



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

ENTERED

APR 08 2013

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New Mexico Environment Department  
Attn: Mr. John Kieling, Chief  
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Dear Mr. Kieling

Holloman Air Force Base is pleased to submit the Final SD-08 Long Term Monitoring Report, Quarter 5, Winter 2013 for your review.

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.

If you have any questions, please contact Ms. DeAnna Rothhaupt of our Asset Management Flight at (575) 572-3931.

Sincerely

A. DAVID BUDAK, GS-14, DAFC

Attachment:  
Final SD-08 Long Term Monitoring Report, Quarter 5, Winter 2013

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**FINAL  
SD-08 LONG TERM MONITORING REPORT  
QUARTER 5, WINTER 2013  
HOLLOMAN AIR FORCE BASE, NEW MEXICO**

*Prepared For:*

**49 CES/CEAN  
Holloman Air Force Base  
New Mexico**

*Under Contract to:*



**U.S. Army Corps of Engineers  
Omaha District  
1616 Capitol Avenue  
Omaha, Nebraska 68102-1618**

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**March 2013**

*Prepared By*



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**FINAL**  
**SD-08 LONG TERM MONITORING REPORT**  
**QUARTER 5, WINTER 2013**  
**HOLLOMAN AIR FORCE BASE, NEW MEXICO**

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- Attachment 1 – New Mexico Environmental Department, Notice of Approval, Request to Perform Eight Quarters of Groundwater Monitoring, Site SD-08 (SWMU 82) HAFB, EPA ID# NM6572124422, HWB-HAFB-07-007, November 22, 2011

**Appendices**

- Appendix A – Portions of the *Draft Final Site Investigation Report Waste Sites SS-06, SD-15, AOC-RR, and AOC-BBMS Holloman Air Force Base, New Mexico* (Ebasco Services Inc. and Groundwater Technology Government Services Inc. [GTI], October 1995)
- Appendix B - Depth to Water Field Form
- Appendix C - Groundwater Sampling Field Forms
- Appendix D - Laboratory Analytical Results (Provided on Enclosed CD)
- Appendix E – Data Validation Report
- Appendix F - Daily Quality Control Reports

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**ACRONYMS**

amsl	above mean sea level
AOC	Area of Concern
Bhate	Bhate Environmental Associates Inc.
COC	Contaminants of Concern
1,2-DCA	1,2 dichlorethane
1,2-DCP	1,2 dichloropropane
DQCR	Daily Quality Control Reports
EBASCO	Electric Bond and Share Company
ERP	Environmental Restoration Program
ft	Feet or foot
ft <sup>2</sup>	Square feet
FS/CMS	Feasibility Study/Corrective Measures Study
GCAL	Gulf Coast Analytical Laboratories
GPS	Global Positioning System
GTI	Groundwater Technology Government Services Inc.
HAFB	Holloman Air Force Base
IDW	Investigative Derived Wate
IRP	Installation Restoration Program
J	Laboratory Qualifier denoting an estimated result
LTM	Long Term Monitoring
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
µg/L	Micrograms per liter
mg/L	Milligrams per liter
NAVD	North American Vertical Datum
NationView	Nation View, LLC
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMWQCC	New Mexico Water Quality Control Commission
O/WS	Oil Water Separator
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Recovery and Conservation Act
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RPD	Relative Percent Difference
SOP	Standard Operating Procedure
SOW	Scope of Work
SWMU	Solid Waste Management Unit

TAL	Target Analyte List
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
U	Laboratory Qualifier denoting a non-detect result
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UTL	Upper Tolerance Limit
VOC	Volatile Organic Compound
WGS	World Geodetic System
WWTP	Wastewater Treatment Plant

## **1 INTRODUCTION**

This Long Term Monitoring (LTM) Quarterly Report documents the fifth quarterly (Winter 2013) groundwater sampling field event at Environmental Restoration Program (ERP) Site SD-08 (Solid Waste Management Unit [SWMU] 82 – Building 131 Washrack) at Holloman Air Force Base (HAFB), New Mexico. NationView LLC (NationView) conducted this sampling event under contract W9128F-09-D-0055, Task Order No. 0003 for the United States Army Corps of Engineers (USACE), Omaha District.

The primary objectives of the SD-08 LTM quarterly groundwater sampling events are based on recommendations provided by the USACE Omaha Statement of Work (SOW) dated March 2, 2010 (USACE, 2010). The LTM objectives are based on the findings presented in the *Final RCRA Facility Investigation Report, Building 131 Washrack, Site SD-08, Holloman AFB, New Mexico* (Bhate Environmental Associates, Inc. [Bhate], 2007). Additionally, on November 22, 2011, the New Mexico Environment Department (NMED) approved HAFB's request to perform two years of quarterly groundwater monitoring at Site SD-08 (NMED, 2011a). The NMED Notice of Approval letter, *Request to Perform Eight Quarters of Groundwater Monitoring, Site SD-08* (NMED, 2011a) is provided as Attachment 1. Specifically, the project objectives are to conduct a quarterly monitoring program for two years in order to determine if natural attenuation is degrading the primary contaminants of concern (COCs) (1,2-dichloroethane [1,2-DCA], 1,2 dichloropropane [1,2-DCP], manganese, and arsenic) previously identified in monitoring wells MW-08-01, MW-08-03, and MW-08-07 during the 2006 Resource Conservation Recovery Act (RCRA) Facility Investigation (RFI) groundwater sampling event.

### **1.1 Report Organization**

This Quarterly Report is organized into the following eight sections:

- Section 1 – Introduction
- Section 2 – Site Background
- Section 3 – Applicable Screening Criteria
- Section 4 – Groundwater Sampling Field Activities
- Section 5 – Groundwater Analytical Results
- Section 6 – Comparison of the January 2013 Analytical Results to Previous SD-08 LTM Results
- Section 7 – Conclusions and Recommendations
- Section 8 – References

The figures, tables, attachments and appendices referenced throughout this Quarterly Report are included following the text (after Section 8).

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## **2 SITE BACKGROUND**

### **2.1 SD-08 Site Description**

HAFB is located in south central New Mexico, in the northwest central portion of Otero County, approximately 75 miles north-northeast of El Paso, Texas (Figure 2-1). Site SD-08 is located in the northeastern portion of the main base area (Figure 2-2). The original SD-08 Site occupied approximately one-half acre and was surrounded by a chain-link fence. Within the fenced area were Building 131, a steam cleaner washrack with associated drains, and an oil water separator. The area was unpaved with sparse vegetation along the fence. Site topography was, and remains, generally flat. The washrack was installed in 1942 and consisted of a rectangular concrete pad (approximately 1,000 square feet [ft<sup>2</sup>]). Refuse collection trucks (trash trucks) were routinely washed with soap and water at the washrack. Base records indicate that pesticides were routinely sprayed inside the trucks during the 1970s for fly control; however, this practice ceased in 1982. Drains located at the north end of the washrack connected to a sewer line which carried wastewater to an oil/water separator (OWS) near the northwest corner of the washrack. According to site personnel, it was common for the sewer line to clog, causing the sump and OWS to overflow onto surrounding soil. The washrack pad contained cracks in the concrete and was replaced in 1992 with a new washrack in the same location (Foster Wheeler/Radian, 1995). In 1995 the entire yard area was covered with an asphalt cap as part of the remedial measures performed onsite.

Since 1991 Site SD-08 has been the subject of a series of environmental investigations and one remedial action related to pesticide contamination detected in soil and groundwater. The end result of the remedial action was installation of an asphalt cap that covers approximately 41,000 ft<sup>2</sup>, and a chain link fence surrounding the site to restrict access.

As shown on Figure 2-3, Site SD-08 consists of an asphalt cap, chain link fence, concrete washrack, oil water separator and eight groundwater monitoring wells (MW-08-01 through MW-08-08). Site SD-08 is listed as the Building 131 Washrack (SMWU 82) in Appendix 4-A (Table A) of the HAFB Hazardous Waste Facility Permit No. NM6572124422 (NMED, 2005).

### **2.2 Previous Investigations**

Site SD-08 was identified as a potential contaminant source during the Installation Restoration Program (IRP) Phase I Records Search (CH2M Hill, 1983). As a result, the site was investigated under Phase I of the IRP as Site SD-08 in 1991. The ensuing *Remedial Investigation Report, Investigation, Study and Recommendation for 29 Waste Sites* (Radian, 1992) indicated that pesticide contamination was present in both shallow soil and groundwater onsite. The associated risk evaluation concluded that pesticide concentrations in soil posed an occupational health risk. To mitigate this risk, the site entered into the Feasibility Study/Corrective Measures Study (FS/CMS) process, which established health based cleanup criteria, identified the area exceeding these cleanup

criteria, and recommended the installation of an impermeable cap. The Phase II RFI (Foster Wheeler/Radian, 1995) delineated the extent of organochlorine pesticide contamination in groundwater. During the 29 Waste Sites Remedial Investigation (RI) and Phase II RFI, metals and pesticides were identified in soil samples; further, metals, volatile organic compounds (VOCs) and pesticides were detected in groundwater samples. The primary contaminants attributed to site activities at SD-08 were pesticides. Subsequently, the source of detected VOCs was identified as the former tank area at Area of Concern (AOC)-RR (Radian, 1993). In 1996, Site SD-08 was recommended for long-term groundwater monitoring to ensure that the remedial action was preventing further degradation of groundwater. In 2006, an RFI was conducted to review available information and to collect soil and groundwater data in order to fulfill data gap requirements identified by the NMED (Bhate, 2007). The RFI included a risk based evaluation that was established by using identified target levels and site specific representative COC concentrations. The RFI concluded that residual soil and groundwater concentrations were protective of future onsite receptors and recommend a no further action status for the SD-08 Site (Bhate, 2007).

A complete summary of historical site specific investigations is provided within Section 2.3 of the *Final RCRA Facility Investigation Report, Building 131 Washrack, Site SD-08, Holloman Air Force Base, New Mexico* (Bhate, 2007). Additionally, source characterization and LTM results for Site SD-08 are described in the following documents:

- *Remedial Investigation (RI) Report, Investigation, Study and Recommendation for 29 Waste Sites, Holloman Air Force Base, New Mexico, Volume I*, Radian, June 1992.
- *Draft Final Feasibility Study, Investigation, Study and Recommendation for 29 Waste Sites, Holloman Air Force Base, New Mexico*, Radian, December 1993.
- *Draft Final Phase II RCRA Facility Investigation Report, Table 1 Solid Waste Management Units, Holloman Air Force Base, New Mexico*, Foster Wheeler/Radian, June 1995.
- *Final Long-Term Groundwater Monitoring Report, Holloman Air Force Base, New Mexico*, Bhate, May 2006.
- *Final SD-08 Long Term Groundwater Monitoring Report Quarter 1, Winter 2012, Holloman AFB, New Mexico*, NationView, March 2012.
- *Final SD-08 Long Term Groundwater Monitoring Report Quarter 2, Spring 2012, Holloman AFB, New Mexico*, NationView, June 2012.
- *Final SD-08 Long Term Groundwater Monitoring Report Quarter 3, Summer 2012, Holloman AFB, New Mexico*, NationView, September 2012.
- *Final SD-08 Long Term Groundwater Monitoring Report Quarter 4, Fall 2012, Holloman AFB, New Mexico*, NationView, December 2012.

## **2.3 Upgradient Site AOC-RR Groundwater Impacts at Site SD-08**

As a result of the findings presented in the SD-08 Remedial Investigation Report (Radian, 1992), a Site Investigation was conducted at AOC-RR by Electric Bond and Share Company (EBASCO) Services, Inc. in 1995 (EBASCO/GTI, 1995). AOC-RR (Building 80) was historically used to repair railroad locomotives and included a former underground storage area (three tanks, unknown volumes). The last known product the tanks contained was a petroleum based dust suppressant used for roads. As shown on Figure 2-3 the two areas which comprise AOC-RR (Building 80 and the underground storage tank area) are located approximately 120 feet west and upgradient of SD-08. The AOC-RR Site Investigation included groundwater and soil sampling at SD-08. VOCs or total petroleum hydrocarbons (TPH) were not detected in any of the 13 soil samples collected at AOC-RR during the 1995 Site Investigation (Table 3-3, Appendix A). However, the groundwater data indicated that both sites (SD-08 and AOC-RR) had been impacted by VOCs (petroleum constituents). Specifically, elevated concentrations of ethylbenzene (1,000 micrograms per liter [ $\mu\text{g/L}$ ]), benzene (870  $\mu\text{g/L}$ ), 1,2 DCA (440  $\mu\text{g/L}$ ), toluene (90  $\mu\text{g/L}$ ), and xylenes (560  $\mu\text{g/L}$ ) were detected in the groundwater sample collected from GP-06 (Table 3-4, and Figure 3-4 Appendix A) which is located approximately 120-ft hydraulically up gradient from the SD-08 Site. Additionally, as shown on Figure 3-4 (Appendix A) several other groundwater samples (GP-01, GP-04, GP-05, GP-07, GP-09, GP-11 and GP-13) collected in the vicinity of AOC-RR contained elevated concentrations of VOCs (1,2-DCA, 1,2-DCP, benzene, toluene and ethylbenzene) above current action levels. Historically, 1,2-DCA and 1,2-DCP were commonly used as lead scavengers in antiknock gasoline.

Because VOCs have not been detected in the soil samples collected at either site during previous investigations, the source of VOCs (1,2-DCA and 1,2-DCP) identified in groundwater at SD-08 is still unknown; however, based on the elevated concentrations of VOCs detected in eight of the AOC-RR groundwater samples collected in 1995, AOC-RR is the probable source of elevated VOC contamination (1,2-DCA and 1,2-DCP) identified in several SD-08 monitoring wells (EBASCO/GTI, 1995).

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### **3 APPLICABLE SCREENING CRITERIA**

The analytical data collected during the fifth quarterly (Winter 2013) sampling event has been evaluated against all of the applicable regulatory screening criteria that are specified in Appendix 4-F *Action Levels and Cleanup Levels* of the HAFB Hazardous Waste Permit No: NM6572124422 (NMED, 2004). Groundwater data evaluation will consist of a direct comparison to the applicable action level screening criteria.

The maximum detected concentration of each contaminant which is detected above the method detection limit (MDL) will be used for comparison. The following sections present regulatory screening criteria which will be used to evaluate the groundwater analytical data for the SD-08 fifth quarter sampling event conducted in January 2013.

#### **3.1 VOCs, TAL Metals and General Chemistry**

As per Appendix 4-F (NMED, 2004), there are two applicable standards for groundwater, the New Mexico Water Quality Control Commission (NMWQCC) groundwater cleanup levels for contaminants (New Mexico Administrative Code [NMAC] 20.6.2.3103) and the United States Environmental Protection Agency's (USEPA) National Primary Drinking Water Regulations MCLs (USEPA, 2009). The lower of the two standards will be used as action levels for VOCs, and general chemistry parameters (chloride, fluoride, nitrate, nitrite and sulfate). Filtered (dissolved) total analyte (TAL) metals and unfiltered (total) mercury will be compared to the USEPA maximum contaminant levels (MCLs) (USEPA, 2009) and the NMWQCC groundwater standards (NMAC 20.6.2.3103). TAL metals will also be compared to the NMED Approved Background Levels for filtered (dissolved) Constituents in Groundwater (Table 3, NMED 2011b) and unfiltered (total) mercury will also be compared to the NMED Approved Background Levels for Filtered (Dissolved) Constituents in Groundwater (Table 2, NMED 2011b).

#### **3.2 Total Dissolved Solids**

There are two applicable standards for total dissolved solids (TDS); the NMWQCC groundwater standards (NMAC 20.6.2.3103) and the USEPA's *National Primary Drinking Water Regulations Secondary MCLs* (USEPA, 2009). The lower of the two standards will be used as the action levels for TDS.

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## **4 GROUNDWATER SAMPLING FIELD ACTIVITIES**

The primary objective of the SD-08 LTM program is to collect additional groundwater data to determine if natural attenuation of previously identified COCs (i.e., 1,2-DCA and 1,2-DCP) identified during the RFI (Bhate, 2007) is occurring. This objective is being accomplished by sampling monitoring wells; MW-08-01, MW-08-02, MW-08-03, MW-08-04, MW-08-05, MW-08-06, MW-08-07, MW-08-08 on a quarterly basis for two years (January 2012 through October 2014). Based on the results of first quarter (Winter 2012) groundwater sampling event, monitoring wells SWMU183-MW03 and S10-MW01 were added to SD-08 monitoring well network for the second quarterly sampling event to assist with delineating the extent of the 1,2-DCA plume. The two additional monitoring wells were sampled for the same parameters as the January 2012 sampling event (VOCs, TAL metals [dissolved and total], general chemistry parameters [chloride, fluoride, nitrate-nitrite and sulfate], and TDS). However, the downgradient extent was not fully delineated, therefore, monitoring well S10-MW06 was added to the monitoring well network during the third quarter to assist in delineating the downgradient extent of the 1,2-DCA plume. Only VOCs were sampled from monitoring well S10-MW06, during the third quarter sampling event at Site SD-08. During this fifth quarter LTM sampling event (Winter 2013) each well, including S10-MW06, was sampled for (VOCs, TAL dissolved metals, mercury [total], general chemistry parameters [chloride, fluoride, nitrate-nitrite and sulfate], and TDS). With the exception of mercury, total TAL metals were not analyzed for during Quarter 5 in accordance with NMED correspondence dated September 20, 2012 (NMED, 2012).

### **4.1 Groundwater Sampling**

Groundwater samples were collected January 21 - 22, 2013 from eleven monitoring wells (MW-08-01 through MW-08-08, SWMU183-MW03, S10-MW01, and S10-MW06) illustrated in Figure 2-3. Prior to sampling, groundwater levels were collected for each monitoring well; Appendix B provides a complete field log of depth to water measurements. Monitoring well purging and sampling was completed with low flow techniques utilizing a peristaltic pump, disposable polyethylene tubing placed at mid-screen, and a groundwater multi-parameter meter equipped with a flow-thru cell. Field parameters were recorded for every well volume of groundwater removed. Field parameters were considered stable when the pH measurements remained constant within 0.1 units; specific conductivity, dissolved oxygen and temperature varied by no more than 10 percent, and turbidity by no more than 5 nephelometric units. Upon reaching stable purging parameters, VOC samples were collected using disposable Teflon bailers followed by collecting the remaining samples using a peristaltic pump at low flow rates. Samples collected for dissolved TAL metals were also field filtered with a 0.45 micron filter. Each of the wells was pumped at an average rate of less than 1 liter per minute. Monitoring Well Sample Collection Forms are included as Appendix C.

## **4.2 Laboratory Analysis and Data Validation**

The analysis of groundwater samples collected during the fifth quarterly sampling event (January 2013) followed the methodologies presented in the NMED approved *Additional Investigation Requirements Work Plan ERP Site SD-08 (SWMU 82 – Building 131 Washrack), Holloman Air Force Base, New Mexico* (Bhate, 2005). All analytical procedures followed the USEPA SW-846 protocol with the groundwater samples from each well being analyzed for the following:

- Volatile Organic Compounds (VOCs) by USEPA Method 8260B
- Target Analyte List (TAL) Metals by USEPA 6010B (dissolved)
- Total Mercury by USEPA 7470A
- Anions: Nitrate, Nitrite, Sulfate, Chloride and Fluoride by USEPA Method 300
- Total Dissolved Solids (TDS) by Method 2540C

All of the laboratory data generated during this quarterly event was validated by the project chemist. Field Quality Assurance (QA)/Quality Control (QC) samples, including trip blanks, matrix spikes, and matrix spike duplicates were collected to document field and laboratory QA/QC. Analytical data packages are provided in Appendix D and the Data Validation Report is included as Appendix E. Gulf Coast Analytical Laboratories (GCAL) in Baton Rouge, Louisiana performed the analysis of all samples collected.

Overall, only minor QC issues were identified during the data validation of the laboratory results and the laboratory took all necessary corrective actions. All of the data were determined to be usable with only minor qualifications. Information regarding the precision, accuracy, representativeness, and completeness is provided in the Data Validation Report (Appendix E) with the following paragraphs providing a synopsis of each analyte group.

### VOCs:

A low level detection of acetone was detected in the trip blank associated with samples S10-MW01, S10-MW01-A, MW-08-02 and MW-08-01. The positive results were reported at concentrations less than 10x the blank concentration. This indicated the samples were affected by blank contamination and qualified as non detected (U) and raised to the reporting limit.

The relative percent difference (RPD) between sample MW-08-07 and its field duplicate was outside control limits for acetone and qualified estimated in both samples.

### TAL metals:

The metals method blank, associated with all samples, yielded low level detections of total mercury and dissolved cadmium. Those sample concentrations that were less than 5x the blank concentration were considered laboratory artifacts and qualified as not detected, "U", and raised to the sample quantitation limit.

The RPD between sample MW-08-07 and its field duplicate was outside control limits for antimony, cobalt and vanadium. The RPD for vanadium was also outside project defined control limits in sample S10-MW01 and its field duplicate. These compounds were qualified as estimated, "J".

Anions:

No qualification was required of the anion data.

TDS:

No QC deficiencies warranted qualification of the TDS data.

### **4.3 Surveying and Groundwater Elevations**

Monitoring wells used for the potentiometric surface map were surveyed by a qualified surveyor using a survey grade Trimble® Geometrics Pro XR global positioning system (GPS) in accordance with methods described in the *Basewide Quality Assurance Project Plan (QAPP)* (Bhate, 2003). The horizontal locations (northing and easting coordinates) are relative to the World Geodetic System (WGS) 1984 Universal Transverse Mercator (UTM) Coordinate System, Zone 13 North (meters) and surveyed to an accuracy of +/- 0.33 meters. Vertical elevations were referenced to the North American Vertical Datum (NAVD) 1988 and surveyed to an accuracy of +/-0.001 ft. The top of casing for the monitoring wells (vertical control) was used to determine the depth and elevation of the groundwater. The northing and easting and top of casing survey data for the SD-08 Quarter 5 sampling event are included in Table 4-1.

To determine the groundwater flow direction at Site SD-08, groundwater elevations were measured at 13 monitoring wells (MW-08-01 through MW-08-08, S10-MW01, S10-MW02, S10-MW06 and SWMU183-MW03) on January 21, 2013. Static water elevations measured from the top of casing ranged from 4075.04 ft above mean sea level (amsl) at monitoring well MW-09-01 to 4072.39 ft amsl at S10-MW06. Table 4-1 presents the groundwater elevation data collected during this sampling event. A potentiometric surface map of SD-08 was developed using the data collected on January 21, 2013 (Figure 4-1). The groundwater flow direction at SD-08 is primarily to the east-southeast towards Dillard's Draw.

### **4.4 Equipment Decontamination**

All reusable groundwater sampling equipment (water level meter and water quality meter) were decontaminated in accordance with HAFB Standard Operating Procedure (SOP)-2 provided in the *Basewide QAPP* (Bhate, 2003).

### **4.5 Investigative Derived Waste Handling**

Investigative derived waste (IDW) consisting of disposable items such as nitrile gloves and polyethylene tubing, were disposed of in Holloman Air Force Base waste bins, in accordance with HAFB SOP-9 of the *Basewide QAPP* (Bhate, 2003).

