DEPARTMENT OF THE AIR FORCE
27TH SPECIAL OPERATIONS MISSION SUPPORT GROUP (AFSOC)
CANNON AIR FORCE BASE NEW MEXICO

DEC 07 2015

Colonel Douglas W. Gilpin
Commander, 27th Special Operations Mission Support Group
110 E Alison Avenue Suite 1098
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RECEIVED
DEC - 8 2015
NMED
Hazardous Waste Bureau

Mr. John E. Kieling
Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East Bldg 1
Santa Fe NM 87505-6063

Dear Mr. Kieling

Cannon Air Force Base is pleased to submit the "*Revised Final 2014 Biennial Groundwater Monitoring and Landfill Inspection Report*". This revised report is in response to your 14 Aug 2015 Notice of Disapproval. If you have any questions regarding this submittal, please contact Ms. Brandy Chavez, Chief, Environmental Element at (575) 904-6747.

Sincerely,

DOUGLAS W. GILPIN, Colonel, USAF

Attachments:
1. Revised Final 2014 Biennial Groundwater Monitoring & Landfill Inspection Report

cc:
NMED, Dave Cobrain
NMED, Gabriel Acevedo
NMED, Neelam Dhawan

2014 BIENNIAL GROUNDWATER MONITORING AND ANNUAL LANDFILL INSPECTION REPORT – Revision 2

CANNON AIR FORCE BASE
NEW MEXICO
RCRA PERMIT No. NM7572124454

Performance Based Remediation
Contract Number: FA8903-13-C-0008

Prepared for

AIR FORCE CIVIL ENGINEER CENTER
2261 Hughes Ave., Suite 155
JBSA - Lackland, Texas 78236-9853

November 2015

Prepared by:

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RESPONSES TO NMED COMMENTS
2014 BIENNIAL GROUNDWATER MONITORING AND ANNUAL LANDFILL INSPECTION REPORT
DATED DECEMBER 2014
CANNON AFB, NEW MEXICO

Comments by NMED, dated August 14, 2015.

Comment 1. Section 4, Table 4-1 Water Levels-June and July 2014. - A review of the historical top of casing (TOC) elevation data and the September 2014 TOC data indicates significant differences in elevation for may of the wells beyond those altered during well repairs conducted during the biennial report period. For instance while the historical TOC data indicate a 1.1 foot difference in elevation between MW-B and MW-C, the September 2014 TOC data indicate a 2.1 foot difference. Neither of these wells was altered during well maintenance activities following the June 2014 measurements. Provide a detailed description of both survey events and conduct a survey spot check to determine which survey is accurate. Review all past data to determine which data is reliable.

Response: The historical elevations were obtained from historical reports for monitoring activities at Cannon AFB. These historical reports contained varying data for the same survey locations in the approved work plan and the most recent (2012) approved biennial report as indicated in the following table:

Monitoring Well	2011 Facility Wide Long Term Groundwater Monitoring Plan		2012 Biennial Groundwater Monitoring Report		2014 Survey Results included in the 2014 Biennial Groundwater Monitoring Report	
	TOC	Ground	TOC	Ground	TOC	Ground
MW-A	4265.8	4263.83	4269.2	4267.0	4268.72	4267.01
MW-B	4265.41	4262.10	4268.1	4265.8	4266.80	4265.19
MW-C	4267.9	4263.72	4269.2	4266.9	4268.90	4267.00
MW-D	4265.9	4261.94	4267.6	4265.8	4266.90	4265.20
MW-E	4281.12	4279.70	4285.9	4283.0	4284.96	4282.92
MW-F	4278.5	4274.93	4282.3	4279.4	4280.84	4278.09
MW-G	4279.99	4276.46	4283.1	4280.0	4281.55	4279.65
MW-H	4276.15	4275.98	4282.6	4279.6	4281.18	4279.18
MW-Na	4268.4	4266.00	4271.0	4269.8	4270.51	4269.42
MW-Oa	4271.07	4270.11	4273.7	4273.0	4273.96	4273.29
MW-Pa	4271.82	4270.85	4274.8	4274.0	4274.73	4274.07
MW-Rb	N/A	N/A	4278.4	4275.8	4277.73	4275.41
MW-S	4263.83	4260.70	4266.7	4264.7	4265.75	4263.81
MW-T	4263.69	4260.82	4266.6	4264.7	4265.72	4263.90
MW-U	4265.26	4262.27	4267.9	4266.0	4267.30	4265.43
MW-V	N/A	4324.82	4329.8	4327.8	4329.90	4328.27
MW-W	N/A	4296.95	4302.1	4299.8	4302.22	4300.15
MW-X	N/A	4264.76	4269.2	4268.0	4269.23	4268.02

