



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

HAFB 07

JUL 24 2007

MEMORANDUM FOR NEW MEXICO ENVIRONMENT DEPARTMENT

Attn: Mr. 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 the Notice of Deficiency (NOD) for the Technical Memorandum Letter Report, S1-MW3 Source Investigation, August 2006.

1. The following items are attached to complete the NOD response to the NOD for the voluntary Technical Memorandum Letter Report, S1-MW3 Source Investigation.

- a. A copy of the NOD letter dated December 12, 2006.
- b. Changed text from the report with "track changes" feature enabled.
- c. Changed Figures from the report.
- d. Changed Tables from the report.

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 Mr. George Fish at (505) 572-5395.

  
A. DAVID BUDAK  
Deputy Base Civil Engineer

Attachments:

- 1. A copy of the NOD letter dated December 12, 2006
- 2. Changed text from the report with "track changes" feature enabled
- 3. Changed Figures from the report
- 4. Changed Tables from the report

cc (w/o Atchs):

Mr. David Strasser  
Hazardous Waste Bureau  
5500 San Antonio Dr. NE  
Albuquerque, NM 87109

Mr. Will Moats  
Hazardous Waste Bureau  
5500 San Antonio Drive NE  
Albuquerque, NM 87109

Mr. Bob Sturdivant  
USEPA, Region 6 (6PD-F)  
1445 Ross Ave., Ste 12  
Dallas, TX 75202-2733



BILL RICHARDSON  
GOVERNOR

State of New Mexico  
**ENVIRONMENT DEPARTMENT**

Hazardous Waste Bureau  
2905 Rodeo Park Drive East, Building 1  
Santa Fe, New Mexico 87505-6303  
Telephone (505) 428-2500  
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RON CURRY  
SECRETARY

**CERTIFIED MAIL - RETURN RECEIPT REQUESTED**

December 12, 2006

Ms. Debbie Hartell, Chief  
Environmental Flight  
49 CES/CEV  
550 Tabosa Ave.  
Holloman AFB, NM 88330-8458

**RE: NOTICE OF DEFICIENCY: TECHNICAL MEMORANDUM LETTER  
REPORT, S1-MW3 SOURCE INVESTIGATION, AUGUST 2006  
HOLLOMAN AIR FORCE BASE, EPA ID NO. NM6572124422  
HWB-HAFB-06-005**

Dear Ms. Hartell:

The New Mexico Environment Department (NMED) has reviewed the referenced Source Investigation Report (Report) dated August 2006. The Report cannot be approved at this time. Holloman Air Force Base (the Permittee) must address the following deficiencies before the Report can be approved.

1. The Report included a compact disk which provided all soil and ground water laboratory result reports and Table 1 provided the minimum and maximum concentrations of volatile organic compounds (VOCs) detected in the ground water. However, no summary tables were presented to show all contaminant detections in soil and ground water. The Permittee is, therefore, required to submit summary tables showing all soil and ground water contaminant detections. These tables must include the following:
  - Sample ID numbers,
  - Soil sample depths,
  - Method detection limits,
  - Analytical results and units of measurement, and

- Corresponding soil screening levels (SSLs) and ground water standards, either New Mexico Water Quality Control Commission (NMWQCC) standards or standards established through the Permit.

2. **Page 6 of 15, Section 4.1, 1<sup>st</sup> Paragraph, Soil Sampling Analytical Results**

This paragraph states that the SSL for Total Petroleum Hydrocarbons (TPH)-Gasoline Range Organics (GRO) is not applicable since the primary chemicals of TPH-GRO (i.e. VOCs) are evaluated separately. The NMED does not agree with this assertion. TPH Screening Guidelines (November 2005) have been established by the NMED to ascertain if the residual level of petroleum in soil represents an unacceptable risk (e.g. vapor migration) to users of the site and/or provides a continuing source of ground water contamination.

The concentration of TPH-GRO in the soil at 15 feet below ground surface (bgs) in boring DP-21 was 1,200 mg/kg. The residential SSL for jet fuel (the contaminant of concern) is 940 mg/kg. In addition to this elevated TPH-GRO concentration, several other VOCs and semi-volatile organic compounds (SVOCs) were detected in this soil sample, albeit at concentrations less than the SSL. Therefore, the NMED considers the soil at this location (DP-21) to be a possible continuing source of ground water contamination. See Comment #4 for further requirements regarding this potential source.

3. **Page 6 of 15, Section 4.2, Groundwater Sampling Analytical Results and Figure 3**

This Section and Figure indicate that only concentrations of benzene, ethylbenzene and 1,2-dichloroethane were detected in ground water above NMWQCC Standards. The Permittee is advised that the following contaminants were also detected in ground water above standards:

Contaminant	Concentration (µg/L)	Well #	NMWQCC Standard (µg/L)	Standard Per Permit (µg/L)
Naphthalene	163	DP-21	30	
n-Propylbenzene	236	DP-21		96
1,2,4-TMB	231	DP-21		5
1,3,5-TMB	86	DP-21		5
1,2,4-TMB	19.4	DP-22		5
1,3,5-TMB	32.1	DP-22		5

The Permittee is required to revise this Section and Figure to indicate these exceedances.

Ms. Debbie Hartell  
December 12, 2006  
Page 3 of 4

4. Page 7 of 15. Section 5, Conclusions

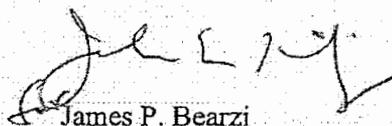
This Section indicates that all detected analytes in the soil were below the NMED SSLs and, therefore, a source area removal is not required. As per Comment #2 above, NMED does not necessarily agree with this assertion. In order to further characterize the potential contamination source area in the vicinity of boring DP-21, the Permittee is required to advance a minimum of two additional soil borings within twenty to forty feet of boring DP-21 to a depth of approximately twenty feet bgs. Soil samples are to be collected from a depth showing the highest level of contamination based on organic vapor analyzer readings and analyzed for TPH (full range), VOCs and SVOCs. The results of this additional characterization activity must be submitted along with the other responses to the Notice.

5. Figures 1, 2, 3 and 4

NMED requires that all site figures include a coordinate system (i.e., UTM, latitude/longitude) and the boundaries of the site must be shown on the figures. Coordinates of site boundaries must also be shown. High accuracy (+/-3 ft) GPS coordinates are acceptable. The Permittee is required to resubmit the subject figures satisfying these requirements

Please respond to this Notice of Deficiency within ninety (90) calendar days of receipt of this notice. If you have any questions regarding this matter or if you would like to discuss the comments prior to your response, please contact David Strasser of my staff at (505) 222-9526.

Sincerely,



James P. Bearzi  
Chief  
Hazardous Waste Bureau

JPB:dcs

cc: J. Kieling, NMED HWB  
W. Moats, NMED HWB  
C. Amindyas, NMED HWB  
D. Strasser, NMED HWB  
D. Tellez, EPA, Region 6 (6PD-F)

Ms. Debbie Hartell  
December 12, 2006  
Page 4 of 4

G. Fish, HAFB  
File: HAFB 2006 and Reading  
HWB-HAFB-06-005

**TECHNICAL MEMORANDUM  
LETTER REPORT  
FOR  
S1-MW3 SOURCE INVESTIGATION  
HOLLOMAN AFB, NEW MEXICO**

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**DATE:** August 10, 2006  
**FROM:** Jim Moore, Bhate Environmental Associates, Inc.  
**TO:** Dave Griffin, 49 CES/CEV, Holloman Air Force Base, NM  
**SUBJECT: S1-MW3 SOURCE INVESTIGATION**

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## 1.0 INTRODUCTION

This technical memorandum was prepared by Bhate Environmental Associates, Inc. (Bhate) for the Environmental Flight 49<sup>th</sup> CES/CEV, Holloman Air Force Base (HAFB), New Mexico. This memorandum presents the results of the subsurface investigation performed to identify the source of benzene historically detected in monitoring well S1-MW3. The most recent sampling of this well was performed in December 2005 as part of the 2005 Long-Term Groundwater Monitoring Program and benzene was reported in excess of the New Mexico Water Quality Control Commission (NMWQCC) groundwater standard of 10 micrograms per liter ( $\mu\text{g/L}$ ) (New Mexico Administrative Code [NMAC] 20.6.2). This investigation was conducted in accordance with the *Memorandum Scope of Work for Soil and Groundwater Sampling and Analysis* (Bhate, May 2006). This Scope of Work was performed through the U.S. Army Corps of Engineers (USACE), under contract DACA45-03-D-0023, Task Order No. 007.