Decontamination and purge waters from groundwater sampling were locally contained in 55 gallon steel drums and conveyed to an 18,000 gallon storage (weir) tank located at Site SS-61. The 18,000 gallon storage tank is maintained by NationView, pending laboratory analysis, until disposal through the HAFB Wastewater Treatment Plant (WWTP) is permitted.

#### **4.6 Documentation**

All field documentation, sample designation and labeling, and chain of custody procedures were conducted in accordance with the procedures specified in the NMED approved *Additional Investigation Requirements Work Plan ERP Site SD-08 (SWMU 82 – Building 131 Washrack), Holloman Air Force Base, New Mexico* (Bhate, 2005). Copies of the Daily Quality Control Reports (DQCRs) are included in Appendix F.

## **5 GROUNDWATER ANALYTICAL RESULTS**

Monitoring wells MW-08-01 through MW-08-08, SWMU183-MW03, S10-MW01, and S10-MW06 were sampled on January 21<sup>st</sup> and 22<sup>nd</sup>, 2013. Groundwater samples were submitted to GCAL for VOC, TAL metals (dissolved), mercury (total), General Chemistry (nitrate-nitrite, chloride, sulfate, fluoride), and total dissolved solids analysis. A summary of the analytical results displaying detections only is provided as Table 5-1. Complete laboratory analytical packages (including chain of custody) and data validation report, are provided in Appendix D and Appendix E, respectively. Figure 5-1 presents NMWQCC and USEPA MCL groundwater exceedences from this sampling event.

### **5.1 Volatile Organic Compounds**

This section summarizes VOC analytical results for the 13 groundwater samples (including two duplicates) collected during the Quarter 5 (January 2013) LTM groundwater sampling event. VOCs were analyzed by USEPA method 8260B.

Eight VOCs (1,2-DCA, 1,2- DCP, 2-butanone, acetone, benzene, bromoform, dibromochloromethane, and tert-butylbenzene) were detected above the MDL in groundwater samples collected during this sampling event. 1,2-DCA was the only VOC detected above the USEPA MCLs and NMWQCC standards. 1,2-DCA was detected with concentrations that exceed the USEPA MCL (5 µg/L) in monitoring wells MW-08-01 (23.8 µg/L), MW-08-02 (63.9 µg/L), MW-08-07 (49.2 µg/L), and S10-MW01 (13.5 µg/L). 1,2-DCA was not detected in any of the remaining wells sampled during this event. Figure 5-2 illustrates the isocontours of 1,2-DCA concentrations detected above the MCL which is currently present in groundwater across Site SD-08. 1,2-DCP was detected in three wells (MW-08-01, MW-08-02, and MW-08-07) with a maximum concentration observed at MW-08-01 (4.97 J µg/L). This detection of 1,2-DCP is just below the USEPA MCL (5 µg/L).

Six additional VOCs were detected at concentrations below applicable groundwater action levels. A low estimated concentration of benzene was detected in monitoring well MW-08-01 (0.584 J µg/L), below the USEPA MCL (5 µg/L). Maximum concentrations of 2-butanone (39.2 µg/L), acetone (6.98 µg/L), and tert-butylbenzene (0.784 J µg/L) were also detected in MW-08-01 during Quarter 5. While, maximum concentrations of bromoform (2.32 J µg/L) and dibromochloromethane (1.24 J µg/L) were detected in MW-08-03. It should be noted that the NMWQCC and USEPA have not established standards for 2-butanone, acetone, bromoform, dibromochloromethane, and tert-butylbenzene.

### **5.2 Target Analyte List Metals**

Target analyte list metals were analyzed via method 6010B/7470A for dissolved and total (mercury only) matrices. The following subsections summarize the dissolved and total TAL metals analysis findings respectively.

### **5.2.1 Dissolved TAL Metals**

Fourteen dissolved (filtered) TAL metals were detected above the MDL in the 13 samples collected (including two duplicates) from monitoring wells MW-08-01 through MW-08-08, S10-MW01, S10-MW06, and SWMU183-MW03. Four of the TAL metals (antimony, iron, manganese, and thallium) were detected above their respective USEPA MCLs, Secondary MCLs, NMWQCC groundwater standards and/or NMED approved background levels (Table 5-1). In addition three dissolved metals (cobalt, silver, and vanadium) were detected above their respective NMED approved background levels (Table 3, NMED 2011b) but at concentrations that do not exceed established action levels.

The following subsections provide a summary of results for the four dissolved TAL metals which were detected above their applicable actions levels and NMED approved background levels. Figure 5-1 presents the distribution of dissolved TAL metals detected in groundwater which exceeded applicable USEPA MCLs, USEPA Secondary MCLs, and/or NMWQCC groundwater standards at SD-08.

#### **Antimony**

Antimony was detected in the groundwater samples collected from nine of the eleven monitoring wells above the USEPA MCL (6 µg/L) and the NMED approved background level (6 µg/L) at concentrations ranging from 19 J µg/L (SWMU183-MW03) to 39 J µg/L (S10-MW01 and S10-MW06). The exceedences of antimony most likely represent the natural variability of groundwater geochemistry at SD-08 as antimony was detected across the site both within and outside the boundary of 1,2-DCA contaminated groundwater plume. In addition, antimony was detected at 33 J µg/L in the furthest upgradient monitoring well (MW-08-08) and therefore this detection cannot be associated with the 1,2-DCA contamination (Figure 5-2). Furthermore, no VOCs were detected in the groundwater sample collected from MW-08-08.

#### **Iron**

Iron was detected in the groundwater samples collected from two monitoring wells above the USEPA Secondary MCL (300 µg/L) at a concentrations of 6,070 µg/L (MW-08-01) and 660 µg/L (MW-08-02). The maximum iron concentration (6,070 µg/L) also exceeds the NMWQCC standard of 1,000 µg/L. In addition, iron was detected above the NMED approved background level (65.6 µg/L) in both wells. Monitoring wells MW-08-01 and MW-08-02 also had VOC detections and are within the area of 1,2-DCA groundwater contamination (Figure 5-2).

#### **Manganese**

Manganese was detected in groundwater samples collected from eight monitoring wells above the USEPA Secondary MCL and the NMED approved background level (50 µg/L) with concentrations ranging from 56 J µg/L (MW-08-05) to 1,840 µg/L (MW-08-01). Seven of the manganese detections also exceed the NMWQCC standard of 200 µg/L. Furthermore, the maximum detection of manganese (1,840 µg/L) was detected in monitoring well MW-08-01 which is located within the boundaries of the 1,2-DCA plume

(Figure 5-2). However, the exceedences of manganese most likely represent the natural variability of groundwater geochemistry at SD-08 as manganese was detected above the USEPA Secondary MCL in three monitoring wells (MW-08-08, SWMU183-MW03 and S10-MW06) which are located outside the 1,2 DCA contaminated groundwater plume.

### **Thallium**

Thallium was detected in groundwater samples collected from five monitoring wells above the USEPA MCL and the NMED approved background level (2 µg/L) at concentrations ranging from 21 J µg/L (SWMU183-MW03) µg/L to 35 J µg/L (MW-08-01). However, the exceedences of thallium most likely represent the natural variability of groundwater geochemistry at SD-08 as thallium was detected above the USEPA MCL in three monitoring wells (MW-08-03, MW-08-06 and SWMU183-MW03) which are located outside the 1,2 DCA contaminated groundwater plume (Figure 5-2).

### **5.2.2 Total TAL Metals**

Unfiltered (total) mercury was detected above the MDL in seven monitoring wells (MW-08-02, MW-08-03, MW-08-05, MW-08-07, MW-08-08, S10-MW01 and SWMU183-MW03). However the maximum mercury concentration detected (0.1 J µg/L) during the fourth quarter sampling event in monitoring well MW-08-05 and MW-08-07, was below the NMWQCC standard (2 µg/L), the USEPA MCL (2 µg/L) and the approved NMED background level (0.5 µg/L) (Table 2, NMED 2011b).

## **5.3 General Chemistry**

General chemistry parameters nitrate, nitrite, chloride, fluoride and sulfate were analyzed in groundwater samples collected from all 11 monitoring wells during the January 2013 sampling event. These parameters were analyzed by USEPA method 300/9056. All of the general chemistry parameters analyzed except for nitrite were detected above the MDL during this sampling event.

Chloride was detected in all 11 monitoring wells at concentrations ranging from 59 milligrams per liter (mg/L) (MW-08-05) to 10,300 mg/L (MW-08-08). With the exception of samples from two wells (MW-08-02 and MW-08-05) all chloride concentrations exceeded the USEPA Secondary MCL (250 mg/L), but were well below the NMED approved background level (35,040 mg/L [Table 2, NMED 2011b]).

Fluoride was detected in ten monitoring wells at concentrations ranging from 1.02 mg/L (MW-08-04) to 5.03 mg/L (MW-08-05). Fluoride concentrations exceeded the NMWQCC groundwater standard (1.6 mg/L) in MW-08-01, MW-08-02, MW-08-05, MW-08-07, S10-MW01, and SWMU183-MW03.

Nitrate was detected in nine monitoring wells at concentrations ranging from 0.321J mg/L (MW-08-05) to 47.5 mg/L (S10-MW06). Nitrate concentrations exceeded the USEPA MCL (10 mg/L) in MW-08-03, MW-08-06, MW-08-08, S10-MW06, and SWMU183-MW03.

Nitrite was not detected in any of the 11 monitoring wells sampled during this event.

Sulfate concentrations were detected in every monitoring well sampled ranging from 1,630 mg/L (MW-08-05) to 7,320 mg/L (S10-MW06). Sulfate also exceeded the USEPA MCL (250 mg/L) in every monitoring well sampled, but all concentrations are well below the NMED approved background level (17,419 mg/L [Table 2, NMED 2011b]).

In summary the highest concentrations of chloride (10,300 mg/L), fluoride (5.03 mg/L), nitrate (47.5 mg/L), and sulfate (7,320 mg/L) were each detected in monitoring wells which are outside the boundary of the 1,2-DCA plume (Figure 5-2). Therefore, these exceedences of most likely represent the natural variability of groundwater geochemistry at Site SD-08.

#### **5.4 Total Dissolved Solids**

Total dissolved solids concentrations ranged from 2,270 mg/L (MW-08-05) to 31,600 mg/L (MW-08-08) in the groundwater samples collected during the fifth quarterly sampling event. All of these TDS concentrations exceed both the NMWQCC groundwater standard (1,000 mg/L) and USEPA Secondary MCL (500 mg/L). TDS concentrations below 10,000 mg/L at Site SD-08 are most likely due to leaking water lines which traverse the eastern and northern boundaries of the site. TDS concentrations in five wells (MW-08-03, MW-08-06, MW-08-08, S10-MW01, and S10-MW06) are greater than 10,000 mg/L. Groundwater with TDS concentrations greater than 10,000 mg/L is classified by the USEPA as a Class III B aquifer (USEPA, 1986), which is designated as unfit for human consumption. As a result of this classification the human ingestion of groundwater at SD-08 is not a valid exposure pathway.

## **6 COMPARISON OF JANUARY 2013 GROUNDWATER SAMPLING RESULTS TO PREVIOUS SD-08 LTM RESULTS**

This section provides a comparison of the Winter 2013 (January 2013) quarterly groundwater results with the results of previous quarterly sampling events for the most frequently detected contaminants of concern (VOCs and TAL Metals). Monitoring well S10-MW06 was added during the third quarter sampling event to better delineate the 1,2-DCA contamination identified during the first two sampling events (January and April 2012).

### **6.1 Volatile Organic Compounds**

Table 6-1 presents the current and previous LTM results for the VOCs which exceed action levels in the groundwater samples collected from the SD-08 monitoring well network (1,2-DCA and 1,2-DCP). Figure 6-1 presents 1,2-DCA concentration trends for monitoring wells MW-08-01, MW-08-02, MW-08-07, and S10-MW01. On a well by well basis, comparisons of the January 2013 VOC data to the previous LTM results are summarized below:

- **MW-08-01:** Concentrations of 1,2-DCA continue to exceed USEPA MCL and NMWQCC standards. However, the 1,2-DCA concentration decreased slightly from 29.3 µg/L (October 2012) to 23.8 µg/L (January 2013) and continues to trend lower since the first quarterly sampling event (January 2012 [(Figure 6-1)]). The concentration of 1,2-DCP (4.97 µg/L) has decreased since the January 2012 event 6.49 µg/L and is now less than the USEPA MCL (5 µg/L).
- **MW-08-02:** The concentration of 1,2-DCA increased to 63.9 µg/L and is the highest detection at MW-08-02 in five quarterly sampling events. 1,2-DCA has exceeded the USEPA MCL (5 µg/L) in four of the five quarterly sampling events (Figure 6-1). 1,2-DCP detected at 1.38 µg/L is the highest recorded concentration observed at MW-08-02 since January 2012, however this detection is below the USEPA MCL (5 µg/L).
- **MW-08-03:** As of January 2013, all VOC detections have not exceeded applicable action levels.
- **MW-08-04:** With the exception of low estimated concentrations of acetone and bromoform detected during the second quarter and fifth quarter sampling events, VOCs have not been historically detected.
- **MW-08-05:** Low estimated concentrations of 1,2-DCA and acetone were detected during second quarterly sampling event which were not detected during

the first quarter, however no VOCs were detected during the fifth quarter sampling event (January 2013).

- **MW-08-06:** VOCs have generally not been detected in this well with the exception of low estimated levels of acetone, chloroform and chloromethane observed during the second, fourth, and fifth sampling events.
- **MW-08-07:** Concentrations of 1,2-DCA continue to exceed USEPA MCL and NMWQCC standard. However, the January 2013 concentration of 1,2-DCA decreased from 69.6 µg/L (October 2012) to 49.2 µg/L (January 2013 [Figure 6-1]). 1,2-DCP was also detected slightly lower than the previous sampling event, at a concentration of 1.19 µg/L. Furthermore, this detection of 1,2-DCP continues to be below the USEPA MCL (5 µg/L).
- **MW-08-08:** No VOCs were detected in this monitoring well in January 2013 or during previous LTM sampling events (Table 6-1).
- **S10-MW01:** Concentrations of 1,2-DCA have slightly decreased from 15.6 µg/L to 13.5 µg/L between the fourth and fifth (October 2012 and January 2013) quarterly sampling events (Figure 6-1). However, detections of 1,2-DCA have remained relatively consistent over the five quarters and continues to exceed the USEPA MCL (5 µg/L) and NMWQCC standard (10 µg/L). Trichloroethene which was initially detected in April 2012, was undetected during the fifth quarter (January 2013).
- **S10-MW06:** No VOCs have been detected above applicable groundwater standards since sampling began for VOCs in July 2012 (Quarter 3).
- **SWMU183-MW03:** During the second, third, fourth, and fifth sampling events no VOCs have been detected above applicable groundwater standards.

## **6.2 Metals**

Table 6-1 shows current and previous LTM results for the most frequently detected dissolved (filtered) TAL metals (arsenic, iron and manganese) in groundwater at Site SD-08. On a well by well basis, comparisons of the January 2013 dissolved TAL metals data to the previous LTM results are summarized below:

- **MW-08-01:** Concentrations of dissolved iron and manganese remained relatively the same from October 2012 to January 2013 and continue to exceed NMWQCC standards. Antimony was detected for the first time during the fourth quarter and continues to exceed the USEPA MCL (6 µg/L) in the fifth quarter. However, these detections of antimony most likely represent the natural variability of groundwater geochemistry across the site. Dissolved iron was detected at MW-08-01 for the first time in January 2013 above the USEPA

secondary MCL (300 µg/L). Furthermore, dissolved thallium was detected above the USEPA (2 µg/L) for the first time in January 2013. All other dissolved TAL metal concentrations have remained relatively constant and were detected below NMWQCC standards and USEPA MCLs.

- **MW-08-02:** Concentrations of dissolved iron and manganese continue to exceed applicable USEPA Primary and Secondary MCLs and remain relatively unchanged. Dissolved arsenic previously detected above the USEPA MCL (10 µg/L) during the first four quarterly sampling events was not detected during the fifth quarter. Dissolved thallium detected above the USEPA MCL (2 µg/L) for the first time during the October 2012 sampling event was not detected in January 2013. Dissolved iron was detected at MW-08-02 for the first time in January 2013 above the USEPA secondary MCL (300 µg/L). All other dissolved metals remained below their applicable NMWQCC and USEPA action levels.
- **MW-08-03:** Dissolved arsenic went undetected for the first time since the second quarter in April 2012. Dissolved iron and manganese were also undetected in January 2013. Dissolved antimony and thallium exceeded their respective USEPA MCLs for the first time in the fifth quarterly sampling event. All other total TAL metals remained below applicable NMWQCC and USEPA action levels.
- **MW-08-04:** Arsenic which was detected for the first time in the third quarter (July 2012) decreased slightly in the fourth quarter (October 2012) and was not detected during the fifth quarter (January 2013). Manganese and iron remain undetected at MW-08-04. Thallium and aluminum which had previously exceeded applicable action levels were not detected during the fifth quarter. All other total TAL metals remained below applicable NMWQCC and USEPA action levels.
- **MW-08-05:** Dissolved arsenic, which had previously increased from non-detect in July 2012 to 15 µg/L in October 2012, was not detected during this sampling event (January 2013). Dissolved iron continues to be undetected at MW-08-05. However, dissolved manganese increased to the highest recorded concentration and exceeded the USEPA secondary MCL (50 µg/L) for the first time in January 2013. Dissolved antimony is the only other TAL metal detected above the USEPA MCL (6 µg/L) during the fifth quarter. Antimony was detected for the first time in October 2012.
- **MW-08-06:** Concentrations of dissolved arsenic which had previously decreased from July to October 2012, was not detected during the fifth quarter (January 2013). Dissolved iron and manganese continue to be undetected at MW-08-06. Dissolved thallium detected for the first time during the fourth quarter continued to exceed the USEPA MCL (2 µg/L) during the fifth quarter. As

discussed in Section 5, this detection of thallium most likely represents the natural variability of groundwater geochemistry across the site.

- **MW-08-07:** Concentrations of dissolved arsenic which had been trending higher for the previous three quarters went undetected during the fifth quarter (January 2013). Dissolved iron continues to be undetected, while, the dissolved manganese concentration (1,390 µg/L) remains relatively consistent with previous quarters and exceeds the USEPA secondary MCL (50 µg/L) and NMWQCC standard (1,000 µg/L). Antimony is the only other TAL metal detected above the USEPA MCL (6 µg/L) during the fifth quarter, and was detected for the first time in the fourth quarter (October 2012).
- **MW-08-08:** Dissolved arsenic which had increased to the highest recorded concentration during the fourth quarter (October 2012), was not detected in January 2013 (Quarter 5). Dissolved iron also continues to be undetected. Dissolved manganese (90 J µg/L) increased from the previous quarter and exceeds the USEPA secondary MCL (50 µg/L). However, this manganese detection is below its historical high observed in January 2012 during the first quarterly sampling event. Antimony is the only other TAL metal previously detected above a USEPA MCL was not detected during the fifth quarter (January 2013).
- **S10-MW01:** Dissolved arsenic which had increased to 22 µg/L in the previous quarter (a historical high concentration) was undetected in the fifth quarter (January 2013). Concentrations of dissolved manganese remains constant above the NMWQCC standard and dissolved iron remains not detected, during the fifth quarterly event. Antimony and thallium are the only other TAL metals detected above the USEPA MCLs. Antimony was detected for the first time during the fourth quarterly sampling event(October 2012).
- **S10-MW06:** Dissolved arsenic which was detected above the USEPA MCL in October 2012 was not detected during the fifth quarter (January 2013). Dissolved iron continues to be undetected, and dissolved manganese remains relatively consistent with the previous quarter (October 2012). Antimony is the only other metal detected above the USEPA MCL. Antimony was not detected in the fourth quarter.
- **SWMU183-MW03:** Dissolved arsenic detected for the first time in October 2013 was not detected in the fifth quarter (January 2013). Concentrations of dissolved manganese remain constant above the NMWQCC standard and dissolved iron remains not detected, during the fifth quarterly sampling event. Antimony and thallium are the only other TAL metals detected above the USEPA MCLs in fifth quarter. Antimony was detected for the first time in October 2012.

## **7 CONCLUSIONS AND RECOMMENDATIONS**

The SD-08 LTM quarterly groundwater sampling program was developed to address COCs (VOCs [1,2-DCA and 1,2-DCP] and TAL Metals [arsenic, iron and manganese]) identified during the 2006 RFI. The primary purpose of the SD-08 LTM sampling groundwater program is to determine if natural attenuation is degrading the previously identified COCs. Analytical results obtained during the fifth quarterly sampling event (January 2013) were evaluated and compared with the results of the previous quarterly sampling events (January, April, July, and October 2012). Based on the results of the first four quarterly sampling events the following actions were implemented during the fifth quarterly sampling event (January 2013):

- In order to further define the extent of the 1,2-DCA plume it was recommended to sample previously installed monitoring well S10-MW06 (as a site SD-08 downgradient monitoring well) during the third quarter (April 2012) and future quarterly sampling events (NationView, June 2012b). The location of this well is shown on Figure 4-1. The additional monitoring well was sampled for VOCs only during Quarter 3 (July 2012). However, during Quarter 4 (October 2012) and Quarter 5 (January 2013) the well was sampled for the entire analytical suite including VOCs, dissolved TAL metals, total mercury, general chemistry parameters [chloride, fluoride, nitrate-nitrite and sulfate], and TDS.
- Based on the Conditional Approval letter, SD-08 LTM Report, Quarter 1, Winter 2012 from NMED dated September 20, 2012 (NMED, 2012a) total TAL metals (unfiltered) analysis was dropped from the LTM program. As required by the NMED mercury is now the only metal collected for total metals (unfiltered) analysis. All other TAL metals were sampled for dissolved (filtered) TAL metals analysis.

Overall, there appears to be a slight decrease in 1,2-DCA and 1,2-DCP concentrations during in the fifth quarterly SD-08 groundwater sampling event compared with the fourth quarterly event (Table 6-1). With one notable exception being an increase in 1,2-DCA concentrations observed in MW-08-02 (Figure 6-1). The following paragraphs summarize the detection and distribution of pertinent COCs and discuss subsequent recommendations.