Attempts to reconcile the differences in data between the 2011 work plan and the 2012 biennial report were unsuccessful. Additionally, FPM\URS completed well maintenance

activities at three wells that had been modified by a previous contractor (unknown) that altered the top of casing at each well as described in Section 3.1. These wells could not be locked in the configurations in which FPM\URS found them. The wells were repaired to the point they could be locked.

FPM\URS had Lydick Engineering of Clovis, New Mexico (licensed surveyor in New Mexico) survey the locations and elevations of both the concrete pad and top of casing (TOC) for all 18 monitoring wells on September 11, 2014. The results of this survey will be utilized going forward as the accepted elevation data for these monitoring wells. The survey data from the 2014 biennial report is included in the above table for comparison purposes.

Due to the fact that the raw historical survey data could not be identified, no comparison of the old data to the current (2014) data is possible.

Comment 2. Section 4.1, Water Level Measurements, Paragraph Six.

Permittee's Statement "The potentiometric surface for June is presented in Figure 4-1. Groundwater elevations for Figure 4-1 were calculated using the June water level data and monitoring well TOC elevations from the 2012 Biennial Groundwater report (Bhate 2013)."

NMED's Comment "Review of Figure 4-1 indicates the reported groundwater elevations in the figure are from the data collected during the July 2014 gauging event utilizing September 2014 TOC elevation data. Resolve this discrepancy. Generate a potentiometric surface map for each reporting period in order to aid in the development of a conceptual model of groundwater elevation trends.

Response: Agree. Figures will be created for the July 2013, June 2014, and July 2014 water level measurement events. The text of the 6th paragraph will be revised to state "Potentiometric surface maps were generated from the July 2013 (Figure 4-1), June 2014 (Figure 4-2), and July 2014 (Figure 4-3) field measurements. Groundwater elevations for Figure 4-1 were based on field data obtained from the USGS for the July 2013 field event and calculated using the monitoring well TOC elevations from the 2012 Biennial Groundwater report (Bhate 2013). Groundwater elevations for Figures 4-2 and 4-3 were based on field data collected during the June 2014 sampling event and the July 2014 field event. Groundwater elevations for these figures were calculated based on the September 2014 survey data for the monitoring wells."

Comment 3. Section 4., Analytical Results Figure. Provide a figure which depicts concentrations of chemical of concern (COCs) that are greater that the applicable federal or State of New Mexico groundwater quality or tap water quality standards. The presentation of COCs in exceedance of applicable standards will better aid NMED in developing a conceptual site model related to concentration trends over time. Refer to NMED's position paper General Reporting Requirements for Routine Groundwater Monitoring at RCRA Sites dated February 14, 2013 available on the NMED Hazardous Waste Bureau's guidance web page for reporting requirements for future submissions.

Response: Agree. The results of the groundwater sampling exceeding an applicable standard will be added to Figure 4-4. This figure will be referenced in Section 4.3 as

follows "…Guidance (NMED 2012). Reported detections and comparisons to MCLs, NMGWQSs, or the NMED Risk Assessment Guidance, are provided in Table 4-3. Detections exceeding applicable screening levels are depicted on Figure 4-4."