## 2.0 SITE LOCATION, DESCRIPTION AND BACKGROUND

Monitoring well S1-MW3 was one of five wells installed during the Remedial Investigation conducted at the Main Base Landfill (LF-01, Solid Waste Management Unit [SWMU] 106) in 1989 (Walk, Haydel and Associates, 1989). These wells were installed around the landfill to establish the groundwater flow direction and to determine if groundwater contamination was present. The primary purpose of installing S1-MW3 was to contribute groundwater elevation data south of the landfill. Monitoring well S1-MW3 is located approximately 0.3 miles downgradient of LF-01 and is adjacent to the Petroleum, Oil and Lubricants

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(POL) Storage Area (Site SS-02&05) in the vicinity of an abandoned POL railroad supply line (Figure 1).

Benzene (82 µg/L), 1, 2-dichloroethane (9 µg/L), toluene (6 µg/L), and total xylenes (85 µg/L) were initially detected in the groundwater sample collected from S1-MW3 during the 1989 Remedial Investigation (Walk, Haydel & Associates, 1989). In December 1994 the well was resampled as part of the Phase II RCRA Facility Investigation (RFI) conducted at Site SS-02&05 and benzene was detected at a concentration of 4,100 µg/L (Foster Wheeler, June 1995). In August 1995, the well was sampled as part of the LF-01 Long Term Monitoring (LTM) program. Benzene was detected in S1-MW3 at a concentration of 3,900 µg/L. Other volatile organic compounds detected in this well were isopropylbenzene at 51 µg/L and naphthalene at 56 µg/L. Additionally, arsenic (10 µg/L) and lead (42 µg/L) were detected in S1-MW3 during the 1995 sampling event and concentrations below their respective NMWQCC standards.

The 1995 Long Term Groundwater Monitoring Report attributed the detected volatile organic compounds (VOCs) in well S1-MW3 to the dissolved petroleum hydrocarbon plume related to Site SS-02&05. Based on recommendations included in the 1995 LTM Report, well S1-MW3 was removed from the LF-01 LTM groundwater sampling program in 1997, 1999 and 2001 (Foster Wheeler and Groundwater Technology, June 1996).

Monitoring well S1-MW3 was sampled for VOCs as part of the 2003 LTM program based on the recommendation provided by the New Mexico Environment Department (NMED) after reviewing the 2001 Revised Final LTM Report (Foster Wheeler, 2003). No VOCs were detected in the groundwater sample collected from well S1-MW3 during the April 2003 sampling event (US Army Corps of Engineers, September 2003).

In December 2005 well S1-MW-03 was sampled for VOCs, metals (arsenic, barium, iron, manganese and selenium) and total dissolved solids as part of the LTM program. Concentrations of VOCs detected in the sample included benzene (319 µg/L), acetone (11.2 µg/L), 1,2-dichloroethane (9.4 µg/L), isopropylbenzene (38.6 µg/L) and sec-butylbenzene (5.0 µg/L). This concentration of benzene is above NMWQCC standard for benzene (10 µg/L). On January 30, 2006, a confirmation sample was collected at S1-MW3 and analyzed for VOCs. The concentration of benzene was confirmed in the confirmation sample (201 µg/L) and also exceeded the NMWQCC standard. TDS was detected in S1-MW3 with a concentration of 47,400 milligrams per liter (mg/L) (Bhate, 2006).

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### 3.0 FIELD ACTIVITIES

To address the presence of benzene and VOCs identified in monitoring well S1-MW3, additional soil and groundwater characterization was performed in the immediate proximity of this well. Soil samples were collected with a direct push technology (DPT) drilling rig and six groundwater samples were collected from five temporary and one existing monitoring well. Specific details of the soil and groundwater sampling procedures are discussed below.

#### 3.1 Soil Boring and Sampling

In May 2006, five soil borings (DP20 through DP24) were installed upgradient of well S1-MW3 in the immediate vicinity of the abandoned railroad track for the purpose of soil sampling and temporary monitoring well installation (Figure 1). The subsurface soil samples were collected in accordance with HAFB Standard Operating Procedures (SOPs) provided in the *Base-wide Quality Assurance Project Plan* (Bhate, November 2003). The soil borings were installed using an AMS Power Probe 9600E DPT rig, a 48-inch MacroCore® soil sampling device and associated tooling. These soil borings were sampled continuously to a depth of 14.5 to 21.0 feet (ft) below ground surface (bgs).

Soil samples were visually classified in the field by a geologist according to the Unified Soil Classification System. Soils were screened with a TVA 1000 Organic Vapor Analyzer (OVA) to aid in selecting samples for laboratory analysis. One subsurface soil sample was collected from each borehole from the most contaminated zone based on the results of the headspace analysis and/or other observations such as staining and odor for offsite laboratory analysis. Appendix A contains the drilling logs for this investigation.

Laboratory analytical services using USEPA SW 846 methodology were procured through Accutest Laboratories, Inc located in Orlando Florida. The *Base-wide Quality Assurance Project Plan* (Bhate, November 2003) was followed throughout the processes of sample collection, handling and laboratory analysis. Soil samples were analyzed for:

- Total Petroleum Hydrocarbons (TPH) (Gasoline Range Organics [GRO] /Diesel Range Organics [DRO]/Oil Range Organics [ORO]) by Method 8015M
- Volatile Organic Compounds (VOCs) by Method 8260B
- Semi Volatile Organic Compounds (SVOCs) by Method 8270C
- Target Analyte List (TAL) Metals by Method 6010 and 7471A

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### 3.2 Groundwater Monitoring Well Installation and Sampling

Temporary monitoring wells were installed in each of the five DPT soil borings (DP20 through DP24) for the purpose of collecting groundwater samples (Figure 1). The groundwater monitoring constructed of 1-inch ID polyvinyl chloride (PVC). Each well was screened with 5 or 10 feet of 0.020 inch factory slotted PVC. The annular space surrounding the screen was backfilled with 10/20 Colorado silica sand and capped with a 2-foot layer of bentonite pellets. The monitoring wells were completed as flush mount well completions. Appendix B contains the well construction diagrams for these wells. Each well was developed to promote hydraulic communication with the aquifer and to remove fines prior to sampling.

In June 2006, groundwater samples were collected from each of the temporary monitoring wells after each well was developed. In addition, one groundwater sample was collected from the existing downgradient well MW-02&5-09 (Figure 1). Groundwater samples were collected from each well using disposable polypropylene tubing attached to a peristaltic pump. Prior to sampling, the static water level in each well was measured to the nearest 0.01 feet using an electronic water level measuring device. The well was purged of either three standing casing volumes or until dry (and permitted to recover) prior to sample collection. Groundwater samples were collected under low-flow conditions and transferred directly from the sampling tubing to the sample containers provided by the analytical laboratory. The samples were preserved, placed on ice to 4 degrees centigrade and transported under strict chain-of-custody to the analytical laboratory.

The groundwater samples were analyzed using recognized USEPA SW 846 methodology by Accutest Laboratories, Inc. located in Orlando, Florida. The Base-wide Quality Assurance Project Plan (QAPP) was followed throughout the processes of sample collection, handling and laboratory analysis. Groundwater samples were analyzed for:

- VOCs by Method 8260B
- TDS by Method 160.1

### 3.3 Surveying

Sample locations were surveyed in accordance with methods described in the QAPP (Bhate, November 2003). The temporary monitoring well locations (DP20 through DP24) the existing Site SS-02&05 monitoring well network and well S1-MW3 are referenced with horizontal coordinates, and top of casing elevations were obtained for each monitoring well. All elevations are referenced to the

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North American Datum (NAD) 1983. All horizontal coordinates are referenced to the State Plane Coordinate System, New Mexico Central. Elevations and coordinates are surveyed to the closest 0.001 foot.

### 3.4 Equipment Decontamination

All reusable equipment associated with soil sampling was decontaminated in accordance with the HAFB SOPs provided in the *Base-wide QAPP* (Bhate, November 2003).

### 3.5 Waste Handling

All investigation derived waste (IDW) produced during the investigation process was handled in accordance with the HAFB SOPs provided in the *Base-wide QAPP* (Bhate, November 2003).

## 4.0 SAMPLING RESULTS

This section presents the subsurface soil and groundwater sample results. The DPT soil boring/monitoring well locations are shown on Figure 1. The complete soil and groundwater analytical results by sample delivery group are included in Appendix C (compact disc insert). All detections for the VOC, SVOC, TAL Metals, TPH (GRO/DRO/ORO) and TDS analyses for soil and groundwater are respectively presented in Tables 1 and 2.