Since January 2012, 1,2-DCA has exceeded the USEPA MCL (5 µg/L) in four of the Site SD-08 monitoring wells (MW-08-01, MW-08-02, MW-08-07 and S10-MW01). As shown in Figure 6-1, 1,2-DCA concentrations have generally decreased in monitoring well MW-08-01, remained constant in wells S10-MW01 and MW-08-07 and have increased in monitoring well MW-08-02. The decreasing 1,2-DCA concentration trend in MW-08-01 (upgradient well) and increasing 1,2-DCA trend in MW-08-02 suggest that the 1,2-DCA groundwater plume is attenuating and migrating downgradient from AOC-RR (Figure 5-2). All other detected VOCs are below their applicable NMWQCC standards and USEPA MCLs. As shown on Figure 5-2, the concentrations of 1,2-DCA identified in these four monitoring wells exhibit an easterly migration of 1,2-DCA across the SD-08 site. The four monitoring wells with 1,2-DCA exceedences are bound to the

north and south by five monitoring wells (MW-08-03, MW-08-04, MW-08-06, MW-08-08 and SWMU183-MW03) which have not historically detected 1,2-DCA during the LTM program (Table 6-1 and Figure 5-2). As previously discussed in Section 2.3, and shown on Figure 3-4 of Appendix A, historical AOC-RR groundwater samples had elevated 1,2-DCA results that ranged from 9 µg/L to 440 µg/L in six of the AOC-RR groundwater samples (GP-01, GP-04, GP-05, GP-06, GP-09 and GP-11). These groundwater samples were collected immediately downgradient of Building 80 and the suspected underground storage tanks in April 1995 (EBASCO/GTI, 1995). As groundwater flows from the west to east at SD-08 (Figure 4-1), it can be derived that the source of 1,2-DCA groundwater contamination is from the AOC-RR site located due west of Site SD-08 (Figure 5-2). Therefore, NMED has requested that additional monitoring wells be installed upgradient of site SD-08 near this suspected contaminant source (NMED, 2012b).

Although the northern and southern boundaries of the 1,2-DCA plume have been delineated (Figure 5-2) the downgradient (eastern) boundary is still largely undefined due to the exceedences of 1,2-DCA detected above the USEPA MCLs in monitoring well S10-MW01 during the second, third, fourth, and fifth quarterly sampling events.

Presented below are the recommendations to further delineate the nature and extent of 1,2-DCA groundwater contamination currently present at SD-08:

- Install and sample four new monitoring wells for VOCs, TAL metals (dissolved), mercury (total), nitrate, and TDS. The proposed locations of the new monitoring wells are shown on Figure 7-1. The following narrative describes the new monitoring well locations and provides the rationale for installing these wells:
  1. Install one monitoring well located approximately 325 feet east of S10-MW01. The purpose of this well is to delineate the downgradient extent of the 1,2-DCA groundwater plume.
  2. Install one monitoring well located approximately 390 feet southeast (downgradient) of S10-MW01. The purpose of this well is to delineate the downgradient extent of 1,2-DCA groundwater plume.
  3. Install one monitoring well located approximately 120 feet west (upgradient) of MW-08-01 (adjacent to AOC-RR Building 80). The purpose of this well is confirm that AOC-RR is the source of the 1,2-DCA and 1,2-DCP groundwater contamination which has impacted SD-08.
  4. Install one monitoring well located west (upgradient) of MW-08-02 at the location of the suspected AOC-RR underground storage tank area as requested by NMED in the Conditional Approval Letter dated October 5, 2012 (NMED, 2012b).
- Add existing monitoring well S10-MW02 to the LTM program at SD-08.
- Based on the NMED Conditional Approval letter, SD-08 LTM Report, Quarter 2, Spring 2012 dated October 5, 2012 (NMED, 2012b) the general chemistry

parameters fluoride, chloride, nitrite and sulfate analysis will be dropped from the LTM program. Therefore, sampling will continue at existing monitoring wells including offsite monitoring wells SWMU183-MW03, S10-MW01, and S10-MW06 for VOCs, TAL metals (dissolved), mercury (total), nitrate, and TDS.

Dissolved TAL Metals detected at concentrations above the applicable action levels (antimony, iron, manganese, and thallium) are observed in monitoring wells located throughout Site SD-08. The distribution of four of these TAL metals (antimony, iron, manganese, and thallium) at Site SD-08 is ubiquitous, including upgradient and cross gradient monitoring wells SWMU183-MW03, MW-08-04, MW-08-06, and MW-08-08 which have not been impacted by VOC groundwater contamination. Therefore, antimony, iron, manganese, and thallium detected at Site SD-08 are most likely the result of the natural geochemistry of the local groundwater.

Total dissolved solids exceed NMWQCC and USEPA MCL action levels throughout the SD-08 monitoring well network. TDS concentrations in five wells (MW-08-03, MW-08-06, MW-08-08, S10-MW01, and S10-MW06) are greater than 10,000 mg/L. Groundwater with TDS concentrations greater than 10,000 mg/L is classified by the USEPA as a Class III B aquifer (USEPA, 1986), which is designated as unfit for human consumption. As a result of this classification the human ingestion of groundwater at Site SD-08 is not a valid exposure pathway.

General chemistry analytes (chloride, fluoride, nitrate and sulfate and TDS) detected in all SD-08 monitoring wells sampled during the LTM program are common anions found in groundwater throughout HAFB (NationView|Bhate JV II, 2011). The ubiquitous presence of evaporate minerals such as gypsum (calcium sulfate di-hydrate [ $\text{Ca}_2\text{SO}_4 \cdot 2\text{H}_2\text{O}$ ]) at HAFB, is further evidence of the naturally occurring minerals in the area. Additionally, the consistency and frequency of the general chemistry parameters in all SD-08 monitoring wells, including upgradient wells, is further evidence of the likelihood that these analytes are naturally occurring. Consequently in a letter dated October 12, 2012 the NMED has agreed to discontinue the general chemistry analysis with the exception of nitrate and TDS (NMED, 2012b).

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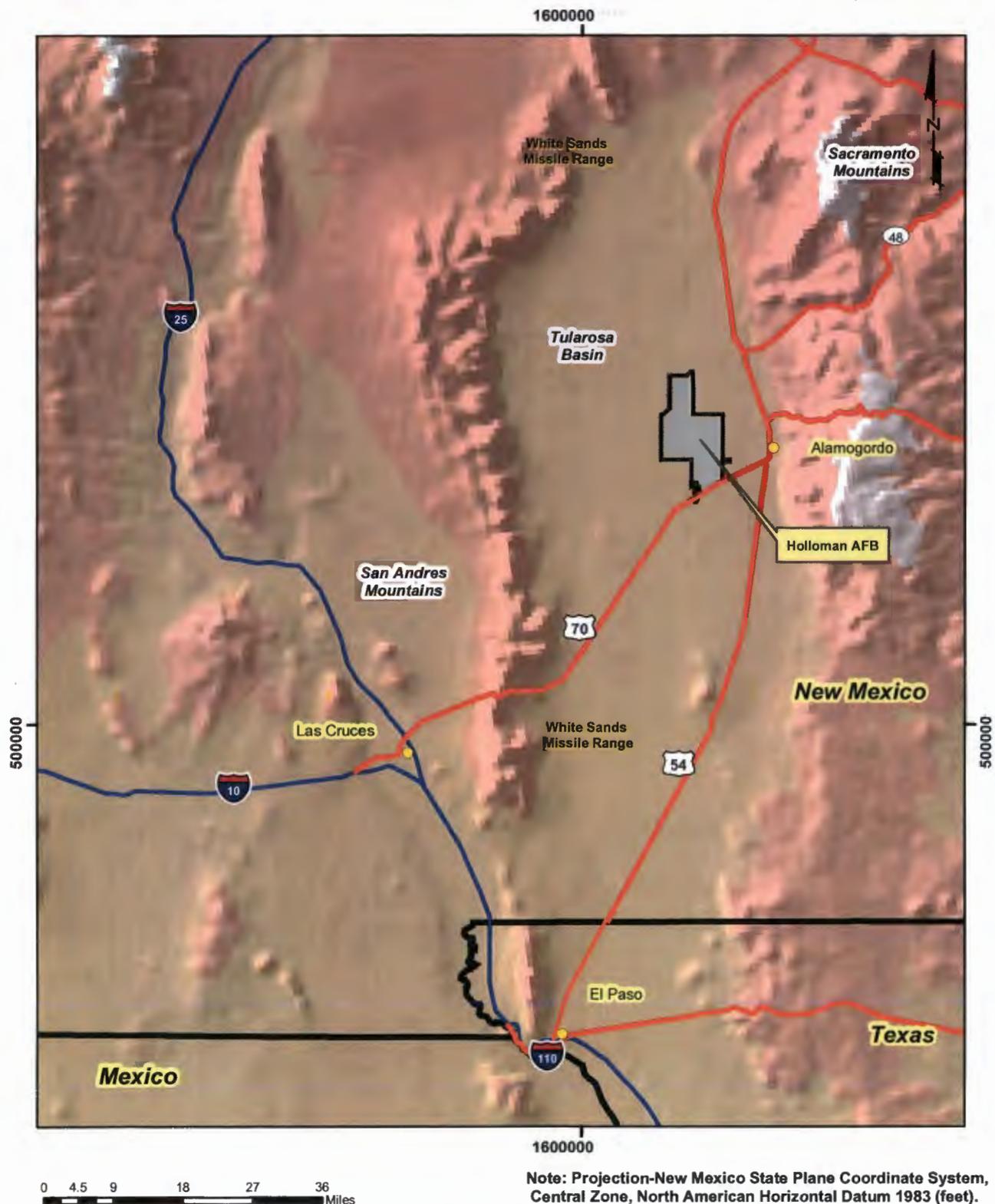
Radian, December 1993. *Draft Final Feasibility Study, Investigation, Study and Recommendation for 29 Waste Sites, Holloman Air Force Base, New Mexico.* United States Environmental Protection Agency (USEPA). November 1986. *Guidelines for Ground-water Classification Under the EPA Ground-water Protection Strategy.*

United States Environmental Protection Agency (USEPA) 1986. *Final Draft Guidelines for Groundwater Classification under the EPA Groundwater Protection Strategy.*

United States Environmental Protection Agency (USEPA). May 2009. *EPA National Primary Drinking Water Regulations.* EPA 816-F-09-004.

United States Army Corps of Engineers, March 2, 2010, *Statement of Work.* Contract Number W9128F-09-D-0055; Delivery Order Number 003.

## **FIGURES**

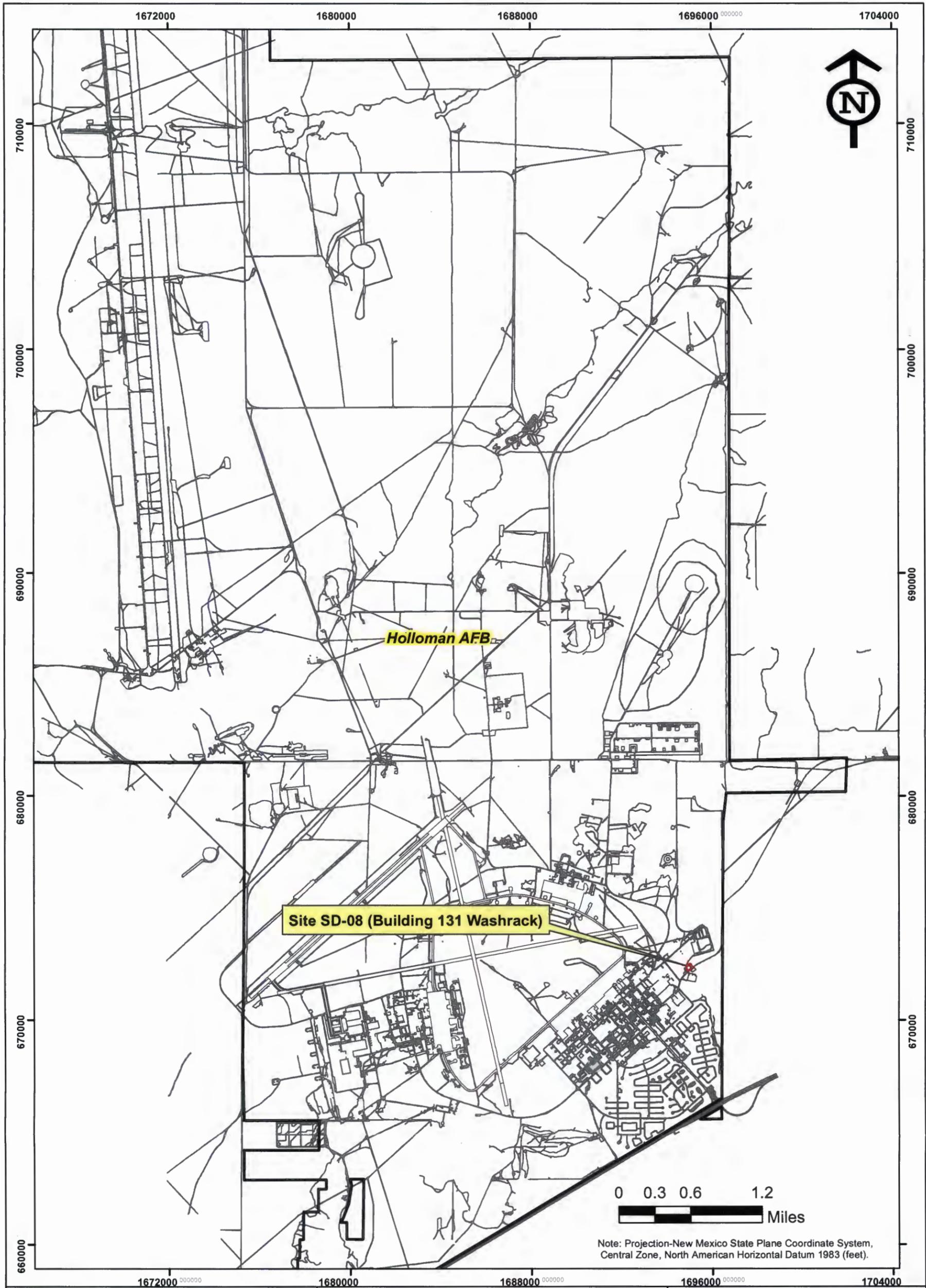


### Holloman Air Force Base, New Mexico Location Map

SD-08  
Long Term Monitoring Report  
Quarter 5, Winter 2013  
Holloman Air Force Base, New Mexico

PROJECT NO.	SCALE	DATE	DRAWN BY:
10-0004	1"=18 Miles	2/8/13	cm
			DRAWING NO.
			Figure 2-1

Figure 2-1

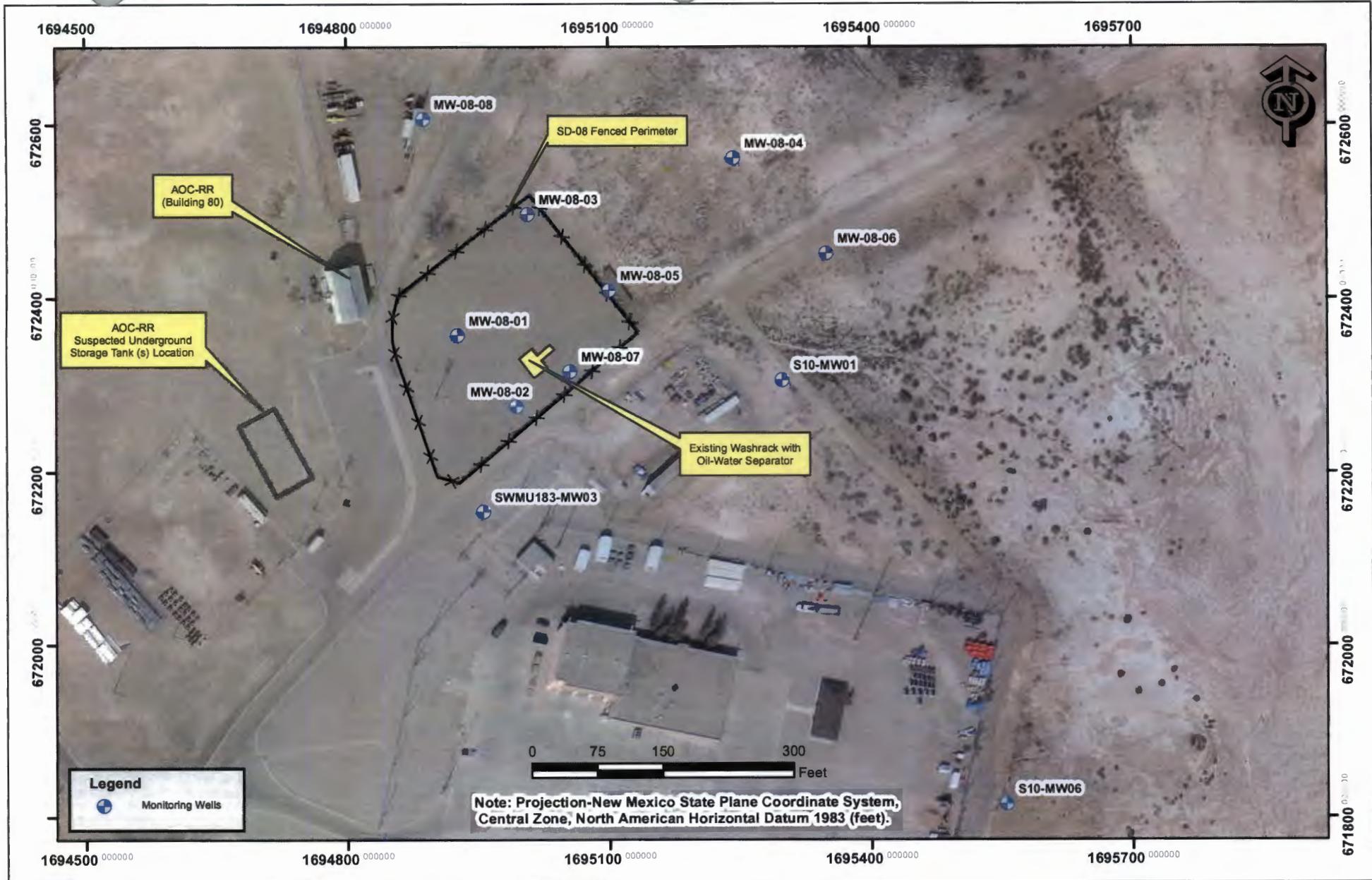


### SD-08 Site Location Map

SD-08  
Long Term Monitoring Report  
Quarter 5, Winter 2013  
Holloman Air Force Base, New Mexico

Figure 2-2

PROJECT NO.	SCALE	DATE	DRAWN BY:
10-0004	1"=4000'	2/8/13	cm
			DRAWING NO:
			Figure 2-2

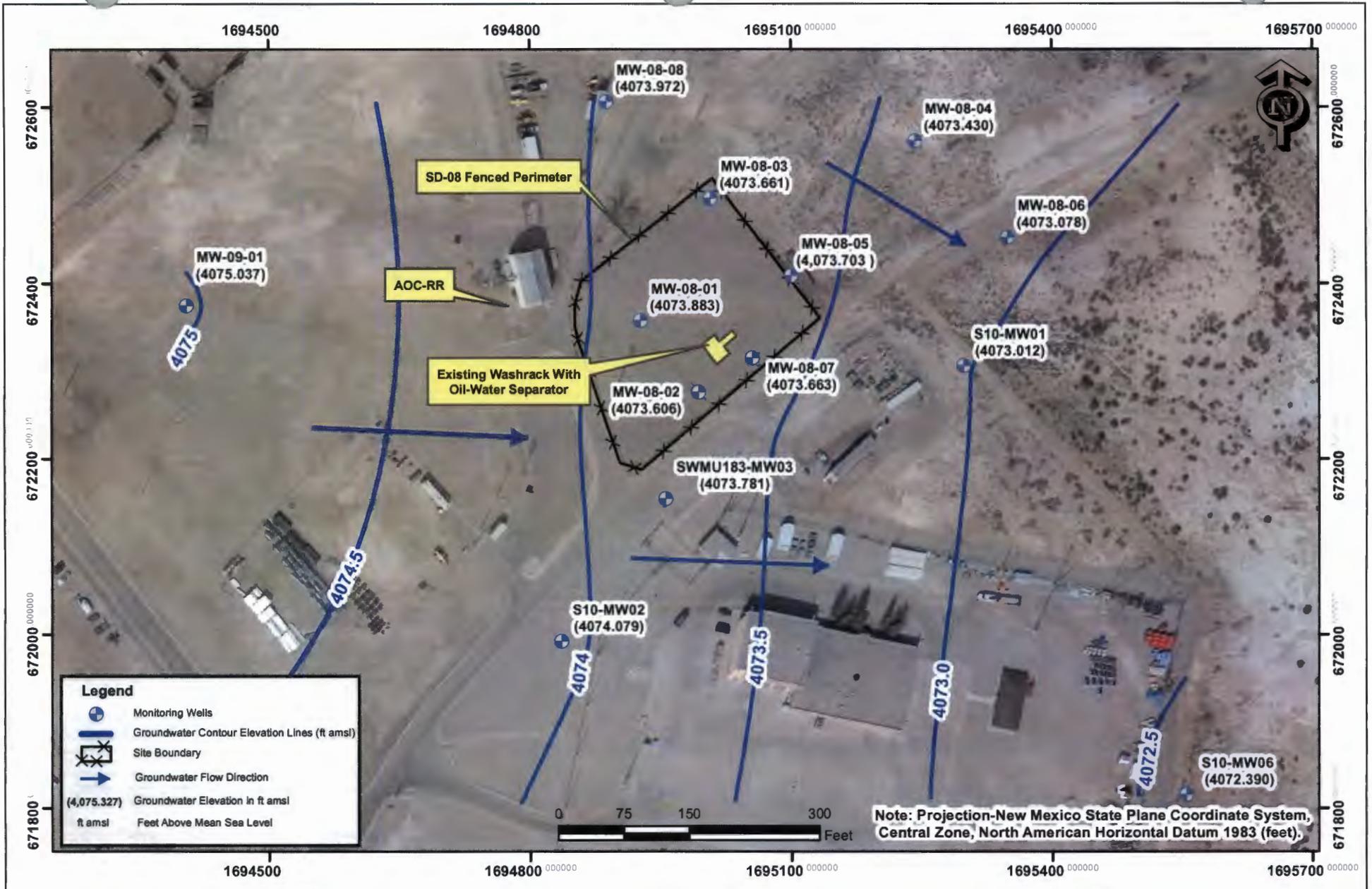


### Site SD-08 Site Plan

PROJECT NO.	SCALE	DATE	DRAWN BY:	cm
10-0004	1"=150'	2/8/13	DRAWING NO:	fig2-3

SD-08  
Long Term Monitoring Report  
Quarter 5, Winter 2013  
Holloman Air Force Base, New Mexico

