specific addendum to the HASP shall be worn by all site personnel. This includes hard hats and safety glasses which must be worn at all times in active work areas.
6. Facial hair (beards, long sideburns, or mustaches) which may interfere with a satisfactory fit of a respirator mask is not allowed on any person who may be required to wear a respirator.
7. Eating, drinking, chewing tobacco or gum, smoking, and any other practice that may increase the possibility of hand-to-mouth contact is prohibited in the work area. (Exceptions may be permitted by the SSHO to allow fluid intake during heat stress conditions.)
8. All lighters, matches, cigarettes, and other forms of tobacco are prohibited in the work area.
9. All signs and demarcations shall be followed. Such signs and demarcations shall not be removed except as authorized by the SSHO.
10. No one shall enter a permit-required confined space without a permit. Confined space entry permits shall be implemented as issued.
11. All personnel must follow Hot Work Permits as issued.
12. All personnel must follow the work-rest regimens and other practices required by the heat stress program.
13. Rest breaks shall be taken in approved locations.
14. All personnel must follow lockout/tagout procedures when working on equipment involving moving parts or hazardous energy sources.
15. No person shall operate equipment unless trained and authorized.

16. No one may enter an excavation greater than 4 feet deep unless authorized by the Competent Person. Excavations must be sloped or shored properly. Safe means of access and egress from excavations must be maintained.
17. Ladders and scaffolds shall be solidly constructed, in good working condition, and inspected prior to use. No one may use defective ladders or scaffolds.
18. Fall protection or fall arrest systems must be in place when working at elevations greater than 6 feet for temporary working surfaces and 4 feet for fixed platforms.
19. Safety belts, harnesses, and lanyards must be selected by the Site Manager. The user must inspect the equipment prior to use. No defective personal fall protection equipment shall be used. Personal fall protection that has been shock loaded must be discarded.
20. Hand and portable power tools must be inspected prior to use. Defective tools and equipment shall not be used.
21. Ground fault interrupters shall be used for cord and plug equipment used outdoors or in damp locations. Electrical cords shall be kept out of walkways and puddles unless protected and rated for the service.
22. Improper use, mishandling, or tampering with health and safety equipment and samples is prohibited.
23. Horseplay of any kind is prohibited.
24. Possession or use of alcoholic beverages, controlled substances or firearms on any site is forbidden.
25. All incidents, no matter how minor must be reported immediately to the Site Manager.
26. All personnel shall be familiar with the Site Emergency Response Plan.

The above health and safety rules are not all inclusive and it is your responsibility to comply with all regulations set forth by OSHA, the Bhate Corporate Health and Safety Plan, site-specific addendum to the HASP, or our Clients.