Comment 4. URS Response to NMED Comment No. 4. NMEDs Comment 4 requirement for additional appendix information in the March 25, 2015 Disapproval letter has not been fulfilled. Provide, as a separate appendix of the report or as a separate submittal, boring and well construction logs for all site monitoring wells. Also, amend Table 4-1 to include well diameter, screen length, and well depth information as separate data columns. Additionally, adjust screen interval information to read from left to right (i.e. top of screened interval to bottom of screened interval). This information must be included in all future reports with the exception of well construction and boring logs, if submitted as a separate document.

Response: Agree. Table 4-1 will be revised to include well diameter, screen length, and well depth information as separate data columns.

The boring logs were completed following the installation of the monitoring wells. These wells were installed by historical contractors and boring logs are not available for all monitoring wells currently installed at the Base. Copies of the well construction diagrams and boring logs we could find have been added to Appendix F. A summary of the information identified for the wells is provided in the following table.

Well Identification Number	Date Installed	Installed By	Boring Logs Identified (Yes/No)	Monitoring Well Identification Report (Yes/No)
MW-A	1/4/1985	Radian Corporation	Yes	Yes
MW-B	11/25/1984	Radian Corporation	Yes	Yes
MW-C	1/9/1985	Radian Corporation	Yes	Yes
MW-D	12/10/1984	Radian Corporation	Yes	Yes
MW-E	11/11/1985	USACE – Tulsa District	Yes	Yes
MW-F	11/19/1985	Roman Well Service	Yes	Yes
MW-G	11/06/1985	USACE – Tulsa District	Yes	Yes
MW-H	11/18/1985	Roman Well Service	Yes	Yes
MW-I	8/10/1988	Roman Well Service	Yes	No
MW-J	8/16/1988	Roman Well Service	Yes	No
MW-L	6/02/1992	USGS	Yes	No

Well Identification Number	Date Installed	Installed By	Boring Logs Identified (Yes/No)	Monitoring Well Identification Report (Yes/No)
MW-M	2/04/1992	USGS	Yes	No
MW-N	12/10/1994	Woodward-Clyde	Yes	No
MW-Na	Unknown	Unknown	No	No
MW-O	12/28/1994	Woodward-Clyde	Yes	No
MW-Oa	Unknown	USGS	No	No
MW-P	7/16/1995	USGS	No	Yes
MW-Pa	Unknown	USGS	No	No
MW-Q	2/24/1996	Unknown	No	No
MW-R	Unknown	Unknown	No	No
MW-Ra	Unknown	Unknown	No	No
MW-Rb	10/2/2012	Tetra Tech	Yes	No
MW-S	12/2/1998	USGS	No	Yes
MW-T	12/16/1998	USGS	No	Yes
MW-U	12/10/1998	USGS	No	Yes
MW-V	8/08/2001	USGS	No	Yes
MW-W	6/01/2002	USGS	No	Yes
MW-X	2/26/2004	USGS	No	Yes

For those wells where information could not be identified, we will continue to work with Cannon AFB and available resources to identify the missing information. Should this information be identified in the future it will be provided to NMED in the following biennial groundwater monitoring report.

Comment 5. Section 4.3, Analytical Results, Hexavalent Chromium Sampling. Although the Permittee has demonstrated data concurrence between samples submitted for hexavalent chromium analysis for preserved and unpreserved groundwater samples collected during the 2014 sampling event, holding time exceedances may require resampling of groundwater where these data quality exceptions occurred. Care should be taken in future events to properly meet all holding times and sample preservation criteria for proper analysis. It should also be noted that although historical data does indicate the occurrence of hexavalent chromium in various site wells, it has never been detected at the frequency reported during this reporting period. This could possibly be attributed to the exceedance of hold times.