Figure 2-3

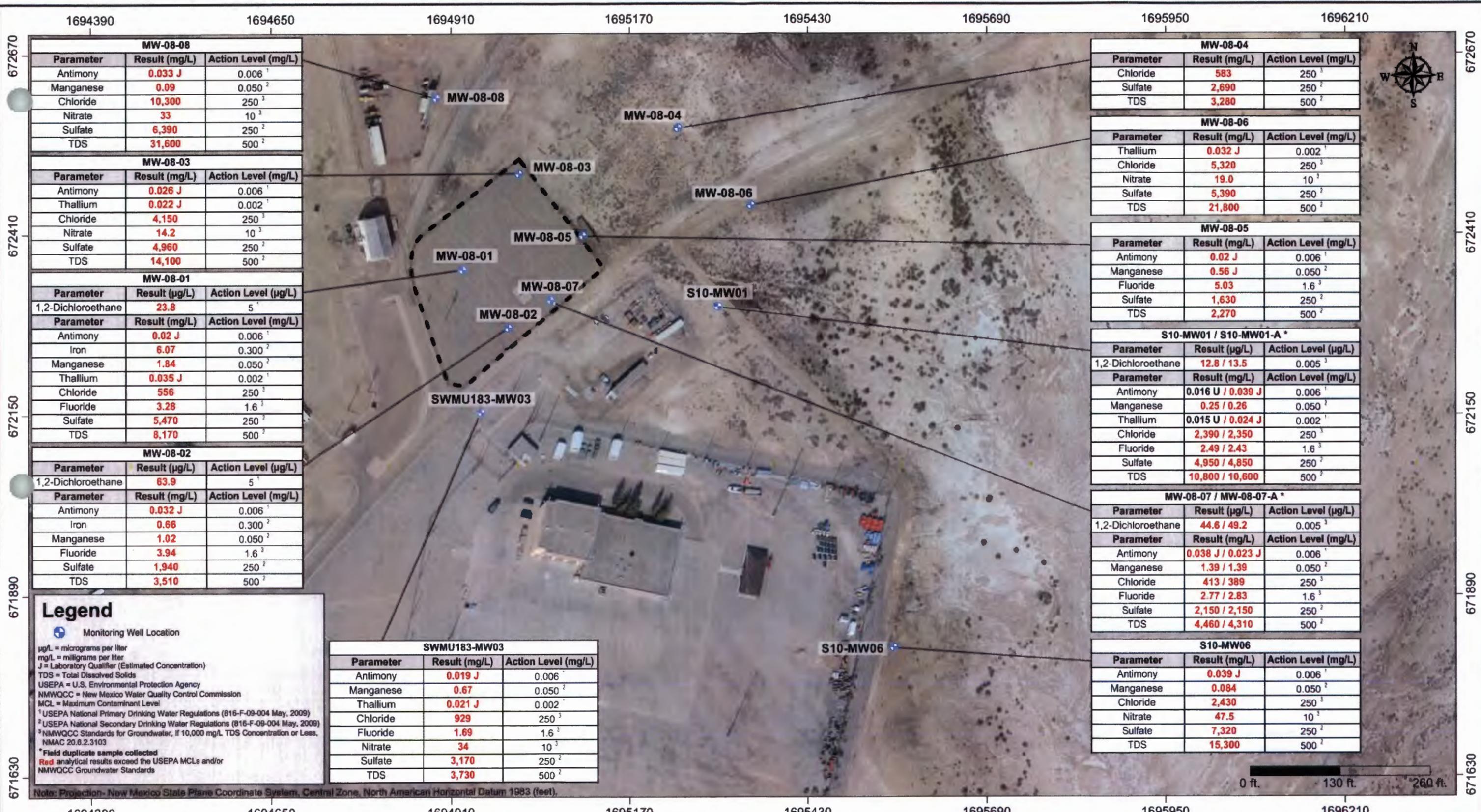


**Site SD-08  
Potentiometric Map  
(January 2013)**

PROJECT NO.	SCALE	DATE	DRAWN BY:	cm
10-0004	1"=150'	2/8/13	DRAWING NO:	fig4-1

**SD-08  
Long Term Monitoring Report  
Quarter 5, Winter 2013  
Holloman Air Force Base, New Mexico**

**Figure 4-1**



### Legend

Monitoring Well Location  
 µg/L = micrograms per liter  
 mg/L = milligrams per liter  
 J = Laboratory Qualifier (Estimated Concentration)  
 TDS = Total Dissolved Solids  
 USEPA = U.S. Environmental Protection Agency  
 NMWQCC = New Mexico Water Quality Control Commission  
 MCL = Maximum Contaminant Level  
<sup>1</sup>USEPA National Primary Drinking Water Regulations (816-F-09-004 May, 2009)  
<sup>2</sup>USEPA National Secondary Drinking Water Regulations (816-F-09-004 May, 2009)  
<sup>3</sup>NMWQCC Standards for Groundwater, If 10,000 mg/L TDS Concentration or Less, NMAC 20.6.2.3103  
 \* Field duplicate sample collected  
 Red analytical results exceed the USEPA MCLs and/or NMWQCC Groundwater Standards

SWMU183-MW03		
Parameter	Result (mg/L)	Action Level (mg/L)
Antimony	0.019 J	0.006 <sup>1</sup>
Manganese	0.67	0.050 <sup>2</sup>
Thallium	0.021 J	0.002 <sup>1</sup>
Chloride	929	250 <sup>3</sup>
Fluoride	1.69	1.6 <sup>3</sup>
Nitrate	34	10 <sup>3</sup>
Sulfate	3,170	250 <sup>2</sup>
TDS	3,730	500 <sup>2</sup>

## Site SD-08 Groundwater Analytical Results Above Action Levels (January 2013)

PROJECT NO.	SCALE	DATE	DRAWN BY:
10-0004	1" = 130'	2/21/2013	dtm
			DRAWING NO:
			Fig. 5-1

SD-08 Long Term Monitoring Report  
 Quarter 5, Winter 2013  
 Holloman Air Force Base, New Mexico

Figure 5-1





Note: Projection- New Mexico State Plane Coordinate System, Central Zone, North American Horizontal Datum 1983 (feet).

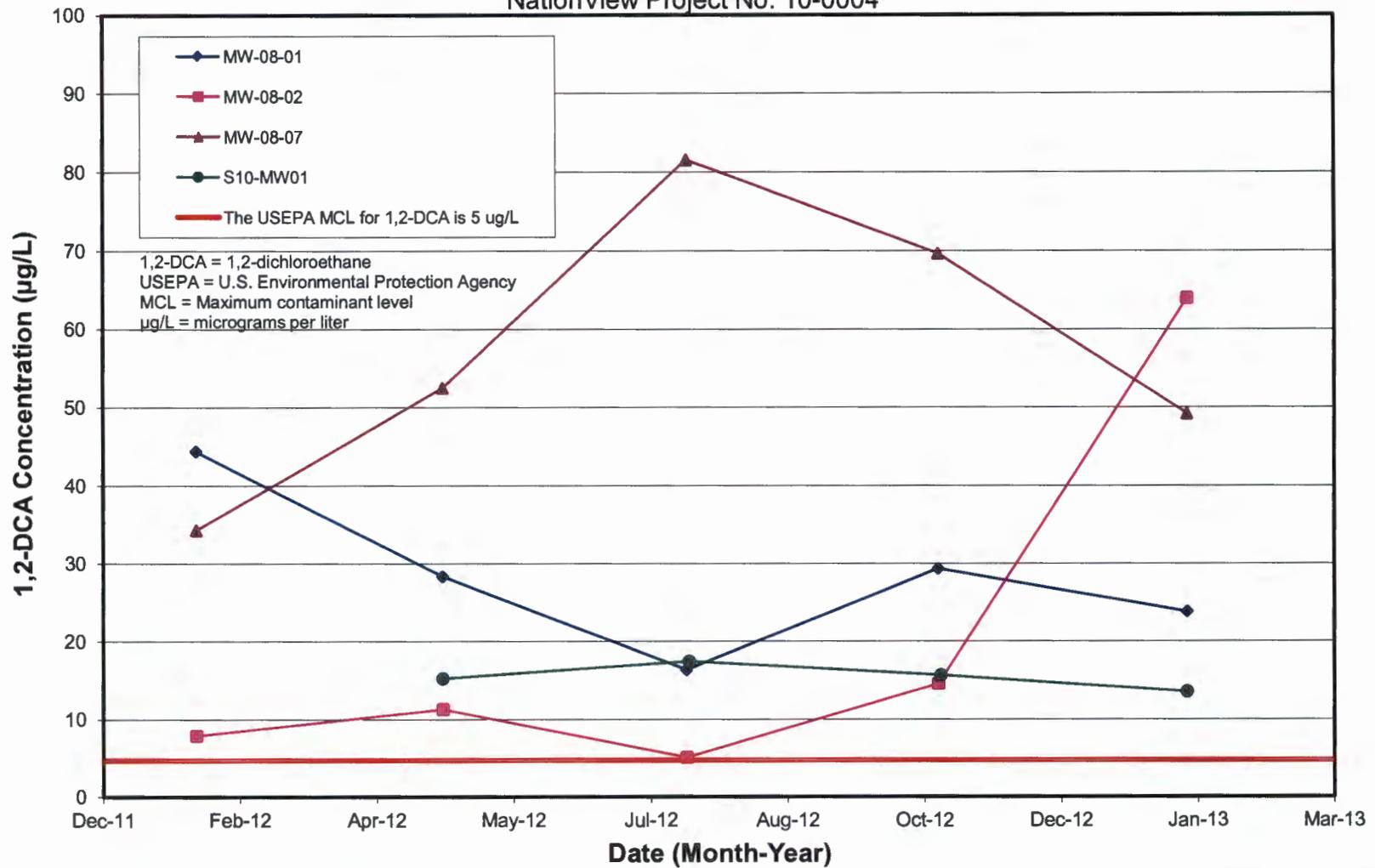


Site SD-08			
1,2-Dichloroethane Isocontour Map (January 2013)			
PROJECT NO.	SCALE	DATE	DRAWN BY:
10-0004	1" = 100'	2/21/2013	dtm
			DRAWING NO:
			Fig. 5-2

SD-08 Long Term Monitoring Report  
 Quarter 5, Winter 2013  
 Holloman Air Force Base, New Mexico

Figure 5-2

**Figure 6-1**  
**1,2-Dichloroethane Concentration Trends in SD-08 Monitoring Wells**  
 Building 131 Washrack (SD-08), Holloman AFB, New Mexico  
 NationView Project No: 10-0004





Note: Projection- New Mexico State Plane Coordinate System, Central Zone, North American Horizontal Datum 1983 (feet).



Site SD-08 Proposed Monitoring Well Location Map			
PROJECT NO.	SCALE	DATE	DRAWN BY:
10-0004	1" = 100'	2/27/2013	dtm
			DRAWING NO:
			Fig. 7-1

SD-08 Long Term Monitoring Report  
 Quarter 5, Winter 2013  
 Holloman Air Force Base, New Mexico

Figure 7-1

## **TABLES**

**Table 4-1**  
**Groundwater Elevation Summary (October 2012)**  
**Building 131 Washrack (SD-08)**  
**Holloman Air Force Base, New Mexico**  
**NationView Project No. 10-0004**

Well Point Number	Northing (UTM meters)	Easting (UTM meters)	Elevation TOC (ft above msl)	January 21, 2013 DTW from TOC (ft below TOC)	Groundwater Elevation January 21, 2013 (ft above msl)
MW-08-01	3634971.461	399637.973	4088.273	14.39	4073.883
MW-08-02	3634945.696	399658.149	4088.726	15.12	4073.606
MW-08-03	3635013.345	399663.352	4087.971	14.31	4073.661
MW-08-04	3635032.485	399734.579	4085.640	12.21	4073.430
MW-08-05	3634985.891	399691.393	4086.543	12.90	4073.643
MW-08-06	3634998.180	399766.517	4084.648	11.57	4073.078
MW-08-07	3634957.670	399676.883	4085.403	11.74	4073.663
MW-08-08	3635047.194	399626.968	4085.072	11.10	4073.972
MW-09-01	3634977.965	399479.072	4085.437	10.40	4075.037
S10-MW01	3634953.884	399751.455	4086.882	13.87	4073.012
S10-MW02	3634860.324	399609.385	4088.499	14.42	4074.079
S10-MW06 <sup>1</sup>	3634803.437	399827.361	4083.500	11.11	4072.390
SWMU183-MW03	3634908.694	399645.623	4086.261	12.48	4073.781

Notes:

UTM = Universal Transverse Mercator

TOC = Top of Casing

DTW = Depth to Water

ft = feet

msl = mean sea level

<sup>1</sup> S10-MW06 not included in the January 2012 survey conducted by NationView

Table 5-1  
Groundwater Analytical Data (January 2013)  
Building 131 Washrack (SD-08)  
Holloman Air Force Base, New Mexico  
NationView Project No. 10-0004

Client Sample Identification:	Groundwater Screening Levels		Basewide Background			MW-08-01		MW-08-02		MW-08-03		MW-08-04		MW-08-05		MW-08-06		MW-08-07			
Lab Sample Identification:	NMWQCC <sup>1</sup>	USEPA MCL <sup>2</sup>	NMED Approved Background Levels <sup>3</sup>	Dissolved Metals in Groundwater UTL <sup>4</sup>	Total Metals in Groundwater UTL <sup>4</sup>	21301231411		21301231410		21301231405		21301220601		21301220603		21301231402		21301231406			
Date Sampled:						1/22/2013		1/22/2013		1/21/2013		1/21/2013		1/21/2013		1/21/2013		1/21/2013		1/22/2013	
Analyte						Result <sup>5</sup>	Q	Q1	Result <sup>5</sup>	Q	Q1	Result <sup>5</sup>	Q	Q1	Result <sup>5</sup>	Q	Q1	Result <sup>5</sup>	Q	Q1	
<b>Volatile Organic Compounds (8260B)</b>	<b>µg/L</b>	<b>µg/L</b>	<b>µg/L</b>	<b>µg/L</b>	<b>µg/L</b>	<b>µg/L</b>			<b>µg/L</b>			<b>µg/L</b>			<b>µg/L</b>			<b>µg/L</b>			
1,2-Dichloroethane	10	5	NV	NV	NV	23.8			63.9			0.116	U		0.116	U		0.116	U		44.6
1,2-Dichloropropane	NV	5	NV	NV	NV	4.97	J		1.38	J		0.15	U		0.15	U		0.15	U		0.941
2-Butanone	NV	NV	NV	NV	NV	39.2			0.142	U		0.142	U		0.142	U		0.142	U		0.142
Acetone	NV	NV	NV	NV	NV	6.98			1.95	J		1.47	J		1.71	J		0.193	U		1.06
Benzene	10	5	NV	NV	NV	0.584	J		0.111	U		0.111	U		0.111	U		0.111	U		0.111
Bromoform	NV	NV	NV	NV	NV	0.215	U		0.215	U		2.32	J		0.636	J		0.215	U		0.215
Dibromochloromethane	NV	NV	NV	NV	NV	0.054	U		0.054	U		1.24	J		0.054	U		0.054	U		0.054
tert-Butylbenzene	NV	NV	NV	NV	NV	0.784	J		0.406	J		0.087	U		0.087	U		0.087	U		0.087
<b>Dissolved TAL Metals Analysis (6010B)</b>	<b>µg/L</b>	<b>µg/L</b>	<b>µg/L</b>	<b>µg/L</b>	<b>µg/L</b>	<b>mg/L</b>			<b>mg/L</b>			<b>mg/L</b>			<b>mg/L</b>			<b>mg/L</b>			<b>mg/L</b>
Antimony	NV	6	6	10.00	NV	0.02	J		0.032	J		0.026	J		0.016	U		0.02	J		0.016
Barium	1,000	2,000	30.2	30.13	NV	0.01	J		0.012	J		0.0062	J		0.012	J		0.018	J		0.0087
Beryllium	NV	4	1	1.00	NV	0.00051	U		0.00051	U		0.00051	U		0.00062	J		0.00051	U		0.00051
Calcium	NV	NV	1,151,302	1,151,301.20	NV	420			562			461			572			535			604
Cobalt	50	NV	2.6	2.60	NV	0.0029	U		0.0029	U		0.0029	U		0.0029	U		0.0029	U		0.0051
Iron	1,000	300 <sup>6</sup>	65.6	65.56	NV	6.07			0.66			0.063	U		0.063	U		0.063	U		0.063
Magnesium	NV	NV	3,630,927	3,630,926.70	NV	515			147			701			255			937			201
Manganese	200	50 <sup>6</sup>	50	118.65	NV	1.84			1.02			0.0066	U		0.0066	U		0.056	J		0.0066
Potassium	NV	NV	120,480	120,479.98	NV	4.28			3.01			19.6			15.1			7.51			23.4
Silver	50	100 <sup>6</sup>	10	10.00	NV	0.0035	U		0.0046	J		0.012	J		0.0035	U		0.004	J		0.0077
Sodium	NV	NV	19,972,499	19,972,499.00	NV	1580			119			3160			639			79.4			5140
Thallium	NV	2	2	15.00	NV	0.035	J		0.015	U		0.022	J		0.015	U		0.015	U		0.032
Vanadium	NV	NV	73.8	73.73	NV	0.0062	U		0.015	J		0.072	J		0.024	J		0.016	J		0.064
Mercury	2	2	0.5	NV	0.44	0.00011	J		0.00012	J		0.00009	J		0.000068	U		0.000068	U		0.000068
<b>Total TAL Metals Analysis (7470A)</b>	<b>µg/L</b>	<b>µg/L</b>	<b>µg/L</b>	<b>µg/L</b>	<b>µg/L</b>	<b>mg/L</b>			<b>mg/L</b>			<b>mg/L</b>			<b>mg/L</b>			<b>mg/L</b>			<b>mg/L</b>
Mercury	2	2	0.5	NV	0.44	0.000068	U		0.00008	J		0.00008	J		0.000068	U		0.0001	J		0.000068
<b>General Chemistry</b>	<b>mg/L</b>	<b>mg/L</b>	<b>mg/L</b>	<b>mg/L</b>	<b>mg/L</b>	<b>mg/L</b>			<b>mg/L</b>			<b>mg/L</b>			<b>mg/L</b>			<b>mg/L</b>			<b>mg/L</b>
Chloride (USEPA 300.0)	250	250 <sup>6</sup>	35,040	NV	35,039.73	556			116			4150			583			59			5320
Fluoride (USEPA 300.0)	1.6	4	NV	NV	NV	3.28			3.94			1.51	J		1.02			5.03			0.9
Nitrate (USEPA 300.0)	10	10	NV	NV	NV	1.15	U		0.132	J		14.2			6.2			0.321	J		19
Nitrite (USEPA 300.0)	NV	1	NV	NV	NV	0.15	U		0.015	U		0.3	U		0.15	U		0.015	U		0.75
Sulfate (USEPA 300.0)	600	250 <sup>6</sup>	17,419	NV	17,418.99	5470			1940			4960			2690			1630			5390
Solids, Total Dissolved (SM 2540 C)	1,000	500 <sup>6</sup>	NV	NV	65,956.58	8170			3510			14100			3280			2270			21800

**Notes:**  
 NMWQCC = New Mexico Water Quality Control Commission  
 USEPA = United States Environmental Protection Agency  
 MCL = Maximum Contaminant Level  
 NMED = New Mexico Environmental Department  
 UTL = Upper Tolerance Limit  
 TAL = Total Analyte List  
 µg/L = micrograms per liter  
 mg/L = milligrams per liter  
 NV = No Value  
 Q = Laboratory Qualifier  
 Q1 = Validating Chemist Qualifier

**Qualifiers**  
 U = Not detected  
 J = Indicates an estimated value  
 B = Indicates the analyte was detected in the associated method blank

**Sample Identification Nomenclature**  
 MW = Monitoring Well Sample  
 08 = Site identifier for SD-08  
 A = Sample suffix denoting a duplicate sample

<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> USEPA National Primary Drinking Water Regulations MCLs (816-F-09-004, May 2009)  
<sup>3</sup> Table 3, Conditional Approval Letter, Basewide Background Study Report, Holloman Air Force Base, New Mexico (NMED, December 2011)  
<sup>4</sup> Table 5-18, Basewide Background Study Report, Holloman Air Force Base, New Mexico (NationView/Bhate JV III, July 2011)  
<sup>5</sup> If results are not detected (U) then the value is set at the Method Detection Limit (MDL)  
<sup>6</sup> USEPA Secondary Drinking Water Standard (816-F-09-004, May 2009)

**Bold value indicates analytes above the New Mexico Groundwater Quality Standards or the USEPA MCLs**  
**Indicates analytical results above the New Mexico Groundwater Quality Standard, or USEPA MCL, but below the NMED Approved Background Level**  
**Indicates analytical results above the NMED Approved Background Level, but below the New Mexico Groundwater Quality Standard and USEPA MCL**

**Table 5-1**  
**Groundwater Analytical Data (January 2013)**  
**Building 131 Washrack (SD-08)**  
**Holloman Air Force Base, New Mexico**  
**NationView Project No. 10-0004**

Client Sample Identification: Lab Sample Identification: Date Sampled:	Groundwater Screening Levels					Basewide Background					MW-08-07-A		MW-08-08		S10-MW01		S10-MW01-A		S10-MW-06		SWMU183-MW03	
	NMWQCC <sup>1</sup>	USEPA MCL <sup>2</sup>	NMED Approved Background Levels <sup>3</sup>	Dissolved Metals in Groundwater UTL <sup>4</sup>	Total Metals in Groundwater UTL <sup>4</sup>	21301231407	1/22/2013	21301220602	1/21/2013	21301231408	1/22/2013	21301231409	1/22/2013	21301231401	1/21/2013	21301220604	1/21/2013					
Analyte					Result <sup>5</sup>	Q	Q1	Result <sup>5</sup>	Q	Q1	Result <sup>5</sup>	Q	Q1	Result <sup>5</sup>	Q	Q1	Result <sup>5</sup>	Q	Q1	Result <sup>5</sup>	Q	Q1
<b>Volatile Organic Compounds (8260B)</b>	µg/L	µg/L	µg/L	µg/L	µg/L			µg/L			µg/L			µg/L			µg/L			µg/L		
1,2-Dichloroethane	10	5	NV	NV	NV			49.2			0.116	U		12.8			13.5			0.116	U	
1,2-Dichloropropane	NV	5	NV	NV	NV			1.19	J		0.15	U		0.15	U		0.15	U		0.15	U	
2-Butanone	NV	NV	NV	NV	NV			0.142	U		0.142	U		0.142	U		0.142	U		0.142	U	
Acetone	NV	NV	NV	NV	NV			1.08	J	J	0.193	U		0.193	U		1.26	J	J	0.193	U	
Benzene	10	5	NV	NV	NV			0.111	U		0.111	U		0.111	U		0.111	U		0.111	U	
Bromoform	NV	NV	NV	NV	NV			0.215	U		0.215	U		0.215	U		0.215	U		0.215	U	
Dibromochloromethane	NV	NV	NV	NV	NV			0.054	U		0.054	U		0.054	U		0.054	U		0.054	U	
tert-Butylbenzene	NV	NV	NV	NV	NV			0.087	U		0.087	U		0.087	U		0.087	U		0.087	U	
<b>Dissolved TAL Metals Analysis (6010B)</b>	µg/L	µg/L	µg/L	µg/L	µg/L			mg/L			mg/L			mg/L			mg/L			mg/L		
Antimony	NV	6	6	10.00	NV			0.023	J	J	0.033	J		0.016	U		0.039	J		0.039	J	
Barium	1,000	2,000	30.2	30.13	NV			0.011	J		0.011	J		0.0074	J		0.0073	J		0.0082	J	
Beryllium	NV	4	1	1.00	NV			0.00051	U		0.00051	U		0.00051	U		0.00051	U		0.00051	U	
Calcium	NV	NV	1,151,302	1,151,301.20	NV			536			613			504			500			441		
Cobalt	50	NV	2.6	2.60	NV			0.0034	J	J	0.0029	U		0.0029	U		0.0029	U		0.0029	U	
Iron	1,000	300 <sup>o</sup>	65.6	65.56	NV			0.063	U		0.063	U		0.063	U		0.063	U		0.063	U	
Magnesium	NV	NV	3,630,927	3,630,926.70	NV			170			1370			493			477			610		
Manganese	200	50 <sup>o</sup>	50	118.65	NV			1.39			0.09			0.25			0.26			0.084		
Potassium	NV	NV	120,480	120,479.98	NV			4.18			33.6			15.2			16			30.3		
Silver	50	100 <sup>o</sup>	10	10.00	NV			0.0066	J		0.011	J		0.0065	J		0.0086	J		0.011	J	
Sodium	NV	NV	19,972,499	19,972,499.00	NV			442			7190			2370			2490			3330		
Thallium	NV	2	2	15.00	NV			0.015	U		0.015	U		0.015	U		0.024	J		0.015	U	
Vanadium	NV	NV	73.8	73.73	NV			0.023	J	J	0.077	J		0.055	J	J	0.076	J	J	0.081	J	
Mercury	2	2	0.5	NV	0.44			0.00009	J		0.00011	J		0.000068	U		0.00012	J		0.00011	J	
<b>Total TAL Metals Analysis (7470A)</b>	µg/L	µg/L	µg/L	µg/L	µg/L			mg/L			mg/L			mg/L			mg/L			mg/L		
Mercury	2	2	0.5	NV	0.44			0.000068	U		0.00009	J		0.000068	U		0.00008	J		0.000068	U	
<b>General Chemistry</b>	mg/L	mg/L	mg/L	mg/L	mg/L			mg/L			mg/L			mg/L			mg/L			mg/L		
Chloride (USEPA 300.0)	250	250 <sup>o</sup>	35,040	NV	35,039.73			389			10300			2390			2350			2430		
Fluoride (USEPA 300.0)	1.6	4	NV	NV	NV			2.83			0.9	U		2.49			2.43			1.23	J	
Nitrate (USEPA 300.0)	10	10	NV	NV	NV			1.47	J		33			4.97	J		5.06	J		47.5		
Nitrite (USEPA 300.0)	NV	1	NV	NV	NV			0.075	U		0.75	U		0.3	U		0.3	U		0.3	U	
Sulfate (USEPA 300.0)	600	250 <sup>o</sup>	17,419	NV	17,418.99			2150			6390			4950			4850			7320		
Solids, Total Dissolved (SM 2540 C)	1,000	500 <sup>o</sup>	NV	NV	65,956.58			4310			31600			10800			10600			15300		