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### 4.1 Soil Sampling Analytical Results

The five subsurface soil samples collected from soil borings DP20 through DP24 were analyzed for VOCs, SVOCs, TPH (GRO/DRO/ORO), and TAL metals. Several VOCs were detected in the subsurface soil samples collected from DP21, DP22 and DP23 (Figure 2). The VOCs include benzene, n-butylbenzene, sec-butylbenzene, ethylbenzene, isopropylbenzene, p-isopropyltoluene, naphthalene, n-propylbenzene, 1, 2, 4-trimethylbenzene, 1, 3, 5-trimethylbenzene, and m, p-xylene. A gray discolored zone with a strong petroleum odor (2,547 parts per million OVA reading) was reported in soil boring DP21 from 14 to 19 ft bgs. The highest concentrations of VOCs were found in the sample collected at 15 ft in DP21 where benzene was reported at 1.76 milligrams per kilogram (mg/kg), ethylbenzene at 17.4 mg/kg, naphthalene at 5.25 mg/kg, 1, 2, 4-trimethylbenzene at 30.8 mg/kg, 1, 3, 5-trimethylbenzene at 12.6 mg/kg, and m, p-xylene at 7.71 mg/kg. All detected VOCs were below their respective NMED soil screening levels (SSL) (NMED, 2006). VOCs detected in soil samples collected during this sampling event are shown on Figure 2.

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SVOCs were only detected in the soil sample collected from DP21. The concentrations of 2, 4-dinitrotoluene (0.305 mg/kg), dibenzofuran (0.165 mg/kg), fluorene (0.0886 mg/kg), 2-methylnaphthalene (4.71 mg/kg) and naphthalene (1.22 mg/kg) were all below their respective NMED soil screening levels (SSL) (NMED, 2006). TPH fractions GRO (C<sub>6</sub> – C<sub>10</sub>) and DRO (C<sub>10</sub> – C<sub>28</sub>) were detected in the soil samples collected from DP21, 22 and 23. The highest concentrations of GRO (1,200 mg/kg) and DRO (676 mg/kg) were detected in the soil sample collected from boring DP-21. The TPH-GRO concentration in this sample exceeds the NMED SSL (NMED,2006) of 940 mg/kg.

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Deleted: are not required since the primary chemicals of TPH-GRO (i.e., benzene, toluene, ethylbenzene and xylenes) are evaluated separately. Additionally the maximum concentration of TPH-DRO was below the NMED TPH Screening Guideline for kerosene and jet fuel (760 mg/kg) (NMED, 2005). The TPH fraction ORO (>C<sub>22</sub> – C<sub>36</sub>) was not detected in any of the samples collected during this investigation.

With the exception of arsenic all of the TAL metals detected in these soil samples were below the NMED SSLs. Arsenic concentrations ranged from 5.1 to 5.9 mg/kg in borings DP22, 23 and 24. Although the NMED SSL for arsenic is 3.9 mg/kg the established HAFB upper tolerance limit (UTL) is 6.88 mg/kg indicating that the arsenic is naturally occurring.

#### 4.2 Groundwater Sampling Analytical Results

The seven groundwater samples (including one duplicate) collected from temporary monitoring wells DP20 through DP24 and existing monitoring well MW-02&05-9 were analyzed for VOCs and total dissolved solids (TDS). A variety of VOC analytes were detected in the seven groundwater samples collected from the monitoring well network. Table 3 presents the minimum and maximum concentrations for VOCs detected in these samples. The most frequently detected VOCs were benzene, sec-butylbenzene, ethylbenzene, isopropylbenzene, naphthalene, 1, 2, 4-trimethylbenzene, 1, 3, 5-trimethylbenzene, and m, p-xylene. Benzene, the most widely distributed VOC constituent was detected in four of the six wells sampled with concentrations ranging from 4.0 to 614 µg/L.

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The maximum concentrations of benzene (614 µg/L), sec-butylbenzene (35.0 µg/L), ethylbenzene (2,230 µg/L), isopropylbenzene (167 µg/L), naphthalene (163 µg/L), 1, 2, 4-trimethylbenzene (231 µg/L), 1, 3, 5-trimethylbenzene (86.0 µg/L), and m, p-xylene (67.9 µg/L) were detected in the sample collected from the temporary monitoring well installed in soil boring DP21 (borehole containing a 5-ft thick gray discolored zone with strong petroleum odor). Concentrations of 1, 2-dichloroethane (17.2 µg/L) and methyl ethyl ketone (10.7 µg/L) were also detected in the temporary monitoring wells DP20 and DP22, respectively. VOCs detected in groundwater samples for this sampling event are shown on Figure 3.

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Concentrations of benzene, ethylbenzene, 1, 2-dichloroethane and naphthalene were detected above the New Mexico Water Quality Control Commission (NMWQCC) Human Health Standards (New Mexico Administrative Code [NMAC] 20.6.2) for these compounds (10 µg/L, 750 µg/L, 10 µg/L and 30 µg/L, respectively) in wells DP20, DP21 and DP22.

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TDS concentrations ranged from 9,120 (DP24) to 52,700 mg/L (MW-02&5-09). It is hypothesized that the TDS concentration found in DP24 is artificially low due to the dilution of natural groundwater from leaking water lines associated with the POL Storage Area (Site SS-02&05). It appears that artificial mounding of the groundwater table from leaking water lines has altered the natural groundwater flow direction from the east towards Dillard's Draw to the north along the eastern side of Site SS-02&05 (Figure 4). This hypothesis is also verified by the fact that TDS concentrations steadily increased in the wells downgradient of DP24 to a maximum TDS concentration of 52,700 mg/L detected in MW-02&5-09.

### 4.3 Site Hydrogeology

Water levels for the five temporary monitoring wells (DP20 through DP24) and nine existing wells (S1-MW3, MW-02&5-02, -05, -06, -07, -08, -09, -9a and -10) were measured in July 2006. The northing and easting coordinates, top of casing (TOC), depth to water (DTW) and groundwater elevations are presented in Table 4. The depth to groundwater measurements for these wells ranged from 4.99 to 18.61 ft below TOC, and groundwater elevations ranged from 4081.79 (DP24) to 4079.13 (MW-02&5-06) ft above mean sea level (msl). A map of the potentiometric surface was prepared using the groundwater elevation data (Figure 4). The contour map indicates that groundwater flows to the north-northeast across the site at a gradient of approximately 0.003.

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## 5.0 CONCLUSIONS

Based on the findings of this investigation, the following conclusions and recommendations have been developed. The highest concentrations of VOCs were detected in the soil sample collected from DP21 (gray stained soil with petroleum odor 14 to 19 ft bgs) indicating that this boring penetrated the source area that has historically contaminated S1-MW3 (LF-01 monitoring well) with benzene and petroleum fuel related compounds. DP21 is located in the immediate vicinity of the abandoned POL railroad supply lines where unreported spills likely occurred and is located approximately 150 ft upgradient of S1-MW3 (Figure 2). In addition, VOCs were not detected in the soil samples collected in the upgradient and downgradient boreholes (DP20 and DP24 respectively). Based on the results from the four other soil samples (DP20, 22, 23 and 24) the nature and extent of the petroleum fuel source area was defined during this investigation (Figure 3). With the exception of arsenic all detected analytes

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(VOCs, SVOCs, and TAL metals) were below the NMED SSLs. Additionally, all of the arsenic concentrations were below the base-wide UTLs and do not pose any unacceptable risks.

The TPH contaminated soil at DP-21 appears to be isolated. Rather than performing additional characterization in the immediate area of the boring to further delineate what appears to be a small area of contamination, the soil at DP-21 will be excavated. The excavation will step out in all directions until TPH contamination has been reduced to below the SSLs. The contaminated soil will be placed in the onsite land farm for treatment. Given the present configuration of equipment and personnel available at the Base, this approach is considered more cost effective than delineating with additional characterization and reporting.

Groundwater analytical results from DP20, 21 and 22 indicate the presence of benzene, 1, 2-dichloroethane, ethylbenzene and naphthalene in excess of NMWQCC groundwater standards. Based on the results from the six groundwater samples, the nature and extent of the benzene and fuel related VOCs detected in well S1-MW3 during the December 2005 LTM sampling event have been defined. The highest detection of benzene (614 µg/L) and several VOCs were detected in well DP21, located in the center of the S1-MW3 source area monitoring well network (Figure 4). The groundwater sample collected from the most downgradient well (MW-02&5-09) contained only estimated concentrations of two VOCs (isopropylbenzene at 0.95 µg/L and naphthalene at 1.3 µg/L). In addition, the groundwater sample collected from the most upgradient well contained only one detected VOC (chloroform at 2.8 µg/L). Since the Base will be performing source removal (PCS excavation), further efforts regarding groundwater will not be necessary.