**Notes:**  
 NMWQCC = New Mexico Water Quality Control Commission  
 USEPA = United States Environmental Protection Agency  
 MCL = Maximum Contaminant Level  
 NMED = New Mexico Environmental Department  
 UTL = Upper Tolerance Limit  
 TAL = Total Analyte List  
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 mg/L = milligrams per liter  
 NV = No Value  
 Q = Laboratory Qualifier  
 Q1 = Validating Chemist Qualifier

**Qualifiers**  
 U = Not detected  
 J = Indicates an estimated value  
 B = Indicates the analyte was detected in the associated method blank

**Sample Identification Nomenclature**  
 MW = Monitoring Well Sample  
 08 = Site identifier for SD-08  
 A = Sample suffix denoting a duplicate sample

**Table 6-1**  
**Summary of Selected SD-08 Groundwater Analytical Results Above Action Levels (Jan 2012 - Jan 2013)**

Building 131 Washrack (SD-08)  
 Holloman Air Force Base, New Mexico  
 NationView Project No. 10-0004

Monitoring Well	Date Sampled	VOCs (µg/L)		Dissolved TAL Metals (µg/L)			General Chemistry (mg/L)				
		1,2-Dichloroethane	1,2-Dichloropropane	Arsenic	Iron	Manganese	Chloride	Flouride	Nitrate	Sulfate	TDS
MW-08-01	1/26/12	<b>44.4</b>	<b>6.49</b>	5.2 J	<b>7,560<sup>1</sup></b>	<b>2,600<sup>1</sup></b>	<b>627<sup>1</sup></b>	<b>5.78<sup>1</sup></b>	ND	<b>6,260<sup>1</sup></b>	<b>9,720<sup>1</sup></b>
	4/25/12	<b>28.3</b>	<b>5.62<sup>1</sup></b>	ND	<b>5,340<sup>1</sup></b>	<b>1,850</b>	NS	NS	NS	NS	<b>10,700<sup>1</sup></b>
	7/23/12	<b>16.3</b>	2.98 J	3.7 J	<b>5,170</b>	<b>1,710</b>	<b>519</b>	<b>5.41</b>	ND	<b>5,540</b>	<b>9,140</b>
	10/23/12	<b>29.3</b>	<b>5.58</b>	ND	<b>5,520</b>	<b>1,660</b>	<b>563</b>	<b>3.38</b>	ND	<b>5,780</b>	<b>9,750</b>
	1/22/13	<b>23.8</b>	4.97 J	ND	<b>6,070</b>	<b>1,840</b>	<b>556</b>	<b>3.28</b>	ND	<b>5,470</b>	<b>8,170</b>
MW-08-02	1/26/12	<b>7.82</b>	0.114	<b>26</b>	520	<b>1,030</b>	73.1	<b>7.31</b>	0.09	<b>2,160</b>	<b>3,270</b>
	4/25/12	<b>11.2</b>	ND	<b>13 J</b>	330	<b>800</b>	NS	NS	NS	NS	<b>3,510</b>
	7/23/12	4.98 J	ND	<b>30</b>	<b>1,530</b>	<b>2190</b>	119	<b>4.12</b>	ND	<b>1,960</b>	<b>3,450</b>
	10/23/12	<b>14.5</b>	ND	<b>40</b>	<b>920</b>	<b>1,150</b>	101	<b>3.53</b>	ND	<b>1,890</b>	<b>3,430</b>
	1/22/13	<b>63.9</b>	1.38 J	ND	<b>660</b>	<b>1,020</b>	116	<b>3.94</b>	0.132 J	<b>1,940</b>	<b>3,510</b>
MW-08-03	1/25/12	ND	ND	<b>14</b>	ND	ND	<b>4,030</b>	<b>2.95</b>	<b>16.6</b>	<b>4,890</b>	<b>11,800</b>
	4/25/12	ND	ND	ND	ND	ND	NS	NS	NS	NS	<b>12,300</b>
	7/23/12	ND	ND	<b>22</b>	ND	ND	<b>4,100</b>	<b>2.21</b>	<b>11.7</b>	<b>5,060</b>	<b>13,200</b>
	10/23/12	ND	ND	<b>19</b>	ND	ND	<b>5,180</b>	<b>3.11 J</b>	<b>12.3</b>	<b>5,970</b>	<b>13,400</b>
	1/21/13	ND	ND	ND	ND	ND	<b>4,150</b>	1.51 J	<b>14.2</b>	<b>4,960</b>	<b>14,100</b>
MW-08-04	1/25/12	ND	ND	ND	ND	ND	<b>477</b>	<b>2.26</b>	4.97	<b>3,550</b>	<b>5,060</b>
	4/24/12	ND	ND	ND	ND	ND	NS	NS	NS	NS	<b>6,060</b>
	7/23/12	ND	ND	9.2 J	ND	ND	<b>457</b>	1.26	4.18 J	<b>2,950</b>	<b>5,110</b>
	10/23/12	ND	ND	3.9 J	ND	ND	<b>513</b>	0.901 J	4.19 J	<b>3,130</b>	<b>5,310</b>
	1/21/13	ND	ND	ND	ND	ND	<b>583</b>	1.02	6.2	<b>2,690</b>	<b>3,280</b>
MW-08-05	1/25/12	ND	ND	5.8 J	74 J	33	27.7	<b>5.35</b>	0.787	<b>1,800</b>	<b>2,580</b>
	4/24/12	4.61 J	ND	ND	ND	24	NS	NS	NS	NS	<b>2,850</b>
	7/24/12	ND	ND	ND	ND	36	34.2	<b>4.55</b>	0.434 J	<b>1,590</b>	<b>2,700</b>
	10/23/12	ND	ND	<b>15</b>	ND	23	22.6	<b>4.19</b>	ND	<b>1,640</b>	<b>2,930</b>
	1/21/13	ND	ND	ND	ND	<b>56 J</b>	59	<b>5.03</b>	0.321 J	<b>1,630</b>	<b>2,270</b>
MW-08-06	1/24/12	ND	ND	<b>12</b>	ND	ND	<b>6710</b>	<b>3.09</b>	<b>19.4</b>	<b>8,170</b>	<b>19,900</b>
	4/24/12	ND	ND	ND	ND	ND	NS	NS	NS	NS	<b>19,400</b>
	7/23/12	ND	ND	<b>22</b>	ND	ND	<b>6240</b>	1.14	<b>15.9</b>	<b>7,970</b>	<b>19,900</b>
	10/23/12	ND	ND	<b>13</b>	ND	ND	<b>5,860</b>	0.465 J	<b>15.2</b>	<b>7,070</b>	<b>19,800</b>
	1/21/13	ND	ND	ND	ND	ND	<b>5,320</b>	ND	<b>19</b>	<b>5,390</b>	<b>21,800</b>
MW-08-07	1/26/12	<b>34.3</b>	0.783 J	<b>48</b>	ND	<b>1,330</b>	436	<b>4.66</b>	2.36 J	<b>2,230</b>	<b>3,840</b>
	4/25/12	<b>52.5</b>	0.915 J	<b>29</b>	ND	<b>1,370</b>	NS	NS	NS	NS	<b>4,020</b>
	7/23/12	<b>81.5</b>	1.3 J	<b>53</b>	ND	<b>1,530</b>	<b>452<sup>1</sup></b>	<b>3.35<sup>1</sup></b>	1.26 J <sup>1</sup>	<b>2,270<sup>1</sup></b>	<b>4,360<sup>1</sup></b>
	10/23/12	<b>69.6</b>	1.65 J	<b>69<sup>1</sup></b>	ND	<b>1,510<sup>1</sup></b>	<b>485</b>	<b>2.94<sup>1</sup></b>	0.765 J <sup>1</sup>	<b>2,300</b>	<b>4,780</b>
	1/22/13	<b>49.2<sup>1</sup></b>	1.19 J <sup>1</sup>	ND	ND	<b>1,390</b>	<b>413</b>	<b>2.83<sup>1</sup></b>	1.47 J <sup>1</sup>	<b>2,150</b>	<b>4,460</b>
MW-08-08	1/25/12	ND	ND	<b>10 J</b>	ND	<b>240</b>	<b>13,500</b>	ND	<b>37.8</b>	<b>8,900</b>	<b>33,600</b>
	4/24/12	ND	ND	ND	ND	<b>220</b>	NS	NS	NS	NS	<b>29,300</b>
	7/24/12	ND	ND	ND	ND	<b>79</b>	<b>12,400</b>	ND	<b>25.8</b>	<b>8,070</b>	<b>30,700</b>
	10/22/12	ND	ND	<b>45 J</b>	ND	41 J	<b>12,300</b>	ND	<b>24.4 J</b>	<b>7,540</b>	<b>31,800</b>
	1/21/13	ND	ND	ND	ND	<b>90</b>	<b>10,300</b>	ND	<b>33</b>	<b>6,390</b>	<b>31,600</b>
S10-MW01	4/25/12	<b>15.2</b>	ND	ND	ND	<b>240</b>	<b>3,330</b>	<b>3.34</b>	5.42	<b>5,940</b>	<b>12,900</b>
	7/24/12	<b>17.4</b>	ND	8.7 J	ND	<b>210</b>	<b>3860</b>	<b>2.81</b>	4.44 J	<b>6,190</b>	<b>14,600</b>
	10/24/12	<b>15.6</b>	0.582 J	<b>22<sup>1</sup></b>	ND	<b>210</b>	<b>4,180<sup>1</sup></b>	1.83 J	4.48 J <sup>1</sup>	<b>6,010<sup>1</sup></b>	<b>15,700<sup>1</sup></b>
	1/22/13	<b>13.5<sup>1</sup></b>	ND	ND	ND	<b>260<sup>1</sup></b>	<b>2390</b>	<b>2.49</b>	5.06 J <sup>1</sup>	<b>4,950</b>	<b>10,800</b>
S10-MW06	7/24/12	ND	ND	NS	NS	NS	NS	NS	NS	NS	NS
	10/23/12	ND	ND	<b>21</b>	ND	<b>70</b>	<b>2,280</b>	0.638 J	<b>47.1</b>	<b>6,860</b>	<b>14,700</b>
	1/21/13	ND	ND	ND	ND	<b>84</b>	<b>2,430</b>	1.23 J	<b>47.5</b>	<b>7,320</b>	<b>15,300</b>
SWMU183-MW03	4/25/12	ND	ND	ND	ND	<b>820</b>	<b>930</b>	1.67	<b>64.2</b>	<b>2780</b>	<b>5,400</b>
	7/24/12	ND	ND	ND	ND	<b>790</b>	<b>907</b>	1.44	<b>55.9</b>	<b>2780</b>	<b>5,520</b>
	10/23/12	ND	ND	<b>12</b>	ND	<b>800</b>	<b>1,010</b>	1.44 J	<b>47.9</b>	<b>2,960</b>	<b>6,330</b>
	1/21/13	ND	ND	ND	ND	<b>670</b>	<b>929</b>	1.69 J	<b>34</b>	<b>3,170</b>	<b>3,730</b>

Notes:  
 mg/L = milligrams per liter  
 µg/L = micrograms per liter  
 J = Indicates an estimated value  
 NS = Not Sampled  
 ND = Not detected  
 VOC = Volatile Organic Compounds  
 Table presents metals that are considered contaminants of concern  
<sup>1</sup> Duplicate Result

TDS = Total Dissolved Solids  
 USEPA = U.S. Environmental Protection Agency  
 MCL = Maximum Contaminant Level  
 NMED = New Mexico Environment Department  
 TPH = Total Petroleum Hydrocarbons

**Bold value indicates analytes above the New Mexico Groundwater Quality Standards, the USEPA MCLs, or the NMED TPH Screening Guidelines**  
 Indicates analytical results above the New Mexico Groundwater Quality Standard, or USEPA MCL, but below the NMED approved Basewide Background Level

**ATTACHMENT 1**

**NMED Notice of Approval Letter, Request to Perform  
Eight Quarters of Groundwater Monitoring, Site SD-08  
(SWMU 82) Holloman AFB, EPA ID # NM6572124422,  
HWB-HAFB-07-007 (November 22, 2011)**



SUSANA MARTINEZ  
Governor

JOHN A. SANCHEZ  
Lieutenant Governor

**NEW MEXICO  
ENVIRONMENT DEPARTMENT**

***Hazardous Waste Bureau***

**2905 Rodeo Park Drive East, Building 1  
Santa Fe, New Mexico 87505-6303  
Phone (505) 476-6000 Fax (505) 476-6030  
[www.nmenv.state.nm.us](http://www.nmenv.state.nm.us)**



DAVE MARTIN  
Cabinet Secretary

BUTCH TONGATE  
Deputy Secretary

**CERTIFIED MAIL - RETURN RECEIPT REQUESTED**

November 22, 2011

A. David Budak  
Deputy Base Civil Engineer  
550 Tabosa Ave.  
Holloman AFB, NM 88330-5840

**RE: NOTICE OF APROVAL  
REQUEST TO PERFORM EIGHT QUARTERS OF GROUNDWATER  
MONITORING, SITE SD-08 (SWMU 82)  
HOLLOMAN AIR FORCE BASE, EPA ID# NM6572124422  
HWB-HAFB-07-007**

Dear Mr. Budak:

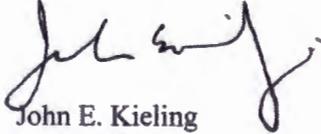
The New Mexico Environment Department (NMED) has reviewed Holloman Air Force Base's November 2, 2011 request to perform eight quarters of groundwater monitoring at Site SD-08 (SWMU 82). The analytical parameters to be collected include Volatile Organic Compounds (VOCs), Target Analyte List (TAL) Metals, Nitrate and Total Dissolved Solids (TDS) from nine (9) existing monitoring wells at the site. A quarterly report is to be submitted to NMED following each sampling event.

Please be advised that the NMED hereby approves this request as proposed. As you know, NMED is presently reviewing a RCRA Facility Investigation Report for this site and is aware that there is petroleum hydrocarbon (TRPH) contamination in the soil above target levels and 1,2-Dichloroethane (1,2-DCA) contamination in groundwater above cleanup standards. A risk assessment in this report concludes that the presence of these contaminants does not present a risk to unrestricted future use of the site. Therefore, the proposed monitoring is anticipated to support this conclusion.

Mr. A. David Budak  
November 22, 2011  
Page 2 of 2

If you have any questions regarding this letter, please contact David Strasser of my staff at (505) 222-9526.

Sincerely,



John E. Kieling  
Acting Chief  
Hazardous Waste Bureau

cc: W. Moats, NMED HWB  
C. Amindyas, NMED HWB  
D. Strasser, NMED HWB  
L. King, EPA-Region 6 (6PD-N)  
File: HAFB 2011 and Reading  
HWB-HAFB-07-007

**APPENDIX A**

**Portions of the Draft Final Investigation Report, Waste Sites SS-06,  
SD-15, AOC-RR and AOC-BBMS**

**Holloman Air Force Base, New Mexico**

**Ebasco Services Inc. and Groundwater Technology Government  
Services Inc., October 1995**

**DRAFT FINAL  
SITE INVESTIGATION REPORT  
WASTE SITES SS-06, SD-15, AOC-RR, AND AOC-BBMS  
HOLLOMAN AIR FORCE BASE, NEW MEXICO**

Prepared for:

49 CES/CEVR  
Holloman Air Force Base, NM

and

HQ ACC/ESVR  
Langley Air Force Base, VA

Prepared by:

Ebasco Services, Inc. dba  
Foster Wheeler Environmental Corporation  
143 Union Blvd., Suite 1010  
Lakewood, Colorado 80228-1824

and

Groundwater Technology  
Government Services, Inc.  
2501 Yale Blvd., S.E.  
Albuquerque, New Mexico 87106

Under Contract No. DACW-45-94-D-0003

Delivery Order 1, Work Authorization Directives 3, 5, 9

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

October 1995

# **AOC-RR**

## **Area of Concern - Railroad Building**

**TABLE 3-1  
 SOIL VAPOR SURVEY RESULTS AT AOC-RR-  
 RAILROAD BUILDING 80  
 HOLLOMAN AFB, NM  
 MARCH 1995**

Sample No.	Benzene (ug/l)	Toluene (ug/l)	Ethylbenzene (ug/l)	Xylenes (ug/l)	Total BTEX (ug/l)	TPH (ug/l)
AOC-RR-SG-01	0.10	0.24	0.06	0.26	0.66	<20
AOC-RR-SG-02	0.05	0.26	0.08	0.34	0.73	<20
AOC-RR-SG-03	<0.05	0.15	0.05	0.22	0.42	<20
AOC-RR-SG-04	<0.05	0.20	<0.05	0.19	0.39	<20
AOC-RR-SG-05	0.07	0.21	0.07	0.27	0.55	<20
AOC-RR-SG-06	0.07	0.24	0.07	0.28	0.66	<20
AOC-RR-SG-07	0.10	0.25	0.07	0.27	0.69	<20
AOC-RR-SG-08	0.07	0.18	0.06	0.24	0.55	<20
AOC-RR-SG-09	0.09	0.19	0.07	0.27	0.62	<20
AOC-RR-SG-10	0.06	0.23	0.08	0.33	0.70	<20
AOC-RR-SG-11	<0.05	0.17	0.06	0.23	0.46	<20
AOC-RR-SG-11DUP	0.06	0.19	<0.05	<0.05	0.25	<20
AOC-RR-SG-12	<0.05	0.17	0.05	0.21	0.43	<20
AOC-RR-SG-13	<0.05	0.14	0.06	0.19	0.39	<20
AOC-RR-SG-14	<0.05	0.21	0.07	0.29	0.57	<20
AOC-RR-SG-15	0.10	0.31	0.08	0.32	0.81	<20
AOC-RR-SG-16	0.58	0.51	0.10	0.31	1.50	<20
AOC-RR-SG-17	<0.05	0.11	<0.05	0.18	0.29	<20

**TABLE 3-1 (Continued)**  
**SOIL VAPOR SURVEY RESULTS AT AOC-RR**  
**RAILROAD BUILDING 80**  
**HOLLOMAN AFB, NM**  
**MARCH 1995**

Sample No.	Benzene (ug/l)	Toluene (ug/l)	Ethylbenzene (ug/l)	Xylenes (ug/l)	Total BTEX (ug/l)	TPH (ug/l)
AOC-RR-SG-18	<0.05	0.13	<0.05	0.12	0.25	<20
AOC-RR-SG-19	<0.05	0.15	0.06	0.22	0.43	<20
AOC-RR-SG-20	<0.05	0.20	0.08	0.33	0.61	<20
AOC-RR-SG-21	<0.05	0.15	<0.05	0.22	0.37	<20
AOC-RR-SG-22	0.05	<0.05	0.14	0.19	0.38	<20
AOC-RR-SG-22DUP	<0.05	0.16	<0.05	0.21	0.37	<20
AOC-RR-SG-23	0.07	0.24	0.08	0.37	0.76	<20
AOC-RR-SG-EQUIP. BLANK (3/21/95)	<0.05	0.18	0.06	0.30	0.54	<20
AOC-RR-SG-24	<0.05	0.16	0.06	0.29	0.51	<20
AOC-RR-SG-25	<0.05	0.17	0.06	0.28	0.51	<20
AOC-RR-SG-26	0.08	0.40	0.15	0.71	1.34	<20
AOC-RR-SG-27	<0.05	0.14	<0.05	0.22	0.36	<20
AOC-RR-SG-28	<0.05	0.17	0.06	0.27	0.50	<20
AOC-RR-SG-29	<0.05	0.14	<0.05	0.20	0.34	<20
AOC-RR-SG-29DUP	0.05	0.16	<0.05	<0.05	0.21	<20

\*Samples analyzed for BTEX and TPH by EPA Methods Modified 5030/8020 and 8015.

ug/l = Micrograms per liter.

TPH = Total Petroleum Hydrocarbons as JP-4.

< = Indicates compound not detected at the stated reporting limit.

**TABLE 3-2  
 GEOTECHNICAL SOIL ANALYTICAL RESULTS AT AOC-RR  
 RAILROAD BUILDING 80  
 HOLLOMAN AFB, NM  
 MARCH 1995**

SAMPLE NO.	DEPTH (FT)	USCS IDENT	MOISTURE CONTENT (%wt)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	MEDIAN GRAIN SIZE (mm)
AOC-RR-SB-01-6-8	6-8	ML	23.9	29	26	3	0.0128
AOC-RR-SB-02-8-10	8-10	SM/SC	21.5	-	NON-PLASTIC	-	0.0090
AOC-RR-SB-03-4-6	4-6	ML	20.8	32	25	7	0.0294
AOC-RR-SB-04-2-4	2-4	SM/SC	22.5	-	NON-PLASTIC	-	0.0075
AOC-RR-SB-05-6-8	6-8	ML	35.2	38	33	5	0.0053
AOC-RR-SB-06-6-8	6-8	ML	29.6	35	33	2	0.0062

- = Not measured  
 USCS = Unified Soil Classification System  
 %wt = Weight percent  
 FT = Feet  
 mm = Millimeter

**TABLE 3-3  
 SUMMARY OF SOIL ANALYTICAL RESULTS AT AOC-RR  
 RAILROAD BUILDING 80  
 HOLLOMAN AFB, NM  
 MARCH - APRIL 1995**

CONSTITUENTS	COMPARATIVE CONCENTRATIONS		AOC-RR- SB01-6-8	AOC-RR- SB01-10-12	AOC-RR- SB02-2-4	AOC-RR- SB02-2-4D	AOC-RR- SB02-8-10	AOC-RR- SB03-4-6	AOC-RR- SB03-8-10	AOC-RR- SB04-2-4
	Background*	Risk-based Levels*								
SAMPLE DEPTH (feet)	--	--	6-8	10-12	2-4	2-4	8-10	4-6	8-10	2-4
<b>VOLATILE ORGANICS - METHOD 8240 (mg/kg)</b>										
All Constituents	N/A	N/A	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL PETROLEUM HYDROCARBONS - METHOD 8015 (mg/kg)	N/A	1000*	<20	<20	<20	<20	<20	<20	<20	<20
<b>TAL METALS - METHODS 6000s AND 7000s (mg/kg)</b>										
Barium	84	72,000	<100	<100	<100	<100	<100	170	63	<100
Calcium	250,000	N/A	160,000	130,000	170,000	170,000	140,000	140,000	130,000	130,000
Chromium	6.61	1,000,000	<15	<15	<15	<15	<15	<15	6.6	<15
Copper	4.84	38,000	<12	<12	<12	<12	<12	<12	5.0	<12
Iron	6,362	N/A	9,100	7,600	2,500	2,600	3,400	5,400	6,300	3,700
Lead	2.32	400*	7.5	3.9	2.0	1.8	1.4	3.2	3.0	2.9
Nickel	5.61	20,000	<20	<20	<20	<20	<20	<20	8	<20
Vanadium	15.46	7,200	<25	<25	<25	<25	<25	<25	17	<25
Zinc	20.25	310,000	30	32	19	20	31	25	19	27

TABLE 3-3 (Continued)  
 SUMMARY OF SOIL ANALYTICAL RESULTS AT AOC-RR  
 RAILROAD BUILDING 80  
 HOLLOMAN AFB, NM  
 MARCH - APRIL 1995

CONSTITUENTS	COMPARATIVE CONCENTRATIONS		AOC-RR- SB04-4-4	AOC-RR- SB05-2-4	AOC-RR- SB05-4-8	AOC-RR- SB04-2-4	AOC-RR- SB04-4-8
	Background*	Risk-based Levels*					
SAMPLE DEPTH (feet)	--	--	6-8	2-4	6-8	2-4	6-8
VOLATILE ORGANICS - METHOD 8240 (ug/kg)							
All Constituents	N/A	N/A	ND	ND	ND	ND	ND
TOTAL PETROLEUM HYDROCARBONS - METHOD 8015 (mg/kg)	N/A	1000*	<20	<20	<20	<20	<20
TAL METALS - METHODS 6000s AND 7000s (mg/kg)							
Barium	84	72,000	<100	<100	<100	280	<100
Calcium	250,000	N/A	120,000	220,000	300,000	180,000	190,000
Chromium	6.61	1,000,000	<15	<15	<15	<15	<15
Copper	4.84	38,000	<12	<12	<12	<12	<12
Iron	6,362	N/A	4,600	1,200	6,700	6,700	3,100
Lead	-2.32	400*	2.3	1.3	3.8	2.6	6.9
Nickel	5.61	20,000	<20	<20	<20	<20	<20
Vanadium	15.46	7,200	<25	<25	<25	<25	<25
Zinc	20.25	310,000	24	64	41	26	60

**TABLE 3-3 (Continued)**  
**SUMMARY OF SOIL ANALYTICAL RESULTS AT AOC-RR**  
**RAILROAD BUILDING 80**  
**HOLLOMAN AFB, NM**  
**MARCH - APRIL 1995**

*\*Basewide Background Study Holloman AFB (Radian, 1993).*

*\*EPA Region III Risk-based levels (R.L. Smith, November 1994).*

*\*NMED USTB Correspondence to Holloman AFB, dated November 2, 1992.*

*\*EPA Action Level for residential exposure.*

ND = No compounds detected for method specified.

ug/kg = Micrograms per kilogram

N/A = Not applicable/not established

NA = Not analyzed

mg/kg = Milligrams per kilogram

TAL = Target Analyte List

< = Indicates compound not detected at the stated reporting limit.

**TABLE 3-4**  
**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS AT AOC-RR**  
**RAILROAD BUILDING 80**  
**HOLLOMAN AFB, NM**  
**APRIL 1995**

ANALYTES	COMPARATIVE CONCENTRATIONS		AOC-RR-GP-01	AOC-RR-GP-02	AOC-RR-GP-03	AOC-RR-GP-04	AOC-RR-GP-05	AOC-RR-GP-05DUE	AOC-RR-GP-06	AOC-RR-GP-07	AOC-RR-GP-07D
	Detected	Not Detected									
<b>VOLATILE ORGANICS - METHOD 8240 (ug/l)</b>											
Benzene	N/A	0.36	3,000	<5	<5	<5	36	23	870	700	780
1,2-Dichloroethane	N/A	0.12	380	<5	<5	9	190	170	440	<50	51
1,2-Dichloropropane	N/A	0.16	<250	<5	<5	<5	20	16	<50	<50	<50
Ethylbenzene	N/A	1,300	260	<5	<5	24	30	18	1,000	<50	<50
Toluene	N/A	750	1,200	<5	<5	<5	8	5	90	<50	<50
Xylene	N/A	12,000	1,200	<5	<5	<5	49	35	560	120	180
<b>TAL METALS - METHODS 6000s and 7000s (ug/l)</b>											
Aluminum	N/A	37,000	19,000	<10,000	<10,000	12,000	12,000	NA	22,000	44,000	NA
Lead	19.9	N/A	<4.0	<4.0	<4.0	<4.0	<4.0	NA	<4.0	46	NA
Manganese	N/A	180	4,200	<750	2,000	2,900	8,700	NA	3,300	<1,500	NA
Zinc	253	11,000	9,300	<1,000	1,400	4,800	3,100	NA	<1,000	<2,000	NA
pH - METHOD 150.1	N/A	6-9	7.45	7.72	7.63	7.67	7.29	NA	7.25	7.20	7.17

**TABLE 3-4 (continued)**  
**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS AT AOC-RR**  
**RAILROAD BUILDING 80**  
**HOLLOMAN AFB, NM**  
**APRIL 1995**

ANALYTES	COMPARATIVE CONCENTRATION		AOC-RR-GP-06	AOC-RR-GP-09	AOC-RR-GP-11	AOC-RR-GP-12	AOC-RR-GP-12D	AOC-RR-GP-13	AOC-RR-GP-14	AOC-RR-GP-15	AOC-RR-GP-16
	Background <sup>a</sup>	Risk-based Levels <sup>b</sup>									
<b>VOLATILE ORGANICS - METHOD 8240 (ug/l)</b>											
Benzene	N/A	0.36	<5	750	3,300	<1	<1	100	<1	<1	40
1,2-Dichloroethane	N/A	0.12	<5	85	280	<2	<2	<20	<2	<2	290
1,2-Dichloropropane	N/A	0.16	<5	<50	<250	<2	<2	<20	<2	<2	<4
Ethylbenzene	N/A	1,300	<5	<50	960	2	2	490	<1	<1	210
Toluene	N/A	750	<5	<50	<250	<5	<5	1,600	<5	<5	<10
Xylenes	N/A	12,000	<5	750	<250	5	6	3,200	3	<2	<4
<b>TAL METALS - METHODS 6000s and 7000s (ug/l)</b>											
Aluminum	N/A	37,000	53,000	38,000	<200	NA	NA	NA	NA	NA	NA
Lead	19.9	N/A	<20	<20	<20	NA	NA	NA	NA	NA	NA
Manganese	N/A	180	<1,500	<1,500	1,900	NA	NA	NA	NA	NA	NA
Zinc	233	11,000	<2000	<2,000	<20	NA	NA	NA	NA	NA	NA
pH - METHOD 150.1	N/A	6-9	7.35	7.64	7.39	6.78	NA	7.31	6.47	7.10	6.95

**TABLE 3-4**  
**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS AT AOC-RR**  
**RAILROAD BUILDING 80**  
**HOLLOMAN AFB, NM**  
**APRIL 1995**

*\*Basewide Background Study for Holloman AFB (Radian, 1993).*

*\*EPA Region III, Risk-Based Concentrations (R.L. Smith, November 8, 1994).*

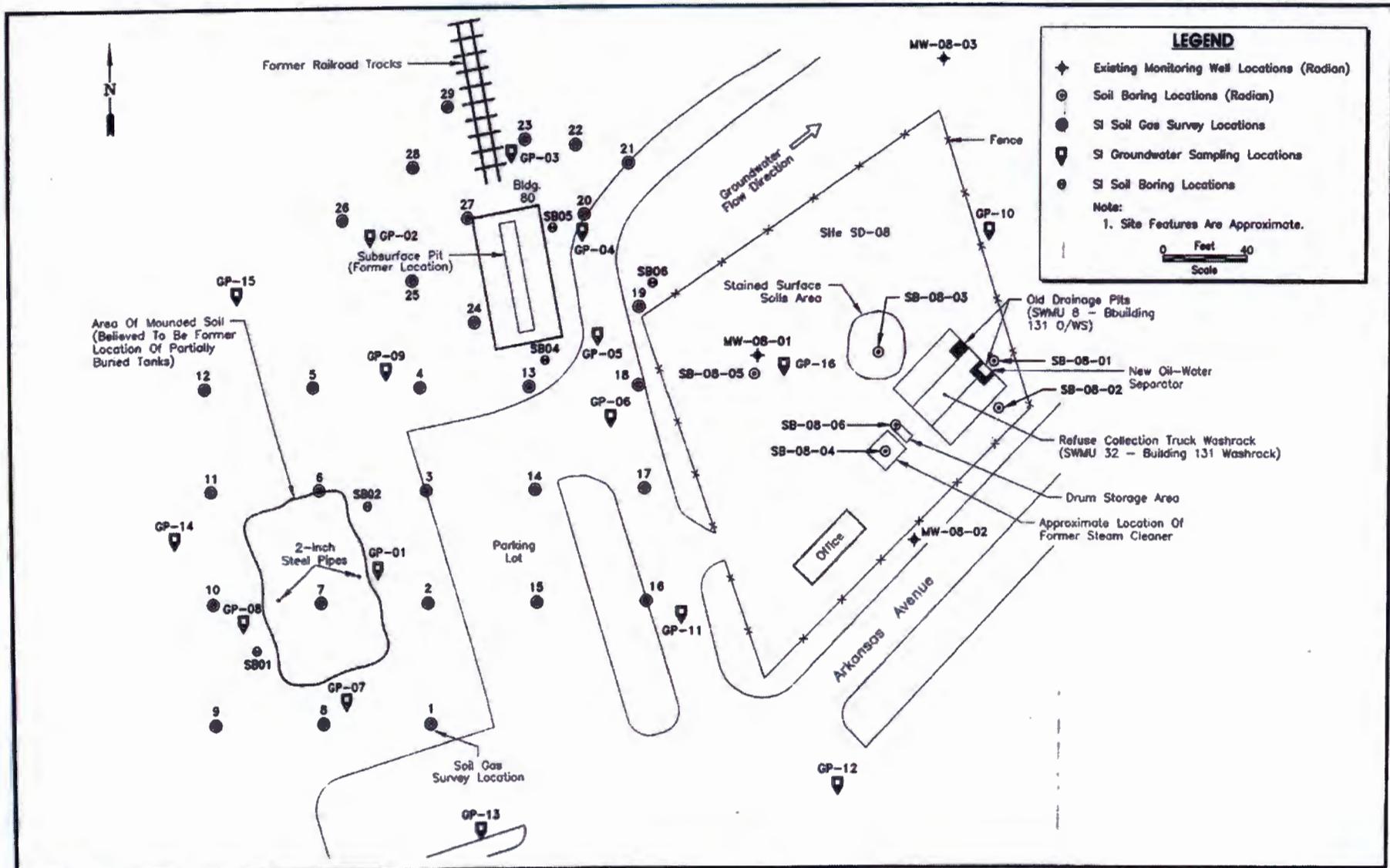
< = Indicates compound not detected at the stated reporting limit.

ug/l = Micrograms per Liter

NA = Not Analyzed

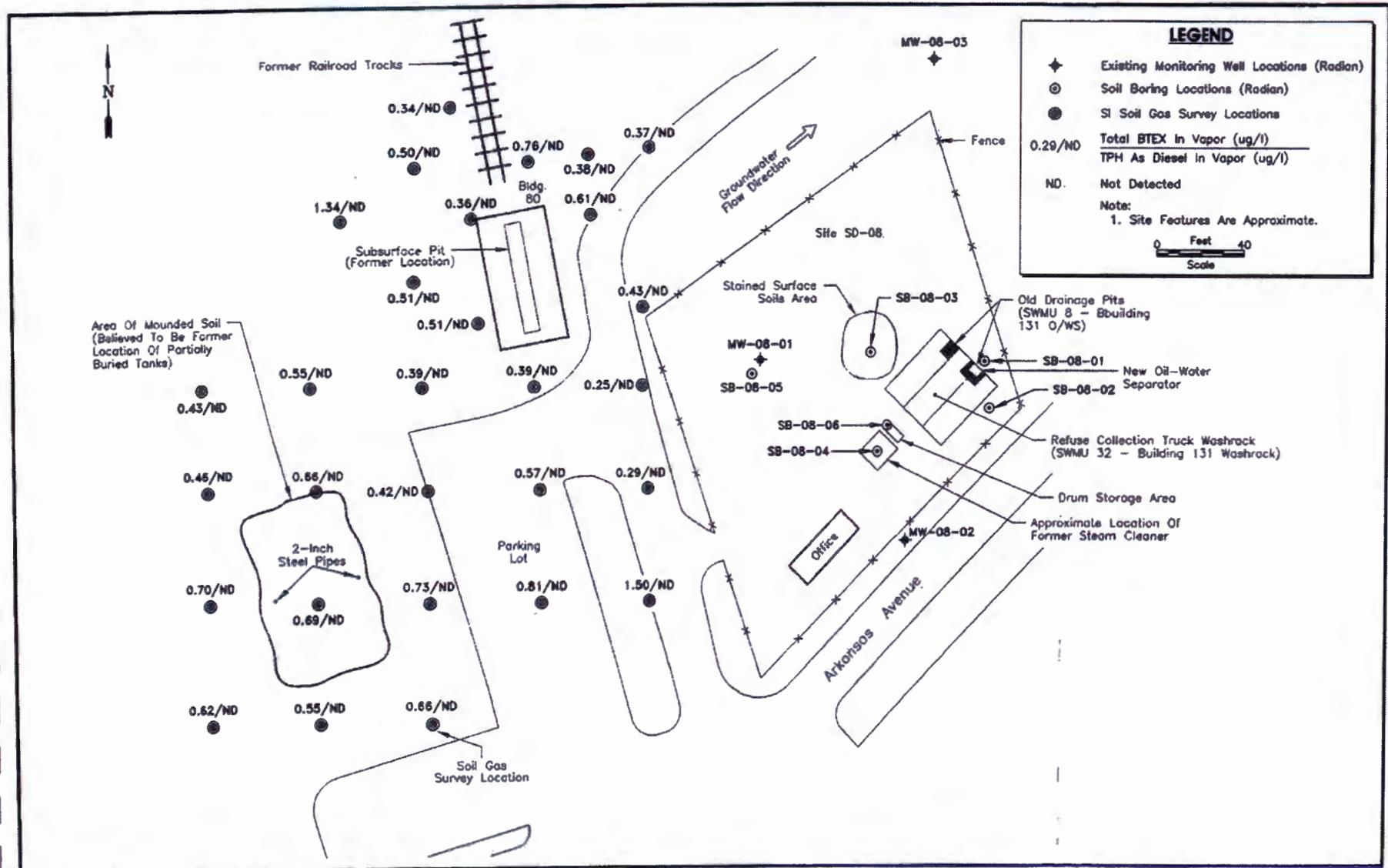
TAL = Target Analyte List

N/A = Not applicable/not established



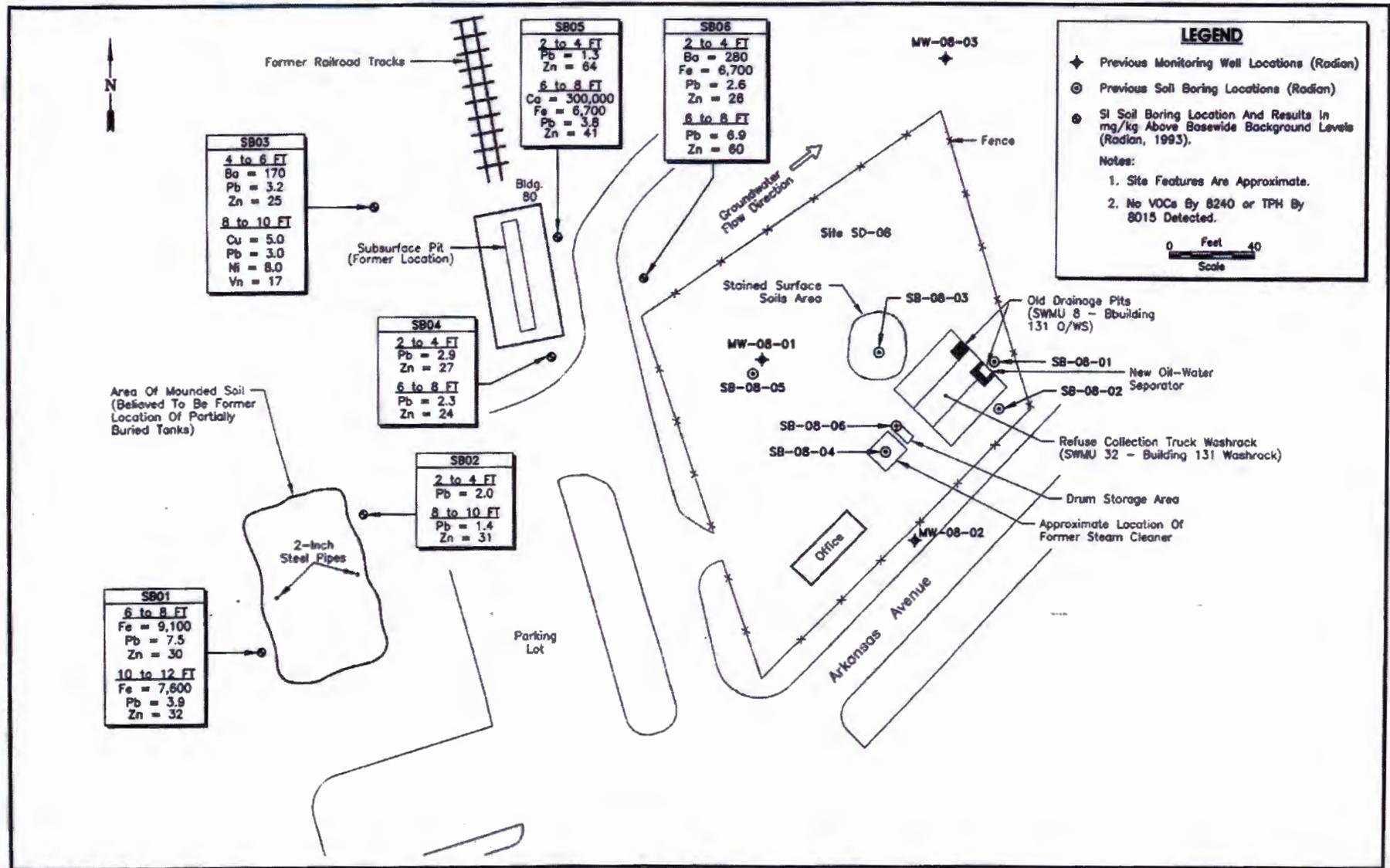
2201-ST3 (1:40)

Figure 3-1. Site Map  
Site AOC-RR, Railroad Building 80



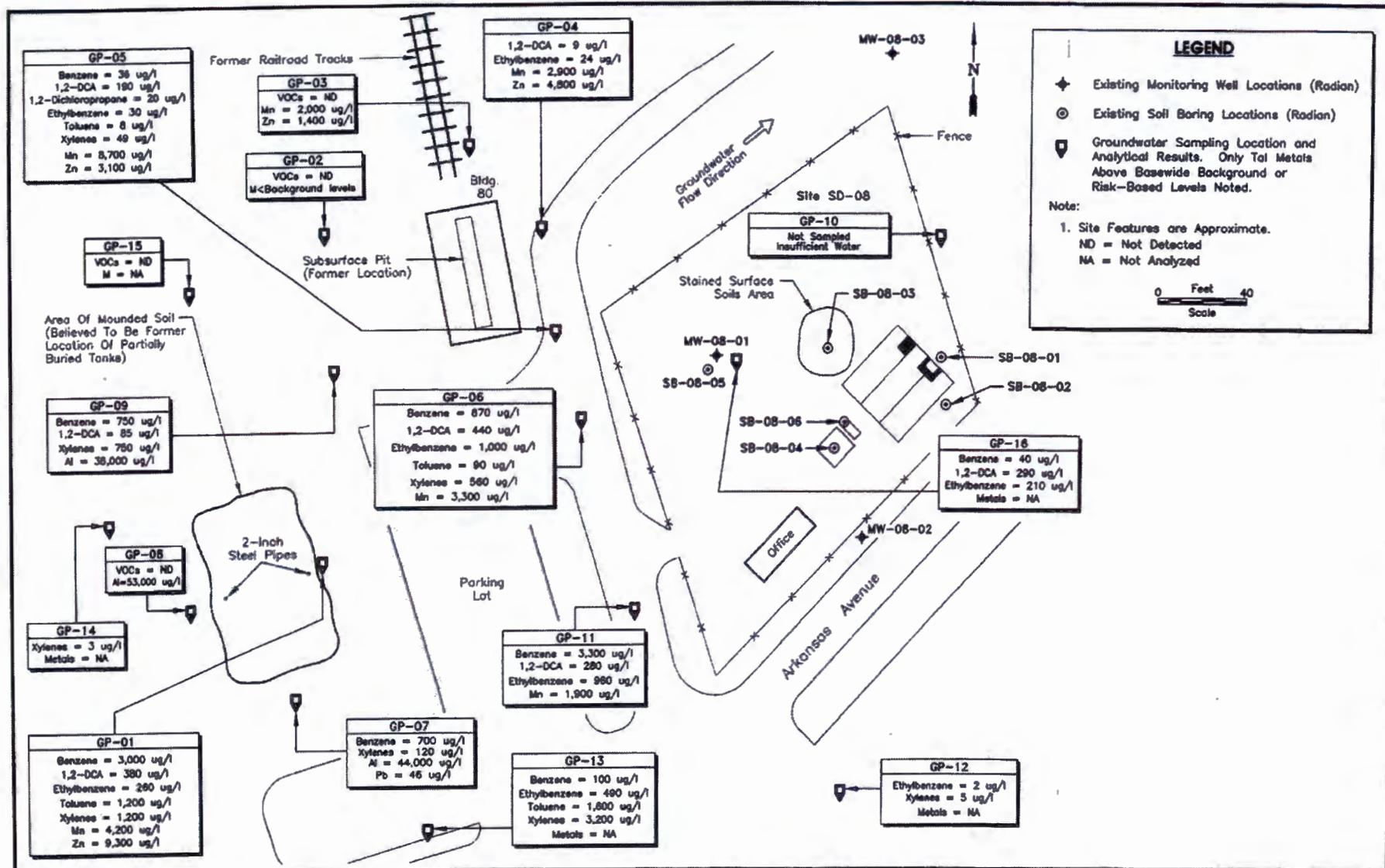
2201-SVS (1:40)