## 6.0 REFERENCES

Bhate Environmental Associates, Inc. November 2003. *Final Base-wide Quality Assurance Project Plan.*

Bhate Environmental Associates, Inc. May 2006. *Memorandum Scope of Work for Soil and Groundwater Sampling and Analysis, Holloman Air Force Base, New Mexico.*

Bhate Environmental Associates, Inc. May 2006. *Final 2005 Long-Term Groundwater Monitoring Report Holloman Air Force Base, New Mexico*

Foster Wheeler Environmental Corporation and Groundwater Technology, Inc.. June 1996. *Draft Final 1995 Long Term Groundwater Monitoring Report, Holloman Air Force Base, New Mexico.*

**Deleted:** Based on the results from the four other soil samples (DP20, 22, 23 and 24) the nature and extent of the petroleum fuel source area was defined during this investigation (Figure 3). With the exception of arsenic all detected analytes (VOCs, SVOCs, TPH and TAL metals) were below the NMED SSLs, therefore a source area removal is not required. Additionally, all of the arsenic concentrations were below the base-wide UTLs and do not pose any unacceptable risks.¶

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NMAC 20.6.2, New Mexico Water Quality Control Commission Regulations, September 15, 2002.  
([http://www.nmenv.state.nm.us/NMED\\_Regs/gwb/20\\_6\\_2\\_NMAC.pdf](http://www.nmenv.state.nm.us/NMED_Regs/gwb/20_6_2_NMAC.pdf)).

New Mexico Environment Department. November 2005. *NMED TPH Screening Guidelines*.

New Mexico Environment Department. June 2006. *NMED Technical Background Document for Development of Soil Screening Levels, Revision 4.0*.

U.S. Army Corps of Engineers Omaha District. September 2003. *Final 2003 Long-Term Groundwater Monitoring Report, Holloman Air Force Base, New Mexico*.

Walk, Haydel & Associates, Inc. December, 1989. *Final Remedial Investigation Report, Holloman Air Force Base, New Mexico*.

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# LIST OF ATTACHMENTS

## Figures

- Figure 1. S1-MW3 Source Area Investigation Soil Boring and Temporary Monitoring Well Locations
- Figure 2. S1-MW3 Source Area Investigation Soil VOC Analytical Results
- Figure 3. S1-MW3 Source Area Investigation Groundwater VOC Analytical Results
- Figure 4. S1-MW3 Source Area Investigation Potentiometric Surface Map

## Tables

Table 1	Soil Analytical Results, S1-MW3 Source Investigation	
Table 2	Groundwater Analytical Results, S1-MW3 Source Investigation	
Table 3	Minimum and Maximum Concentrations of VOCs Detected in Groundwater Samples S1-MW3 Source Investigation	Deleted: 1.
Table 4	Groundwater Elevation Summary S1-MW3 Source Investigation	Deleted: 2.

## Appendix

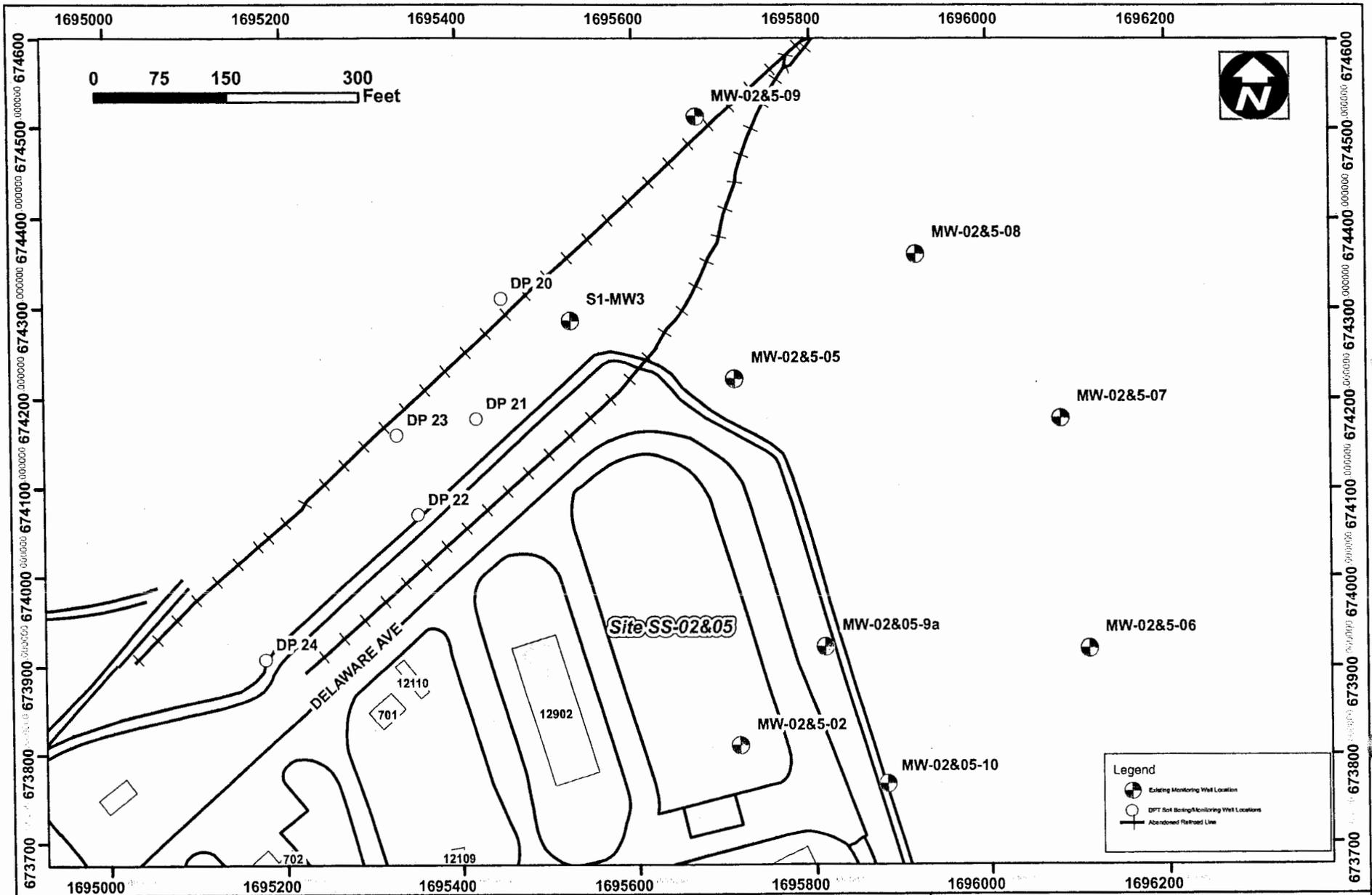
- A Drilling Logs
- B Well Construction Diagrams
- C Analytical Data Packages (compact disc insert)

# FIGURES

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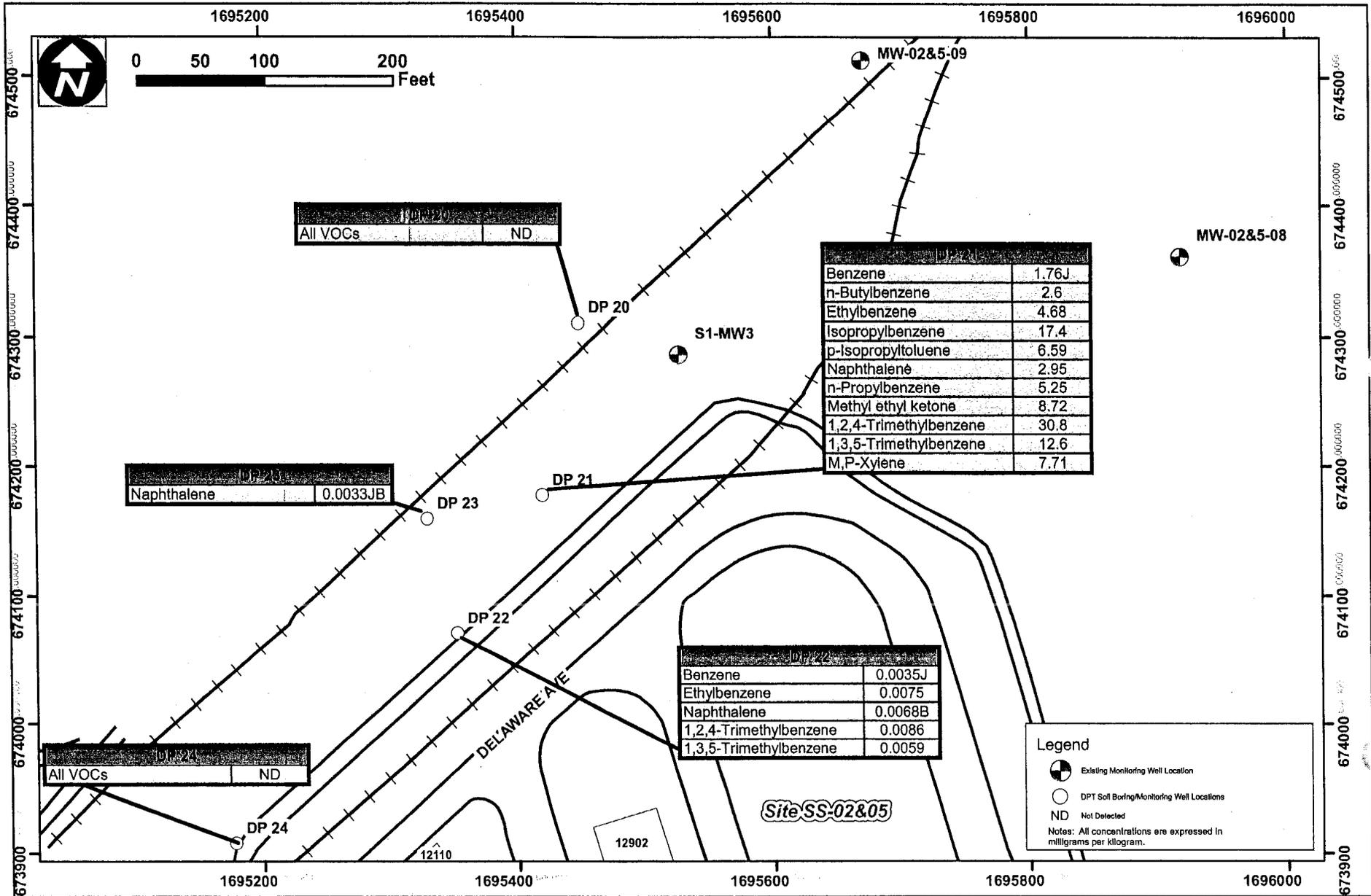


**S1-MW3 Source Area Investigation  
Soil Boring and Monitoring Well Locations**

Site SS02/05  
Holloman AFB, New Mexico

PROJECT NO.	SCALE	DATE	DRAWN BY:
9050043	1"=150'	1/2/07	cm
			DRAWING NO: fig1

Figure 1



All VOCs	ND
----------	----

Benzene	1.76J
n-Butylbenzene	2.6
Ethylbenzene	4.68
Isopropylbenzene	17.4
p-Isopropyltoluene	6.59
Naphthalene	2.95
n-Propylbenzene	5.25
Methyl ethyl ketone	8.72
1,2,4-Trimethylbenzene	30.8
1,3,5-Trimethylbenzene	12.6
M,P-Xylene	7.71

Naphthalene	0.0033JB
-------------	----------

Benzene	0.0035J
Ethylbenzene	0.0075
Naphthalene	0.0068B
1,2,4-Trimethylbenzene	0.0086
1,3,5-Trimethylbenzene	0.0059