Figure 3-2. Soil Vapor Survey Results, March 1995  
 Site AOC-RR, Railroad Building 80



2201-SSRV (1:40)

Figure 3-3. Soil Sample Results, March - April 1995  
Site AOC-RR, Railroad Building 80



2201-GA (1:40)

Figure 3-4. Groundwater Analytical Results, April 1995  
 Site AOC-RR Railroad, Building 80

## **APPENDIX B**

### **Depth to Water Field Form**

<b>Project Name:</b>	<b>SD-08 Quarterly Groundwater</b>	<b>Date:</b>	<b>01/21/2013</b>	<b>Page</b>	<b>1</b>	<b>of</b>	<b>1</b>
<b>Project Number:</b>	<b>10-0004</b>	<b>Site Name:</b>	<b>SD-08 – Building 131 Washrack</b>				
<b>Field Personnel #1</b>	<b>Z. Beck</b>	<b>Field Personnel #2</b>	<b>D. McNeil</b>				
<b>Survey Datum (NGVD)</b>	<b>NAVD 88</b>	<b>Weather (previous 24 hours): Mostly sunny, light wind</b>					
<b>Measuring Device</b>	<b>Solinst</b>						

Well Number	Time (hhmm)	Measuring Point		Depth to Water (ft, TOC)	Elevation of Water (ft, NGVD)
		Description	Elevation (ft, NGVD)		
MW-08-01		2" Riser		14.39	
MW-08-02		2" Riser		15.12	
MW-08-03		2" Riser		14.31	
MW-08-04		2" Riser		12.21	
MW-08-05		2" Riser		12.90	
MW-08-06		2" Riser		11.57	
MW-08-07		2" Flush Mt		11.74	
MW-08-08		2" Flush Mt		11.10	
MW-09-01		2" Riser		10.40	
S10-MW01		2" Riser		13.87	
S10-MW02		2" Riser		14.42	
S10-MW06		2" Riser		11.11	
SWMU183-MW03		1" Flush Mt		12.48	

**Notes:** NGVD = National Geodetic Vertical Datum  
 TOC = Top of Well Casing

**Comments/Observations:** MW-09-01 had possible roots affecting the depth to water measurement.

## **APPENDIX C**

### **Groundwater Sampling Field Forms**



MONITORING WELL SAMPLE COLLECTION FORM

<b>LOCATION</b>	Site: SD-08	Location ID: MW-08-01	Date: 1/22/2013								
	Project Name: Long Term Monitoring	Project No./Phase: 10-0004	Recorded By: Z. Beck								
<b>EQUIPMENT</b>	Pump Type: Geopump (Peristaltic)	Water Quality Meter: Horiba U-52	PID Type/ID#: NA								
	Water Level Indicator Type: Solinst	Other Equipment: Hanna Turbidity Meter	Decon Method: Liquinox soap & DI water rinse								
	Tubing Type/Diameter (in): 1/4" OD Poly	Other Equipment:	PPE Level: D C B A								
<b>WELL INFO</b>	(A) Initial Depth to Water (ft BTOC): 14.41	Casing: Type PVC Diam. (in) 2.00	Weather:								
	(B) Total Well Depth (ft BTOC): 21.65	(E) Casing Volume Multiplier (gal/in ft): 0.16	Background PID (ppm): NA								
	(C) Water Column Thickness (ft) (B-A): 7.24	Screen Length (lin ft):	Breathing Zone PID (ppm): NA								
	(D) Well Volume (gal) (C x E): 1.16	Screen Info: Type: Factory Slot Slot Size: 0.010-inch	Well Opening PID (ppm): NA								
<b>CASING INFO</b>	Riser/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
	(D) Casing Volume Multiplier(gal/in ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08

DATE (mmddy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mL)	Pumping Rate (mL/min)	Temp (°C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
1/22/2013	0952	14.41	0	500	16.58	6.06	11.1	0.00	4.65	-25	Clear - Odor present
1/22/2013	1001	14.65	4,500	500	20.46	5.85	10.3	0.00	3.09	-66	Clear - Odor present
1/22/2013	1010	14.65	9,000	500	20.58	5.86	10.4	0.00	2.40	-71	Clear - Odor present
1/22/2013	1019	14.66	13,500	500	20.89	5.87	10.3	0.00	1.57	-75	Clear - Odor present
1/22/2013	1028	14.66	18,000	500	20.36	5.87	10.4	0.00	2.91	-40	Clear - Odor present

Colorimeter Results					No. Containers/Volume/Type			Preserv.	Filter (Y/N)	Method	Parameter(s)
Time	Analyte	Dilution	Result	Units	3	40 ml	VOAs	HCl	N	8260B	VOCs
					1	500 ml	Plastic	None	N	300	CL/NO2/NO3/FL/SO4
<b>Sample Time</b>					1	250 ml	Plastic	HNO3	Y	6010	Metals-Dissolved
1100					1	250 ml	Plastic	HNO3	N	6010	Mercury-Total
<b>Sample Identification</b>					1	250 ml	Plastic	None	N	2540	TDS
MW-08-01											

Conversions	Stabilization Criteria			
1 L = 0.26 gals	Temp	+/- 10%	DO	+/- 10%
1 gal = 3.79 L	pH	+/- 0.1	Turb	+/- 5 NTU
	Cond	+/- 10%	ORP	N/A



**MONITORING WELL SAMPLE COLLECTION FORM**

<b>LOCATION</b>	Site: SD-08	Location ID: MW-08-02	Date: 1/22/2013								
	Project Name: Long Term Monitoring	Project No./Phase: 10-0004	Recorded By: T. Lucero / D. McNeil								
<b>EQUIPMENT</b>	Pump Type: Geopump (Peristaltic)	Water Quality Meter: Horiba U-52	PID Type/ID#: NA								
	Water Level Indicator Type: Solinst	Other Equipment: Hanna Turbidity Meter	Decon Method: Liquinox soap & DI water rinse								
	Tubing Type/Diameter (in): 1/4" OD Poly	Other Equipment:	PPE Level: <b>D</b> C    B    A								
<b>WELL INFO</b>	(A) Initial Depth to Water (ft BTOC): 15.16	Casing: Type PVC    Diam. (in) 2.00	Weather: Partly Cloudy, ~40°F								
	(B) Total Well Depth (ft BTOC): 18.76	(E) Casing Volume Multiplier (gal/in ft): 0.16	Background PID (ppm): NA								
	(C) Water Column Thickness (ft) (B-A): 3.60	Screen Length (lin ft):	Breathing Zone PID (ppm): NA								
	(D) Well Volume (gal) (C x E): 0.58	Screen Info: Type: Factory Slot    Slot Size: 0.010-inch	Well Opening PID (ppm): NA								
<b>CASING INFO</b>	Riser/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
	(D) Casing Volume Multiplier(gal/in ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08
<b>DATE</b> (mmddyy)	<b>TIME</b> (24 Hr)	<b>Water Level</b> (BTOC)	<b>Volume Removed</b> (mL)	<b>Pumping Rate</b> (mL/min)	<b>Temp</b> (°C)	<b>pH</b>	<b>Cond.</b> (mS/cm)	<b>Dissolved Oxygen</b> (mg/L)	<b>Turbidity</b> (NTU)	<b>Oxidation Reduction Potential</b> (mV)	<b>Remarks</b> (odor, clarity, etc.)
1/22/2013	0945	15.36	2,200	250	21.19	6.39	3.52	6.83	4.77	29	Clear, No odor
1/22/2013	0954	15.38	4,400	250	21.30	6.42	3.53	5.90	1.63	18	Clear, No odor
1/22/2013	1003	15.40	6,600	250	21.59	6.46	3.54	5.02	0.65	12	Clear, No odor
1/22/2013	1012	15.41	8,800	250	21.71	6.51	3.54	3.32	0.35	5	Clear, No odor
1/22/2013	1021	15.42	11,000	250	21.71	6.54	3.54	3.27	0.31	4	Clear, No odor
1/22/2013	1030	15.42	13,200	250	21.74	6.55	3.54	3.18	0.26	2	Clear, No odor
<b>Colorimeter Results</b>											
<b>Time</b>	<b>Analyte</b>	<b>Dilution</b>	<b>Result</b>	<b>Units</b>	<b>No. Containers/Volume/Type</b>			<b>Preserv.</b>	<b>Filter (Y/N)</b>	<b>Method</b>	<b>Parameter(s)</b>
					3	40 ml	VOAs	HCl	N	8260B	VOCs
					1	500 ml	Plastic	None	N	300	CL/NO2/NO3/FL/SO4
<b>Sample Time</b>					1	250 ml	Plastic	HNO3	Y	6010	Metals-Dissolved
1045					1	250 ml	Plastic	HNO3	N	6010	Mercury-Total
<b>Sample Identification</b>					1	250 ml	Plastic	None	N	2540	TDS
MW-08-02											
<b>Conversions    Stabilization Criteria</b>											
1 L = 0.26 gals	Temp	+/- 10%	DO	+/- 10%							
1 gal = 3.79 L	pH	+/- 0.1	Turb	+/- 5 NTU							
	Cond	+/- 10%	ORP	N/A							



MONITORING WELL SAMPLE COLLECTION FORM

LOCATION	Site: SD-08	Location ID: MW-08-03	Date: 1/21/2013							
	Project Name: Long Term Monitoring	Project No./Phase: 10-0004	Recorded By: T. Lucero / D. McNeil							
EQUIPMENT	Pump Type: Geopump (Peristaltic)	Water Quality Meter: Horiba U-52	PID Type/ID#: NA							
	Water Level Indicator Type: Solinst	Other Equipment: Hanna Turbidity Meter	Decon Method: Liquinox soap & DI water rinse							
	Tubing Type/Diameter (in): 1/4" OD Poly	Other Equipment:	PPE Level: D C B A							
WELL INFO	(A) Initial Depth to Water (ft BTOC): 14.25	Casing: Type PVC Diam. (in) 2.00	Weather: Clear, ~50°F							
	(B) Total Well Depth (ft BTOC): 23.30	(E) Casing Volume Multiplier (gal/lin ft): 0.16	Background PID (ppm): NA							
	(C) Water Column Thickness (ft) (B-A): 9.05	Screen Length (lin ft):	Breathing Zone PID (ppm): NA							
	(D) Well Volume (gal) (C x E): 1.45	Screen Info: Type: Factory Slot Slot Size: 0.010-inch	Well Opening PID (ppm): NA							
CASING INFO	Riser/Well Casing Inner Diameter (in)	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
	(D) Casing Volume Multiplier(gal/lin ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61

DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mL)	Pumping Rate (mL/min)	Temp (°C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
1/21/2013	1525	14.82	5,500	500	21.84	7.09	18.3	0.59	3.47	143	Clear, No odor
1/21/2013	1536	14.98	11,000	500	21.80	7.02	16.0	0.30	1.97	106	Clear, No odor
1/21/2013	1547	15.03	16,500	500	21.81	7.05	16.7	0.24	1.61	122	Clear, No odor
1/21/2013	1558	15.06	22,000	500	21.82	7.05	16.9	0.24	1.14	124	Clear, No odor
1/21/2013	1609	15.07	27,500	500	21.82	7.07	17.0	0.22	0.99	125	Clear, No odor

Colorimeter Results					No. Containers/Volume/Type			Preserv.	Filter (Y/N)	Method	Parameter(s)
Time	Analyte	Dilution	Result	Units	3	40 ml	VOAs	HCl	N	8260B	VOCs
					1	500 ml	Plastic	None	N	300	CL/NO2/NO3/FL/SO4
Sample Time					1	250 ml	Plastic	HNO3	Y	6010	Metals-Dissolved
1615					1	250 ml	Plastic	HNO3	N	6010	Mercury-Total
Sample Identification					1	250 ml	Plastic	None	N	2540	TDS
MW-08-03											
Conversions		Stabilization Criteria									
1 L = 0.26 gals	Temp	+/- 10%	DO	+/- 10%							
1 gal = 3.79 L	pH	+/- 0.1	Turb	+/- 5 NTU							
	Cond	+/- 10%	ORP	N/A							



MONITORING WELL SAMPLE COLLECTION FORM

LOCATION	Site: SD-08	Location ID: MW-08-04				Date: 1/21/2013					
	Project Name: Long Term Monitoring	Project No./Phase: 10-0004				Recorded By: T. Lucero / D. McNeil					
EQUIPMENT	Pump Type: Geopump (Peristaltic)	Water Quality Meter: Horiba U-52				PID Type/ID#: NA					
	Water Level Indicator Type: Solinst	Other Equipment: Hanna Turbidity Meter				Decon Method: Liquinox soap & DI water rinse					
	Tubing Type/Diameter (in): 1/4" OD Poly	Other Equipment:				PPE Level: D C B A					
WELL INFO	(A) Initial Depth to Water (ft BTOC): 12.21	Casing: Type PVC		Diam. (in) 2.00		Weather: Partly Cloudy, ~40°F					
	(B) Total Well Depth (ft BTOC): 17.90	(E) Casing Volume Multiplier (gal/in ft): 0.16				Background PID (ppm): NA					
	(C) Water Column Thickness (ft) (B-A): 5.69	Screen Length (lin ft):				Breathing Zone PID (ppm): NA					
	(D) Well Volume (gal) (C x E): 0.91	Screen Info: Type: Factory Slot		Slot Size: 0.010-inch		Well Opening PID (ppm): NA					
CASING INFO	Riser/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
	(D) Casing Volume Multiplier(gal/in ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08
DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mL)	Pumping Rate (mL/min)	Temp (°C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
1/21/2013	1040	15.14	3,450	300	19.02	7.12	6.01	3.32	1.09	81	Clear, No odor
1/21/2013	1052	16.50	6,900	300	18.75	7.08	6.01	9.15	0.87	111	Clear, No odor
1/21/2013	1103	16.81	10,350	300	18.68	7.07	5.98	9.06	0.83	114	Clear, No odor
1/21/2013	1114	16.81	13,800	300	18.70	7.08	5.90	9.08	0.85	110	Clear, No odor
Colorimeter Results											
Time	Analyte	Dilution	Result	Units	No. Containers/Volume/Type			Preserv.	Filter (Y/N)	Method	Parameter(s)
					3	40 ml	VOAs	HCl	N	8260B	VOCs
					1	500 ml	Plastic	None	N	300	CL/NO2/NO3/FL/SO4
Sample Time					1	250 ml	Plastic	HNO3	Y	6010	Metals-Dissolved
1120					1	250 ml	Plastic	HNO3	N	6010	Mercury-Total
Sample Identification					1	250 ml	Plastic	None	N	2540	TDS
MW-08-04											
Conversions											
Stabilization Criteria											
1 L = 0.26 gals	Temp	+/- 10%	DO	+/- 10%							
1 gal = 3.79 L	pH	+/- 0.1	Turb	+/- 5 NTU							
	Cond	+/- 10%	ORP	N/A							



MONITORING WELL SAMPLE COLLECTION FORM

LOCATION	Site: SD-08	Location ID: MW-08-05	Date: 1/21/2013									
	Project Name: Long Term Monitoring	Project No./Phase: 10-0004	Recorded By: T. Lucero / D. McNeil									
EQUIPMENT	Pump Type: Geopump (Peristaltic)	Water Quality Meter: Horiba U-52	PID Type/ID#: NA									
	Water Level Indicator Type: Solinst	Other Equipment: Hanna Turbidity Meter	Decon Method: Liquinox soap & DI water rinse									
	Tubing Type/Diameter (in): 1/4" OD Poly	Other Equipment:	PPE Level: D C B A									
WELL INFO	(A) Initial Depth to Water (ft BTOC): 12.90	Casing: Type PVC Diam. (in) 2.00	Weather: Clear, ~50°F									
	(B) Total Well Depth (ft BTOC): 18.88	(E) Casing Volume Multiplier (gal/in ft): 0.16	Background PID (ppm): NA									
	(C) Water Column Thickness (ft) (B-A): 5.98	Screen Length (lin ft):	Breathing Zone PID (ppm): NA									
	(D) Well Volume (gal) (C x E): 0.96	Screen Info: Type: Factory Slot Slot Size: 0.010-inch	Well Opening PID (ppm): NA									
CASING INFO	Riser/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10	
	(D) Casing Volume Multiplier(gal/lin ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08	
DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mL)	Pumping Rate (mL/min)	Temp (°C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)	
1/21/2013	1201	13.16	3,650	250	20.15	6.60	2.92	0.47	4.64	77	Clear, No odor	
1/21/2013	1216	13.21	7,300	250	20.15	6.69	2.92	0.59	0.66	84	Clear, No odor	
1/21/2013	1231	13.20	10,950	250	20.20	6.72	2.91	0.66	0.46	95	Clear, No odor	
1/21/2013	1246	13.21	11,300	250	20.29	6.72	2.92	0.69	0.29	92	Clear, No odor	
<b>Colorimeter Results</b>				<b>No. Containers/Volume/Type</b>			<b>Preserv.</b>	<b>Filter (Y/N)</b>	<b>Method</b>	<b>Parameter(s)</b>		
<b>Time</b>	<b>Analyte</b>	<b>Dilution</b>	<b>Result</b>	<b>Units</b>	3	40 ml	VOAs	HCl	N	8260B	VOCs	
					1	500 ml	Plastic	None	N	300	CL/NO2/NO3/FL/SO4	
<b>Sample Time</b>					1	250 ml	Plastic	HNO3	Y	6010	Metals-Dissolved	
1255					1	250 ml	Plastic	HNO3	N	6010	Mercury-Total	
<b>Sample Identification</b>					1	250 ml	Plastic	None	N	2540	TDS	
MW-08-05												
<b>Conversions</b>	<b>Stabilization Criteria</b>											
1 L = 0.26 gals	Temp	+/- 10%	DO	+/- 10%								
1 gal = 3.79 L	pH	+/- 0.1	Turb	+/- 5 NTU								
	Cond	+/- 10%	ORP	N/A								



**MONITORING WELL SAMPLE COLLECTION FORM**

<b>LOCATION</b>	Site: SD-08	Location ID: MW-08-06	Date: 1/21/2013								
	Project Name: Long Term Monitoring	Project No./Phase: 10-0004	Recorded By: Z. Beck								
<b>EQUIPMENT</b>	Pump Type: Geopump (Peristaltic)	Water Quality Meter: Horiba U-52	PID Type/ID#: NA								
	Water Level Indicator Type: Solinst	Other Equipment: Hanna Turbidity Meter	Decon Method: Liquinox soap & DI water rinse								
	Tubing Type/Diameter (in): 1/4" OD Poly	Other Equipment:	PPE Level: <b>D</b> C B A								
<b>WELL INFO</b>	(A) Initial Depth to Water (ft BTOC): 11.55	Casing: Type PVC Diam. (in) 2.00	Weather:								
	(B) Total Well Depth (ft BTOC): 15.02	(E) Casing Volume Multiplier (gal/in ft): 0.16	Background PID (ppm): NA								
	(C) Water Column Thickness (ft) (B-A): 3.47	Screen Length (lin ft):	Breathing Zone PID (ppm): NA								
	(D) Well Volume (gal) (C x E): 0.56	Screen Info: Type: Factory Slot Slot Size: 0.010-inch	Well Opening PID (ppm): NA								
<b>CASING INFO</b>	Riser/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
	(D) Casing Volume Multiplier(gal/in ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08
<b>DATE (mmddyy)</b>	<b>TIME (24 Hr)</b>	<b>Water Level (BTOC)</b>	<b>Volume Removed (mL)</b>	<b>Pumping Rate (mL/min)</b>	<b>Temp (°C)</b>	<b>pH</b>	<b>Cond. (mS/cm)</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>Turbidity (NTU)</b>	<b>Oxidation Reduction Potential (mV)</b>	<b>Remarks (odor, clarity, etc.)</b>
1/21/2013	1350	11.66	2,250	250	19.48	7.23	24.5	0.00	4.46	139	
1/21/2013	1359	11.69	4,500	250	19.44	7.28	24.7	0.00	1.24	138	
1/21/2013	1408	11.70	6,750	250	19.45	7.29	24.6	0.00	0.72	137	
1/21/2013	1417	11.70	9,000	250	19.51	7.31	24.3	0.00	0.89	137	
1/21/2013	1426	11.70	11,250	250	19.63	7.28	24.2	0.00	0.61	139	
1/21/2013	1435	11.70	13,500	250	19.65	7.27	24.2	0.00	0.52	141	
<b>Colorimeter Results</b>					<b>No. Containers/Volume/Type</b>			<b>Preserv.</b>	<b>Filter (Y/N)</b>	<b>Method</b>	<b>Parameter(s)</b>
<b>Time</b>	<b>Analyte</b>	<b>Dilution</b>	<b>Result</b>	<b>Units</b>	3	40 ml	VOAs	HCl	N	8260B	VOCs
					1	500 ml	Plastic	None	N	300	CL/NO2/NO3/FL/SO4
<b>Sample Time</b>					1	250 ml	Plastic	HNO3	Y	6010	Metals-Dissolved
1500					1	250 ml	Plastic	HNO3	N	6010	Mercury-Total
<b>Sample Identification</b>					1	250 ml	Plastic	None	N	2540	TDS
MW-08-06 / MW-08-06-MS / MW-08-06-MSD											
<b>Conversions</b>	<b>Stabilization Criteria</b>										
1 L = 0.26 gals	Temp	+/- 10%	DO	+/- 10%							
1 gal = 3.79 L	pH	+/- 0.1	Turb	+/- 5 NTU							
	Cond	+/- 10%	ORP	N/A							