All VOCs	ND
----------	----

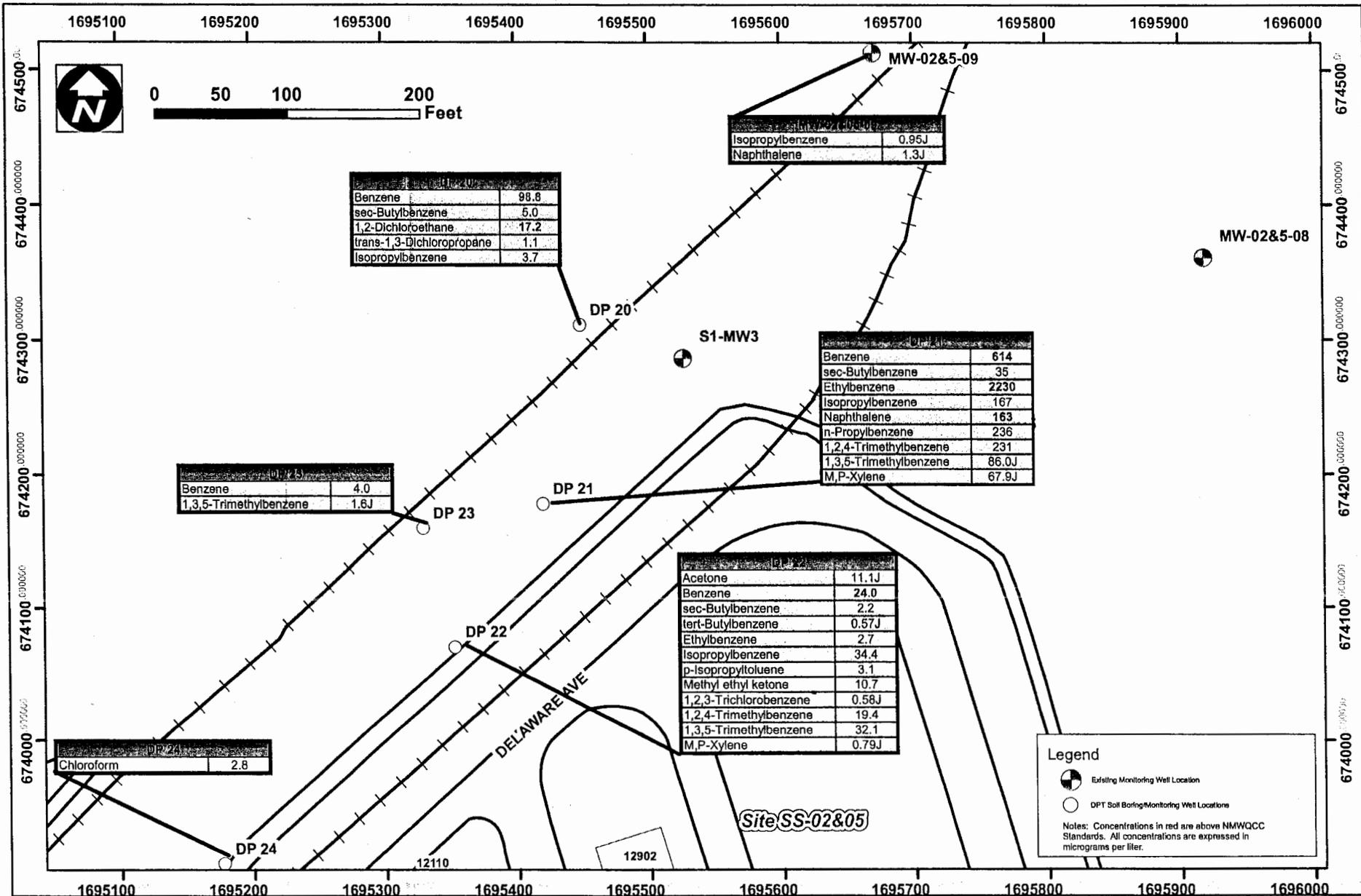


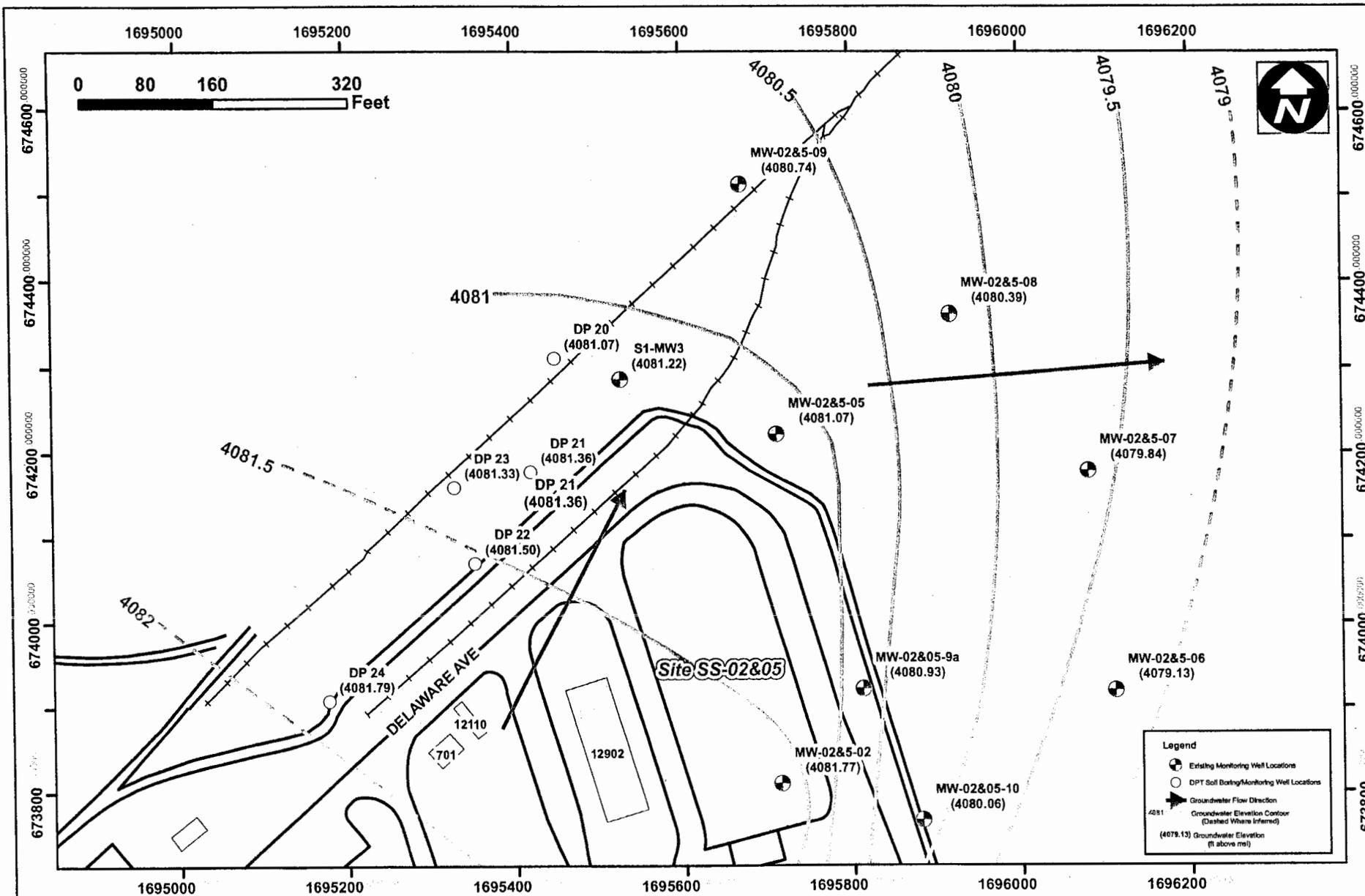
**S1-MW3 Source Area Investigation  
Soil VOC Analytical Results**

Site SS02/05  
Holloman AFB, New Mexico

PROJECT NO. 9050043	SCALE 1"=100'	DATE 1/2/07	DRAWN BY: cm
			DRAWING NO: fig2

Figure 2





**S1-MW3 Source Area Investigation  
Potentiometric Surface Map**

Site SS02/05  
Holloman AFB, New Mexico

PROJECT NO.	SCALE	DATE	DRAWN BY:
9050043	Shown	1/2/07	cm
			DRAWING NO:
			fig4

Figure 4

# TABLES

5/31/2007

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Table 1. Soil Analytical Results  
S1-MW3 Source Area Investigation  
Holloman Air Force Base, New Mexico

Client Sample ID:	Soil Screening Levels		SS02-05-DP-20-11 <sup>3</sup>		SS02-05-DP-21-15		SS02-05-DP-22-15		SS0205-DP23-12		SS0205-DP24-16	
Lab Sample ID:	Basewide UTL	NMED Residential	F40975-1		F40975-3		F40975-2		F41010-1		F41010-2	
Date Sampled:			5/22/2006		5/23/2006		5/23/2006		5/24/2006		5/24/2006	
Analyte			Result <sup>2</sup>	Q	Result <sup>2</sup>	Q	Result <sup>2</sup>	Q	Result <sup>2</sup>	Q	Result <sup>2</sup>	Q
Volatile Organic Compounds		mg/kg	µg/kg		µg/kg		µg/kg		µg/kg		µg/kg	
Benzene	NV	10.3	2.5	U	1760	J	3.5	J	3.0	U	2.5	U
n-Butylbenzene	NV	62.1	3.7	U	2600		3.5	U	4.5	U	3.7	U
sec-Butylbenzene	NV	60.6	2.5	U	4680		2.4	U	3.0	U	2.5	U
Ethylbenzene	NV	128	2.5	U	17400		7.5		3.0	U	2.5	U
Isopropylbenzene	NV	271	2.5	U	6590		2.4	U	3.0	U	2.5	U
p-Isopropyltoluene	NV	NV	2.5	U	2950		2.4	U	3.0	U	2.5	U
Naphthalene	NV	79.5	2.5	U	5250		6.8	B	3.3	JB	2.5	U
n-Propylbenzene	NV	62.1	2.5	U	8720		2.4	U	3.0	U	2.5	U
1,2,4-Trimethylbenzene	NV	58	3.7	U	30800		8.6		4.5	U	3.7	U
1,3,5-Trimethylbenzene	NV	24.8	2.5	U	12600		5.9		3.0	U	2.5	U
m,p-Xylene	NV	82	3.7	U	7710		3.5	U	4.5	U	3.7	U
Semi-Volatile Organic Compounds		mg/kg	µg/kg		µg/kg		µg/kg		µg/kg		µg/kg	
2,4-Dinitrotoluene	NV	122	83	U	305		86	U	86	U	87	U
Dibenzofuran	NV	142	42	U	165	J	43	U	43	U	43	U
Fluorene	NV	2660	42	U	88.6	J	43	U	43	U	43	U
2-Methylnaphthalene	NV	NV	42	U	4710		43	U	43	U	43	U
Naphthalene	NV	79.5	42	U	1220		43	U	43	U	43	U
Total Petroleum Hydrocarbons			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
TPH-GRO (C6-C10)	NV	NV	3.7	U	1200		70.8		4.76	J	3.7	U
TPH (C10-C22)	NV	NV	6.3	U	676		6.5	U	6.4	U	6.5	U
TPH (>C22-C36)	NV	NV	6.3	U	130	U	6.5	U	6.4	U	6.5	U
TAL Metals Analysis	mg/kg	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Aluminum	8764.5	77800	4540		14700		17600		14900		18100	
Antimony	7.28	31.3	0.67	U	0.69	U	0.67	U	0.64	U	1.1	J
Arsenic	6.88	3.9	0.98	U	3.2		5.2		5.1		5.5	
Barium	84.36	15600	56.2		161		111		82.0		89.7	
Beryllium	0.4	156	2.0	U	0.10	U	0.17	J	1.2		1.4	
Cadmium	1.04	39	0.25	J	0.52		1.0		0.024	U	0.026	U
Calcium	250000	NV	168000	E	82400	E	142000	E	146000		157000	
Chromium	6.6	234	3.9		15.5		14.6		15.6		19.4	
Cobalt	2.49	1520	1.1	J	5.7	J	7.5		4.9	J	7.4	
Copper	4.84	3130	2.8	J	9.9		11.3		7.8		9.1	
Iron	6361.7	23500	2960		15100		13400		13500		15400	
Lead	NV	400	2.1	J	8.2	J	9.6	J	4.9	J	6.1	J
Magnesium	14656.2	NV	6430		7880		8650		10200		9170	
Manganese	146.9	3590	28.7		213		403		141		258	
Nickel	5.61	1560	3.3	J	13.8		19.7		13.8		17.2	
Potassium	2501.4	NV	1340		3800		4960		3560		4040	
Selenium	10.53	391	50	U	0.26	U	25	U	0.24	U	0.69	J

Table 1. Soil Analytical Results  
 S1-MW3 Source Area Investigation  
 Holloman Air Force Base, New Mexico

Client Sample ID:	Soil Screening Levels		SS02-05-DP-20-11 <sup>3</sup>	SS02-05-DP-21-15	SS02-05-DP-22-15	SS0205-DP23-12	SS0205-DP24-16
	Basewide UTL	NMED Residential	F40975-1	F40975-3	F40975-2	F41010-1	F41010-2
Lab Sample ID:							
Date Sampled:			5/22/2006	5/23/2006	5/23/2006	5/24/2006	5/24/2006
Sodium	5000	NV	1430	3250	5390	3620	2640
Vanadium	15.46	78.2	6.4	29.3	27.0	28.0	32.7
Zinc	20.25	23500	8.6	36.1	41.2	41.1	48.2
<b>General Chemistry</b>			%	%	%	%	%
Solids, Percent	NV	NV	79.6	77.1	76.6	77.6	77.0

Notes:

NMED = New Mexico Environment Department

TAL = Target Analyte List

UTL = Upper Tolerance Limit

µg/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

NV = No Value

Q = Qualifier

U = Not detected

J = Indicates an estimated value

B = Indicates analyte found in associated method blank.