MONITORING WELL SAMPLE COLLECTION FORM

LOCATION	Site: SD-08	Location ID: MW-08-07	Date: 1/22/2013							
	Project Name: Long Term Monitoring	Project No./Phase: 10-0004	Recorded By: T. Lucero / D. McNeil							
EQUIPMENT	Pump Type: Geopump (Peristaltic)	Water Quality Meter: Horiba U-52	PID Type/ID#: NA							
	Water Level Indicator Type: Solinst	Other Equipment: Hanna Turbidity Meter	Decon Method: Liquinox soap & DI water rinse							
	Tubing Type/Diameter (in): 1/4" OD Poly	Other Equipment:	PPE Level: D C B A							
WELL INFO	(A) Initial Depth to Water (ft BTOC): 11.76	Casing: Type PVC Diam. (in) 2.00	Weather: Partly Cloudy, ~35°F							
	(B) Total Well Depth (ft BTOC): 16.39	(E) Casing Volume Multiplier (gal/lin ft): 0.16	Background PID (ppm): NA							
	(C) Water Column Thickness (ft) (B-A): 4.63	Screen Length (lin ft):	Breathing Zone PID (ppm): NA							
	(D) Well Volume (gal) (C x E): 0.74	Screen Info: Type: Factory Slot Slot Size: 0.010-inch	Well Opening PID (ppm): NA							
CASING INFO	Riser/Well Casing Inner Diameter (in)	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
	(D) Casing Volume Multiplier(gal/lin ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61

DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mL)	Pumping Rate (mL/min)	Temp (°C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
1/22/2013	0816	11.80	2,800	250	19.84	6.49	5.42	0.77	3.67	73	Clear, No odor
1/22/2013	0827	11.80	5,600	250	20.29	6.51	5.26	0.44	1.12	71	Clear, No odor
1/22/2013	0838	11.80	8,400	250	20.89	6.76	5.18	0.29	0.42	54	Clear, No odor
1/22/2013	0849	11.81	11,200	250	21.01	6.75	5.15	0.24	0.30	55	Clear, No odor
1/22/2013	0900	11.81	14,000	250	21.09	6.76	5.13	0.20	0.34	55	Clear, No odor

Colorimeter Results					No. Containers/Volume/Type			Preserv.	Filter (Y/N)	Method	Parameter(s)
Time	Analyte	Dilution	Result	Units							
					3	40 ml	VOAs	HCl	N	8260B	VOCs
					1	500 ml	Plastic	None	N	300	CL/NO2/NO3/FL/SO4
Sample Time					1	250 ml	Plastic	HNO3	Y	6010	Metals-Dissolved
910					1	250 ml	Plastic	HNO3	N	6010	Mercury-Total
Sample Identification					1	250 ml	Plastic	None	N	2540	TDS
MW-08-07 / MW-08-07-A											
Conversions		Stabilization Criteria									
1 L = 0.26 gals	Temp	+/- 10%	DO	+/- 10%							
1 gal = 3.79 L	pH	+/- 0.1	Turb	+/- 5 NTU							
	Cond	+/- 10%	ORP	N/A							



MONITORING WELL SAMPLE COLLECTION FORM

LOCATION	Site: SD-08	Location ID: MW-08-08	Date: 1/21/2013								
	Project Name: Long Term Monitoring	Project No./Phase: 10-0004	Recorded By: Z. Beck								
EQUIPMENT	Pump Type: Geopump (Peristaltic)	Water Quality Meter: Horiba U-52	PID Type/ID#: NA								
	Water Level Indicator Type: Solinst	Other Equipment: Hanna Turbidity Meter	Decon Method: Liquinox soap & DI water rinse								
	Tubing Type/Diameter (in): 1/4" OD Poly	Other Equipment:	PPE Level: D C B A								
WELL INFO	(A) Initial Depth to Water (ft BTOC): 11.03	Casing: Type PVC Diam. (in) 2.00	Weather: Sunny - Cool								
	(B) Total Well Depth (ft BTOC): 16.05	(E) Casing Volume Multiplier (gal/lin ft): 0.16	Background PID (ppm): NA								
	(C) Water Column Thickness (ft) (B-A): 5.02	Screen Length (lin ft):	Breathing Zone PID (ppm): NA								
	(D) Well Volume (gal) (C x E): 0.80	Screen Info: Type: Factory Slot Slot Size: 0.010-inch	Well Opening PID (ppm): NA								
CASING INFO	Riser/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
	(D) Casing Volume Multiplier(gal/lin ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08
DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mL)	Pumping Rate (mL/min)	Temp (°C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
1/21/2013	1045	11.33	3,000	500	18.75	6.83	36.7	0.00	0.90	203	Clear- No odor
1/21/2013	1051	11.49	6,000	500	19.03	6.71	35.7	0.00	0.20	179	Clear- No odor
1/21/2013	1057	11.61	9,000	500	19.15	6.71	35.2	0.00	0.00	182	Clear- No odor
1/21/2013	1103	11.69	12,000	500	19.19	6.72	35.2	0.00	0.00	182	Clear- No odor
1/21/2013	1109	11.75	15,000	500	19.27	6.72	35.4	0.00	0.00	182	Clear- No odor
Colorimeter Results					No. Containers/Volume/Type			Preserv.	Filter (Y/N)	Method	Parameter(s)
Time	Analyte	Dilution	Result	Units	3	40 ml	VOAs	HCl	N	8260B	VOCs
					1	500 ml	Plastic	None	N	300	CL/NO2/NO3/FL/SO4
Sample Time					1	250 ml	Plastic	HNO3	Y	6010	Metals-Dissolved
1115					1	250 ml	Plastic	HNO3	N	6010	Mercury-Total
Sample Identification					1	250 ml	Plastic	None	N	2540	TDS
MW-08-08											
Conversions	Stabilization Criteria										
1 L = 0.26 gals	Temp	+/- 10%	DO	+/- 10%							
1 gal = 3.79 L	pH	+/- 0.1	Turb	+/- 5 NTU							
	Cond	+/- 10%	ORP	N/A							



MONITORING WELL SAMPLE COLLECTION FORM

<b>LOCATION</b>	Site: SD-08	Location ID: S10-MW01	Date: 1/22/2013							
	Project Name: Long Term Monitoring	Project No./Phase: 10-0004	Recorded By: Z. Beck							
<b>EQUIPMENT</b>	Pump Type: Geopump (Peristaltic)	Water Quality Meter: Horiba U-52	PID Type/ID#: NA							
	Water Level Indicator Type: Solinst	Other Equipment: Hanna Turbidity Meter	Decon Method: Liquinox soap & DI water rinse							
	Tubing Type/Diameter (in): 1/4" OD Poly	Other Equipment:	PPE Level: D C B A							
<b>WELL INFO</b>	(A) Initial Depth to Water (ft BTOC): 13.89	Casing: Type PVC Diam. (in) 1.00	Weather: Sunny - Cool							
	(B) Total Well Depth (ft BTOC): 21.65	(E) Casing Volume Multiplier (gal/lin ft): 0.04	Background PID (ppm): NA							
	(C) Water Column Thickness (ft) (B-A): 8.56	Screen Length (lin ft):	Breathing Zone PID (ppm): NA							
	(D) Well Volume (gal) (C x E): 1.37	Screen Info: Type: Factory Slot Slot Size: 0.010-inch	Well Opening PID (ppm): NA							
<b>CASING INFO</b>	Riser/Well Casing Inner Diameter (in)	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
	(D) Casing Volume Multiplier(gal/lin ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61

DATE (mmdyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mL)	Pumping Rate (mL/min)	Temp (°C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
1/22/2013	0814	13.89	0	500	14.00	6.82	19.4	0.00	6.25	171	
1/22/2013	0824	14.18	5,000	500	16.25	6.63	16.0	0.00	10.5	178	
1/22/2013	0834	14.21	10,000	500	16.45	6.65	13.9	0.00	8.40	171	
1/22/2013	0844	14.21	15,000	500	16.81	6.66	13.4	0.00	5.50	180	
1/22/2013	0854	14.22	20,000	500	17.11	6.65	13.4	0.00	3.70	187	
1/22/2013	0904	14.22	25,000	500	16.98	6.66	13.3	0.00	2.40	189	

Colorimeter Results					No. Containers/Volume/Type			Preserv.	Filter (Y/N)	Method	Parameter(s)
Time	Analyte	Dilution	Result	Units	3	40 ml	VOAs	HCl	N	8260B	VOCs
					1	500 ml	Plastic	None	N	300	CL/NO2/NO3/FL/SO4
<b>Sample Time</b>					1	250 ml	Plastic	HNO3	Y	6010	Metals-Dissolved
0915					1	250 ml	Plastic	HNO3	N	6010	Mercury-Total
<b>Sample Identification</b>					1	250 ml	Plastic	None	N	2540	TDS
S10-MW01 / S10-MW01-A											
<b>Conversions</b>		<b>Stabilization Criteria</b>									
1 L = 0.26 gals	Temp	+/- 10%	DO	+/- 10%							
1 gal = 3.79 L	pH	+/- 0.1	Turb	+/- 5 NTU							
	Cond	+/- 10%	ORP	N/A							



MONITORING WELL SAMPLE COLLECTION FORM

LOCATION	Site: SD-08	Location ID: S10-MW06	Date: 1/21/2013								
	Project Name: Long Term Monitoring	Project No./Phase: 10-0004	Recorded By: T. Lucero / D. McNeil								
EQUIPMENT	Pump Type: Geopump (Peristaltic)	Water Quality Meter: Horiba U-52	PID Type/ID#: NA								
	Water Level Indicator Type: Solinst	Other Equipment: Hanna Turbidity Meter	Decon Method: Liquinox soap & DI water rinse								
	Tubing Type/Diameter (in): 1/4" OD Poly	Other Equipment:	PPE Level: D C B A								
WELL INFO	(A) Initial Depth to Water (ft BTOC): 11.11	Casing: Type PVC Diam. (in) 2.00	Weather: Clear, ~50°F								
	(B) Total Well Depth (ft BTOC): 22.16	(E) Casing Volume Multiplier (gal/lin ft): 0.16	Background PID (ppm): NA								
	(C) Water Column Thickness (ft) (B-A): 11.05	Screen Length (lin ft):	Breathing Zone PID (ppm): NA								
	(D) Well Volume (gal) (C x E): 1.77	Screen Info: Type: Factory Slot Slot Size: 0.010-inch	Well Opening PID (ppm): NA								
CASING INFO	Riser/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
	(D) Casing Volume Multiplier(gal/lin ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08
DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mL)	Pumping Rate (mL/min)	Temp (°C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
1/21/2013	1350	11.50	6,700	500	20.12	7.03	16.4	1.69	10.8	146	Clear, No odor
1/21/2013	1403	11.51	13,400	500	20.07	7.04	16.6	1.07	7.50	141	Clear, No odor
1/21/2013	1416	11.51	20,100	500	20.08	7.06	16.7	0.58	6.64	142	Clear, No odor
1/21/2013	1429	11.52	26,800	500	20.09	7.07	16.7	0.33	4.19	144	Clear, No odor
1/21/2013	1442	11.51	33,500	500	20.07	7.06	16.6	0.34	2.82	144	Clear, No odor
1/21/2013	1455	11.52	40,200	500	20.08	7.07	16.7	0.31	2.14	145	Clear, No odor
Colorimeter Results					No. Containers/Volume/Type			Preserv.	Filter (Y/N)	Method	Parameter(s)
Time	Analyte	Dilution	Result	Units	3	40 ml	VOAs	HCl	N	8260B	VOCs
					1	500 ml	Plastic	None	N	300	CL/NO2/NO3/FL/SO4
Sample Time					1	250 ml	Plastic	HNO3	Y	6010	Metals-Dissolved
1500					1	250 ml	Plastic	HNO3	N	6010	Mercury-Total
Sample Identification					1	250 ml	Plastic	None	N	2540	TDS
S10-MW06											
Conversions	Stabilization Criteria										
1 L = 0.26 gals	Temp	+/- 10%	DO	+/- 10%							
1 gal = 3.79 L	pH	+/- 0.1	Turb	+/- 5 NTU							
	Cond	+/- 10%	ORP	N/A							



MONITORING WELL SAMPLE COLLECTION FORM

LOCATION	Site: SD-08	Location ID: SWMU183-MW03	Date: 1/21/2013								
	Project Name: Long Term Monitoring	Project No./Phase: 10-0004	Recorded By: Z. Beck								
EQUIPMENT	Pump Type: Geopump (Peristaltic)	Water Quality Meter: Horiba U-52	PID Type/ID#: NA								
	Water Level Indicator Type: Solinst	Other Equipment: Hanna Turbidity Meter	Decon Method: Liquinox soap & DI water rinse								
	Tubing Type/Diameter (in): 1/4" OD Poly	Other Equipment:	PPE Level: D C B A								
WELL INFO	(A) Initial Depth to Water (ft BTOC): 12.46	Casing: Type PVC Diam. (in) 1.00	Weather: Sunny - Cool								
	(B) Total Well Depth (ft BTOC): 15.92	(E) Casing Volume Multiplier (gal/lin ft): 0.04	Background PID (ppm): NA								
	(C) Water Column Thickness (ft) (B-A): 3.46	Screen Length (lin ft):	Breathing Zone PID (ppm): NA								
	(D) Well Volume (gal) (C x E): 0.14	Screen Info: Type: Factory Slot Slot Size: 0.010-inch	Well Opening PID (ppm): NA								
CASING INFO	Riser/Well Casing Inner Diameter (in) 0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10	
	(D) Casing Volume Multiplier(gal/lin ft) 0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08	
DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mL)	Pumping Rate (mL/min)	Temp (°C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
1/21/2013	1214	13.63	1,000	250	19.35	6.94	9.12	0.00	21.6	4	Clear
1/21/2013	1218	14.21	2,000	250	19.57	7.01	8.22	0.00	4.83	20	Clear
1/21/2013	1222	14.38	3,000	250	19.77	7.04	7.98	0.00	3.58	31	Clear
1/21/2013	1226	14.54	4,000	250	19.96	7.11	7.80	0.00	2.59	46	Clear
1/21/2013	1230	14.63	5,000	250	20.05	7.18	7.71	0.00	2.18	57	Clear
1/21/2013	1234	14.71	6,000	250	20.02	7.25	7.65	0.00	1.36	65	Clear
1/21/2013	1238	14.74	7,000	250	20.06	7.30	7.62	0.00	1.40	69	Clear
1/21/2013	1242	14.77	8,000	250	20.10	7.32	7.60	0.00	0.90	73	Clear
Colorimeter Results					No. Containers/Volume/Type			Preserv.	Filter (Y/N)	Method	Parameter(s)
Time	Analyte	Dilution	Result	Units	3	40 ml	VOAs	HCl	N	8260B	VOCs
					1	500 ml	Plastic	None	N	300	CL/NO2/NO3/FL/SO4
<b>Sample Time</b>					1	250 ml	Plastic	HNO3	Y	6010	Metals-Dissolved
1245					1	250 ml	Plastic	HNO3	N	6010	Mercury-Total
<b>Sample Identification</b>					1	250 ml	Plastic	None	N	2540	TDS
SWMU183-MW03											
Conversions	Stabilization Criteria										
1 L = 0.26 gals	Temp	+/- 10%	DO	+/- 10%							
1 gal = 3.79 L	pH	+/- 0.1	Turb	+/- 5 NTU							
	Cond	+/- 10%	ORP	N/A							

## **APPENDIX D**

**Laboratory Analytical Results  
(Provided on Enclosed CD)**

## **APPENDIX E**

### **Data Validation Report**

## Data Validation Report

This report contains the results of the review and validation of the specified data package performed by Marcia Olive, Bhate Environmental Associates, Denver, Colorado.

### Introduction

This data validation report covers samples taken from Holloman Air Force Base, New Mexico, on January 21-22, 2013. Eight aqueous samples, a field duplicate and associated QC samples were taken from site SD08 for long term monitoring. Additionally, four samples were taken from SWMU183 and S10 to delineate the plume adjacent to site SD08. All analyses were performed by Gulf Coast Analytical, Inc., Baton Rouge, LA. The specific samples included in this validation were:

Sample ID	Matrix	Lab Package	Collection Date	Analyses
MW-08-01	Water	213012314	1/22/13	VOCs (SW8260B), Anions (EPA 300), Dissolved TAL Metals (SW6010B), Total Mercury (SW7470A), TDS (SM2540C)
MW-08-02			1/21/13	
MW-08-03				
MW-08-04		213012206	1/21/13	
MW-08-05				
MW-08-06		213012314	1/22/13	
MW-08-07				
MW-08-07-A		213012206	1/21/13	
MW-08-08				
SWMU183-MW03		213012314	1/22/13	
S10-MW01				
S10-MW01-A				
S10-MW06				

This data was validated against the laboratory's QA/QC limits using the guidelines and practices published in the *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (USEPA, June 2008), the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (USEPA, January 2010).

### Sample Handling and Holding times

The samples were properly preserved and transferred under chain-of-custody to the laboratory for analysis and analyzed within the required holding times.

### Blanks

A low level detection of acetone was detected in the trip blank associated with samples S10-MW01, S10-MW01-A, MW-08-02 and MW-08-01. When a positive result occurred it was reported at a concentration less than 10x the blank concentration. This indicated the samples were affected by this common laboratory contaminant and qualified as non detected (U) and raised to the reporting limit.

The metals method blank, associated with all samples, yielded low level detections of total mercury and dissolved cadmium. Those sample concentrations that were less than 5x the blank concentration were considered laboratory artifacts and qualified as not detected, "U", above the reported sample quantitation limit.

### Blank spike sample (laboratory control sample-LCS)/surrogates

The LCS recoveries for all compounds were within QC limits for all analyses.

## Matrix spike/matrix spike duplicates (MS/MSD)

For lab package 213012314, the MS/MSD relative percent difference (RPD) for hexachlorobutadiene, n-butylbenzene, dissolved mercury, arsenic, calcium, magnesium, selenium, thallium and sodium were outside control limits. The lab package 213012206 yielded MS/MSD recoveries and/or RPDs for dissolved mercury, total mercury, arsenic, calcium, magnesium, selenium, thallium and sodium outside QC limits. Control limits were not applicable for calcium, magnesium and sodium (in both lab packages) since the target analyte concentration exceeded the spiked concentration by a factor of four or more. Precision and accuracy were cross reference with the LCS recoveries, which were within control limits. Using professional judgment, no qualification was required.

## Project specific quality assurance/quality control

Two field duplicates were collected with these lab packages. The RPD between sample MW-08-07 and its duplicate was outside control limits for antimony, cobalt, vanadium and acetone. The RPD for vanadium was also outside project defined control limits in sample S10-MW01 and its duplicate. These compounds were qualified as estimated, "J".

## Compound quantitation and reporting limits

Where a dilution was required, due to either matrix interference or to quantify the data, elevated reporting limits were reported.

## Overall assessment of data

Multiple sample containers for metals required additional nitric acid to lower the pH below 2. Since this was performed at sample receiving the samples were not adversely affected and required no qualification. Additionally, two trip blanks contained excess headspace, since one blank reported no positive results and the other reported a low level of acetone no additional qualification of the sample data was warranted based on this information alone.

All analyses were performed, and the data met the required QC criteria except where noted. The data is 100% complete.

Summary of Qualified Data

Sample ID	Parameter	Qualifier*/Reason
MW-08-01	Acetone	5.0 U
MW-08-02	Acetone	5.0 U
	Total Mercury	0.00020 U
MW-08-03	Total Mercury	0.00020 U
MW-08-05	Total Mercury	0.00020 U
MW-08-07	Antimony	0.038 J
	Cobalt	0.0051 J
	Vanadium	0.011 J
	Acetone	1.62 J
	Total Mercury	0.00020 U
MW-08-07-A	Antimony	0.023 J
	Cobalt	0.0034 J
	Vanadium	0.023 J
	Acetone	1.08 J
MW-08-08	Total Mercury	0.00020 U
SWMU183-MW03	Total Mercury	0.00020 U
S10-MW01	Vanadium	0.055 J
S10-MW01-A	Acetone	5.0 U
	Vanadium	0.076 J
	Total Mercury	0.00020 U

\*volatiles in µg/L/metals in mg/l

## **APPENDIX F**

### **Daily Quality Control Reports**

**DAILY QUALITY CONTROL REPORT**Project Number/Name: 10-0004.01.010 / SD-08 LTM Groundwater Sampling, Quarter 5, Winter 2013 DQCR No.: 1Date 01/21/2013 Time On-Site: 0630 Time Off-Site: 1700Site Name: SD-08 Weather: Partly Cloudy (AM) Clear (PM) Temperature: 30-60°F Wind: Light Breeze (PM)Contractor Personnel On-Site: Tony Lucero (NationView), Dustin McNeil, Zachary Beck (Bhate)Visitors On-Site: NoneSummary of Work Performed: Obtained site-wide water level measurements. Performed low-flow groundwater sampling of monitoring wells MW-08-03, MW-08-04, MW-08-05, MW-08-06, MW-08-08, S10-MW06, SWMU183-MW03Level of Health & Safety Protection: Level DEquipment Used: Solinst water-level meter, Geopump II Peristaltic Pump, Horiba U-52 water quality meter (with flow-through cell), Hanna 2100P turbidity meter, Teflon bailerCalibration(s) Performed: Horiba U-52, Hanna turbidity meterEquipment Problem(s)/Remedies: NoneSamples Collected\* Groundwater: MW-08-03, MW-08-04, MW-08-05, MW-08-06, MW-08-08, S10-MW06, SWMU183-MW03Sample Collection Method(s): Teflon bailer for VOCs, low-flow for all other parameters, 45µ filter used for dissolved metalsQuality Control: Groundwater: MW-08-06-MS (matrix spike), MW-08-06-MSD (matrix spike duplicate)Proposed Schedule for Tomorrow: Complete Quarterly groundwater sampling activities at Site SD-08Additional Remarks: NoneSignature: *Dustin McNeil* Job Title: Geologist

\*Indicates sample media: groundwater, surface water, soil or sediment; sample type: composite, grab, split, duplicate, rinsate, and sample I.D. numbers



# DAILY QUALITY CONTROL REPORT

Project Number/Name: 10-0004.01.010 / SD-08 LTM Groundwater Sampling, Quarter 5, Winter 2013 DQCR No.: 2

Date 01/22/2013 Time On-Site: 0700 Time Off-Site: 1130

Site Name: SD-08 Weather: Partly Cloudy (AM) Clear (PM) Temperature: 30-55°F Wind: None

Contractor Personnel On-Site: Tony Lucero (NationView), Dustin McNeil, Zachary Beck (Bhate)

Visitors On-Site: None

Summary of Work Performed: Obtained site-wide water level measurements. Performed low-flow groundwater sampling of monitoring wells MW-08-01, MW-08-02, MW-08-07, S10-MW01

Level of Health & Safety Protection: Level D

Equipment Used: Solinst water-level meter, Geopump II Peristaltic Pump, Horiba U-52 water quality meter (with flow-through cell), Hanna 2100P turbidity meter, Teflon bailer

Calibration(s) Performed: Horiba U-52, Hanna turbidity meter

Equipment Problem(s)/Remedies: None

Samples Collected\* Groundwater: MW-08-01, MW-08-02, MW-08-07, S10-MW01

Sample Collection Method(s): Teflon bailer for VOCs, low-flow for all other parameters, 45µ filter used for dissolved metals

Quality Control: Groundwater: MW-08-07-A (duplicate), S10-MW01-A (duplicate)

Proposed Schedule for Tomorrow: No onsite activity planned

Additional Remarks: None

Signature: *Dustin McNeil* Job Title: Geologist

\*Indicates sample media: groundwater, surface water, soil or sediment; sample type: composite, grab, split, duplicate, rinsate, and sample I.D. numbers