E = Indicates value exceeds calibration range.

<sup>1</sup>NMED, June 2006. Technical Background Document for Development of Soil Screening Levels, Revision 4.0.

<sup>2</sup>If results are not detected (U) then the value is set at the Method Detection Limit (MDL)

<sup>3</sup>The last two digits of the sample ID number indicate the sampling depth.

**Bold** value indicate analytes above NMED Soil Screening Levels (Rev 4.0, Jun 2006)

Table 2. Groundwater Analytical Results  
S1-MW3 Source Area Investigation  
Holloman Air Force Base, New Mexico

Client Sample ID:	Groundwater Screening Levels			SS02/05DP20		SS02/05DP23		SS02/05DP24		SS02/05DP21	
Lab Sample ID:	NMWQCC	EPA MCL	Basewide UTL <sup>14</sup>	F41196-1		F41196-2		F41196-3		F41294-1	
Date Sampled:				6/1/2006		6/1/2006		6/1/2006		6/6/2006	
Analyte				Result <sup>2</sup>		Result <sup>2</sup>		Result <sup>2</sup>		Result <sup>2</sup>	
Volatile Organic Compounds	µg/L	µg/L		µg/L	Q	µg/L	Q	µg/L	Q	µg/L	Q
Acetone	NV	NV	NV	5.0	U	5.0	U	5.0	U	250	U
Acetonitrile	NV	NV	NV	10	U	10	U	10	U	500	U
Acrolein	NV	NV	NV	10	U	10	U	10	U	500	U
Acrylonitrile	NV	NV	NV	5.0	U	5.0	U	5.0	U	250	U
Allyl chloride	NV	NV	NV	5.0	U	5.0	U	5.0	U	250	U
Benzene	10	5	NV	98.8		4.0		0.50	U	614	
Benzyl Chloride	NV	NV	NV	0.50	U	0.50	U	0.50	U	25	U
Bromobenzene	NV	NV	NV	0.50	U	0.50	U	0.50	U	25	U
Bromochloromethane	NV	NV	NV	0.50	U	0.50	U	0.50	U	25	U
Bromodichloromethane	NV	NV	NV	0.50	U	0.50	U	0.50	U	25	U
Bromoform	NV	NV	NV	0.50	U	0.50	U	0.50	U	25	U
n-Butylbenzene	NV	NV	NV	0.50	U	0.50	U	0.50	U	25	U
sec-Butylbenzene	NV	NV	NV	5.0		0.50	U	0.50	U	35.0	J
tert-Butylbenzene	NV	NV	NV	0.50	U	0.50	U	0.50	U	25	U
Chlorobenzene	NV	100	NV	0.50	U	0.50	U	0.50	U	25	U
Chloroethane	NV	NV	NV	1.0	U	1.0	U	1.0	U	50	U
Chloroform	100	NV	NV	0.50	U	0.50	U	2.8		25	U
1-Chlorohexane	NV	NV	NV	1.0	U	1.0	U	1.0	U	50	U
o-Chlorotoluene	NV	NV	NV	0.50	U	0.50	U	0.50	U	25	U
p-Chlorotoluene	NV	NV	NV	0.50	U	0.50	U	0.50	U	25	U
2-Chloroethyl vinyl ether	NV	NV	NV	2.5	U	2.5	U	2.5	U	130	U
Carbon disulfide	NV	NV	NV	1.0	U	1.0	U	1.0	U	50	U
Carbon tetrachloride	10	5	NV	0.50	U	0.50	U	0.50	U	25	U
1,1-Dichloroethane	25	NV	NV	0.50	U	0.50	U	0.50	U	25	U
1,1-Dichloroethylene	5	7	NV	0.50	U	0.50	U	0.50	U	25	U
1,1-Dichloropropene	NV	NV	NV	0.50	U	0.50	U	0.50	U	25	U
1,2-Dibromo-3-chloropropane	NV	0.2	NV	1.0	U	1.0	U	1.0	U	50	U
1,2-Dibromoethane	0.1	0.05	NV	0.50	U	0.50	U	0.50	U	25	U
1,2-Dichloroethane	10	5	NV	17.2		0.50	U	0.50	U	25	U
1,2-Dichloropropane	NV	5	NV	0.50	U	0.50	U	0.50	U	25	U
1,3-Dichloropropane	NV	NV	NV	0.50	U	0.50	U	0.50	U	25	U
2,2-Dichloropropane	NV	NV	NV	0.50	U	0.50	U	0.50	U	25	U
Dibromochloromethane	NV	NV	NV	0.40	U	0.40	U	0.40	U	20	U
Dichlorodifluoromethane	NV	NV	NV	0.50	U	0.50	U	0.50	U	25	U
cis-1,2-Dichloroethylene	NV	70	NV	0.50	U	0.50	U	0.50	U	25	U
cis-1,3-Dichloropropene	NV	NV	NV	0.30	U	0.30	U	0.30	U	15	U
cis-1,4-Dichloro-2-Butene	NV	NV	NV	10	U	10	U	10	U	500	U
m-Dichlorobenzene	NV	NV	NV	0.50	U	0.50	U	0.50	U	25	U
o-Dichlorobenzene	NV	600	NV	0.50	U	0.50	U	0.50	U	25	U
p-Dichlorobenzene	NV	75	NV	0.50	U	0.50	U	0.50	U	25	U
trans-1,2-Dichloroethylene	NV	100	NV	0.50	U	0.50	U	0.50	U	25	U
trans-1,3-Dichloropropene	NV	NV	NV	1.1		0.30	U	0.30	U	15	U
Ethylbenzene	750	700	NV	0.50	U	0.50	U	0.50	U	2230	
Ethyl methacrylate	NV	NV	NV	2.0	U	2.0	U	2.0	U	100	U
Freon 113	NV	NV	NV	0.50	U	0.50	U	0.50	U	25	U



Table 2. Groundwater Analytical Results  
 S1-MW3 Source Area Investigation  
 Holloman Air Force Base, New Mexico

Client Sample ID:	Groundwater Screening Levels			SS02/05DP20	SS02/05DP23	SS02/05DP24	SS02/05DP21
	NMWQCC <sup>1</sup>	EPA MCL	Basewide UTL <sup>3,4</sup>	F41196-1	F41196-2	F41196-3	F41294-1
Lab Sample ID:							
Date Sampled:				6/1/2006	6/1/2006	6/1/2006	6/6/2006

MCL = Maximum Contaminant Level

UTL = Upper Tolerance Limit

µg/L = micrograms per liter

mg/L = milligrams per liter

NV = No Value

Q = Qualifier

U = Not detected

J = Indicates an estimated value

<sup>1</sup>Standards for Groundwater, if 10,000 mg/l TDS Concentration or Less, New Mexico Administrative Code 20.6.2.3103

<sup>2</sup>If results are not detected (U) then the value is set at the Method Detection Limit (MDL)

<sup>3</sup>Basewide Background Study, Dec 1993, Radian Corp.

<sup>4</sup>UTL for dissolved metals in groundwater (Table 2.2)

**Bold** value indicate analytes above New Mexico Groundwater Quality Standard

Table 2. Groundwater Analytical Results  
S1-MW3 Source Area Investigation  
Holloman Air Force Base, New Mexico

Client Sample ID:	Groundwater Screening Levels			MW-02&5-09		MW-02&5-09D		SS0205-DP22	
	Lab Sample ID:	NMWOCC	EPA MCL	Basewide UTL <sup>1,4</sup>	F41295-1		F41295-2		F41326-1
Date Sampled:					6/6/2006		6/6/2006		6/7/2006
Analyte				Result <sup>2</sup>		Result <sup>2</sup>		Result <sup>2</sup>	
Volatile Organic Compounds	µg/L	µg/L		µg/L	Q	µg/L	Q	µg/L	Q
Acetone	NV	NV	NV	5.0	U	5.0	U	11.1	J
Acetonitrile	NV	NV	NV	10	U	10	U	10	U
Acrolein	NV	NV	NV	10	U	10	U	10	U
Acrylonitrile	NV	NV	NV	5.0	U	5.0	U	5.0	U
Allyl chloride	NV	NV	NV	5.0	U	5.0	U	5.0	U
Benzene	10	5	NV	0.50	U	0.50	U	24.0	
Benzyl Chloride	NV	NV	NV	0.50	U	0.50	U	0.50	U
Bromobenzene	NV	NV	NV	0.50	U	0.50	U	0.50	U
Bromochloromethane	NV	NV	NV	0.50	U	0.50	U	0.50	U
Bromodichloromethane	NV	NV	NV	0.50	U	0.50	U	0.50	U
Bromoform	NV	NV	NV	0.50	U	0.50	U	0.50	U
n-Butylbenzene	NV	NV	NV	0.50	U	0.50	U	0.50	U
sec-Butylbenzene	NV	NV	NV	0.50	U	0.50	U	2.2	
tert-Butylbenzene	NV	NV	NV	0.50	U	0.50	U	0.57	J
Chlorobenzene	NV	100	NV	0.50	U	0.50	U	0.50	U
Chloroethane	NV	NV	NV	1.0	U	1.0	U	1.0	U
Chloroform	100	NV	NV	0.50	U	0.50	U	0.50	U
1-Chlorohexane	NV	NV	NV	1.0	U	1.0	U	1.0	U
o-Chlorotoluene	NV	NV	NV	0.50	U	0.50	U	0.50	U
p-Chlorotoluene	NV	NV	NV	0.50	U	0.50	U	0.50	U
2-Chloroethyl vinyl ether	NV	NV	NV	2.5	U	2.5	U	2.5	U
Carbon disulfide	NV	NV	NV	1.0	U	1.0	U	1.0	U
Carbon tetrachloride	10	5	NV	0.50	U	0.50	U	0.50	U
1,1-Dichloroethane	25	NV	NV	0.50	U	0.50	U	0.50	U
1,1-Dichloroethylene	5	7	NV	0.50	U	0.50	U	0.50	U
1,1-Dichloropropene	NV	NV	NV	0.50	U	0.50	U	0.50	U
1,2-Dibromo-3-chloropropane	NV	0.2	NV	1.0	U	1.0	U	1.0	U
1,2-Dibromoethane	0.1	0.05	NV	0.50	U	0.50	U	0.50	U
1,2-Dichloroethane	10	5	NV	0.50	U	0.50	U	0.50	U
1,2-Dichloropropane	NV	5	NV	0.50	U	0.50	U	0.50	U
1,3-Dichloropropane	NV	NV	NV	0.50	U	0.50	U	0.50	U
2,2-Dichloropropane	NV	NV	NV	0.50	U	0.50	U	0.50	U
Dibromochloromethane	NV	NV	NV	0.40	U	0.40	U	0.40	U
Dichlorodifluoromethane	NV	NV	NV	0.50	U	0.50	U	0.50	U
cis-1,2-Dichloroethylene	NV	70	NV	0.50	U	0.50	U	0.50	U
cis-1,3-Dichloropropene	NV	NV	NV	0.30	U	0.30	U	0.30	U
cis-1,4-Dichloro-2-Butene	NV	NV	NV	10	U	10	U	10	U
m-Dichlorobenzene	NV	NV	NV	0.50	U	0.50	U	0.50	U
o-Dichlorobenzene	NV	600	NV	0.50	U	0.50	U	0.50	U
p-Dichlorobenzene	NV	75	NV	0.50	U	0.50	U	0.50	U
trans-1,2-Dichloroethylene	NV	100	NV	0.50	U	0.50	U	0.50	U
trans-1,3-Dichloropropene	NV	NV	NV	0.30	U	0.30	U	0.30	U
Ethylbenzene	750	700	NV	0.50	U	0.50	U	2.7	
Ethyl methacrylate	NV	NV	NV	2.0	U	2.0	U	2.0	U
Freon 113	NV	NV	NV	0.50	U	0.50	U	0.50	U



Table 2. Groundwater Analytical Results  
 S1-MW3 Source Area Investigation  
 Holloman Air Force Base, New Mexico

Client Sample ID:	Groundwater Screening Levels			MW-02&5-09		MW-02&5-09D		SS0205-DP22	
	NMWQCC	EPA MCL	Basewide UTL <sup>4</sup>	F41295-1		F41295-2		F41326-1	
Lab Sample ID:									
Date Sampled:				6/6/2006		6/6/2006		6/7/2006	

MCL = Maximum Contaminant Level

UTL = Upper Tolerance Limit

µg/L = micrograms per liter

mg/L = milligrams per liter

NV = No Value

Q = Qualifier

U = Not detected

J = Indicates an estimated value

<sup>1</sup>Standards for Groundwater, if 10,000 mg/l TDS Concentration or Less, New Mexico Administ

<sup>2</sup>If results are not detected (U) then the value is set at the Method Detection Limit (MDL)

<sup>3</sup>Basewide Background Study, Dec 1993, Radian Corp.

<sup>4</sup>UTL for dissolved metals in groundwater (Table 2.2)

**Bold** value indicate analytes above New Mexico Groundwater Quality Standard

**Table 3. Minimum and Maximum Concentrations of VOCs Detected In Groundwater Samples  
S1-MW3 Source Investigation  
Holloman AFB, NM  
Bhate Project No. 9050043.01.01**

VOC Analyte	Number of Samples	Number of Detections	Minimum Concentration (µg/L)	Maximum Concentration (µg/L)	NMWQCC Groundwater Standard (µg/L)	EPA MCL (µg/L)
Acetone	6	1	11.1 J	11.1 J	NV	NV
Benzene	6	4	4.0	614	10	5
sec-Butylbenzene	6	3	2.2	35.0 J	NV	NV
tert-Butylbenzene	6	1	0.57 J	0.57 J	NV	NV
Chloroform	6	1	2.8	2.8	100	NV
1,2-Dichloroethane	6	1	17.2	17.2	10	5
trans-1,3-Dichloropropene	6	1	1.1	1.1	NV	NV
Ethylbenzene	6	2	2.7	2,230	750	700
Isopropylbenzene	6	4	0.95 J	34.4	NV	NV
p-Isopropyltoluene	6	1	3.1	3.1	NV	NV
Methyl ethyl ketone	6	1	10.7	10.7	NV	NV
Naphthalene	6	2	1.3 J	163	NV	NV
n-Propylbenzene	6	1	236	236	NV	NV
1,2,3-Trichlorobenzene	6	1	0.58 J	0.58 J	NV	NV
1,2,4-Trimethylbenzene	6	2	19.4	231	NV	NV
1,3,5-Trimethylbenzene	6	3	1.6J	86.0	NV	NV
m,p-Xylene	6	2	0.79 J	67.9 J	620	10,000

Notes:

EPA = US Environmental Protection Agency

J = Indicates an estimated value

MCL = Maximum Contaminant Level

NMWQCC = New Mexico Water Quality Control Commission

NV = No Value

µg/L = micrograms per liter

mg/L = milligrams per liter

VOC = Volatile Organic Compound

**Table 4. Groundwater Elevation Summary  
S1-MW3 Source Investigation  
Holloman AFB, NM  
Bhate Project No. 9050043.01.01**

Well	Northing	Easting	Elevation TOC (ft above msl)	DTW from TOC (ft below TOC)	Groundwater Elevation July 2006 (ft above msl)
DP20	674311.020	1695449.327	4099.550	18.48	4081.07
DP21	674177.985	1695419.678	4098.929	17.56	4081.36
DP22	674071.114	1695352.258	4097.946	16.44	4081.50
DP23	674159.904	1695329.008	4096.391	15.06	4081.33
DP24	673908.354	1695177.053	4096.834	15.04	4081.79
S1-MW3	674280.362	1695537.084	4099.088	17.86	4081.22
MW-02&05-2	673810.177	1695714.552	4097.271	15.50	4081.77
MW-02&05-5	674222.105	1695711.850	4096.424	15.35	4081.07
MW-02&05-6	673920.730	1696110.691	4084.529	5.39	4079.13
MW-02&05-7	674179.447	1696080.236	4084.834	4.99	4079.84
MW-02&05-8	674361.929	1695817.736	4086.059	5.66	4080.39
MW-02&05-9	674512.932	1695669.987	4099.350	18.61	4080.74
MW-02&05-9a	673922.256	1695806.311	4096.304	15.37	4080.93
MW-02&05-10	673763.022	1695894.841	4096.309	16.24	4080.06

# APPENDIX A

## DRILLING LOGS

5/31/2007

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# APPENDIX B

## WELL CONSTRUCTION DIAGRAMS

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# APPENDIX C

## ANALYTICAL DATA PACKAGES (Compact Disc Insert)

<u>Sample Delivery Group (SDG)</u>	<u>Sample Identification</u>
F40975 (Soil)	SS02-05-DP-20-11 SS02-05-DP-22-15 SS02-05-DP-21-15
F41010 (Soil)	SS0205-DP23-12 SS0205-DP24-16
F41196 (Groundwater)	SS02/05DP20 SS02/05DP23 SS02/05DP24
F41294 (Groundwater)	SS02/05DP21
F41295 (Groundwater)	MW-02&5-09 MW-02&5-09a (Duplicate)
F41326 (Groundwater)	SS0205-DP22

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