Response: Comment Noted. The frequency of the detection is attributed to the limit of quantification (LOQ) (0.5 µg/L) allowed by the method utilized (USEPA 7199). The reporting limit for the method utilized in previous sampling (USEPA 7196A) was 4.0 µg/L. The use of the alternative method allowed for the detection of hexavalent chromium at concentrations that were below the ability of the previous sampling method to identify.

Care will be taken in future sampling events to ensure that groundwater samples do not exceed holding time.

Comment 6. URS Response to NMED Comment No. 6. Based on a review of Section 4.1 of the approved *Work Plan Addendum for Landfills and Institutional Controls Inspection Sites* dated June 16, 2015, the sampling program has been downsized from the sampling of 18 monitoring wells to 11 monitor wells for the coming biennial period. This includes MW-C, MW-F, and MW-G which have static groundwater levels above the screened interval. In keeping with the objective of the Facility-Wide Long Term Groundwater Monitoring Plan dated January 2011, monitoring wells MW-C, MW-F, and MW-G should be replaced. Past data from these wells are unreliable due to the fully submerged well screen interval and do not provide useful data for chemicals of concern (COCs) related to the potential leaching from the associated SWMUs. Monitoring wells MW-A, MW-B, MW-E, and MW-H also have measured water levels above their screened interval and should be replaced as they appear to be key up-gradient or perimeter wells which may provide additional information on site conditions should concentrations of COCs be detected during future sampling events. Replaced wells and those deemed not necessary for long term monitoring by NMED may be abandoned in accordance with the requirement of the New Mexico Office of the State Engineer (NMOSE) and NMAC 19.27.4.36(C).

Response: Agree. The monitoring wells at Cannon AFB have been sampled as part of the approved work plan for LTM at Cannon AFB. AFCEC will request funds to replace wells but cannot guarantee when the funds will arrive. It is possible that the funds will not be available until fiscal year 2017.

AFCEC concurs with the recommendation that monitoring wells MW-A and MW-C (associated with LF005) and monitoring wells MW-E-, MW-F, MW-G, and MW-H (associated with SI101) should be replaced. However, MW-B is considered to be a redundant monitoring well due to its close proximity to monitoring wells MW-T and MW-U. MW-T and MW-U are properly screened and monitor the same portion of the aquifer as MW-B (downgradient from LF005). Therefore, MW-B is not required to monitor the groundwater flowing from LF005 to the east and should not be replaced.

AFCEC proposes that monitoring wells MW-A, MW-C, MW-E, MW-F, and MW-H be replaced by installing a groundwater well within 10 feet of the existing monitoring well (or as close to this as possible) and setting the screen five feet above the existing groundwater table at the time of the installation. The screen will extend from five feet above the groundwater table to a depth of five feet below the top of the existing screen in the well being replaced. The depth to groundwater will be determined by measuring the existing (improperly screened) well prior to commencement of drilling. This would allow for the existing well to be utilized once the groundwater drops to within the screened interval while representing a cost saving measure to the Air Force.

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List of Acronyms

µg/L	micrograms per liter
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
amsl	above mean sea level
BTOC	below top of casing
CoC	chain of custody
DQCR	Daily Quality Control Report
FPM	FPM Remediations, Inc.
IDW	Investigation-Derived Waste
J	estimated
LOQ	limit of quantification
MCL	Maximum Contaminant Level
mg/L	milligrams per liter
MS/MSD	matrix spike/matrix spike duplicate
NMED	New Mexico Environmental Department
NMGWQS	New Mexico Groundwater Quality Standards
No.	number
ORP	oxidation-reduction potential
PBR	Performance Based Remediation
TOC	top of casing
U	nondetect
URS	URS Group, Inc.
USEPA	United States Environmental Protection Agency
WPA	Work Plan Addendum

This document is a Biennial Groundwater Monitoring Well and Annual Landfill Inspection Report for six sites at Cannon Air Force Base (AFB), New Mexico.

1.1 LOCATION

Cannon AFB is in Curry County, New Mexico, approximately 7 miles west of the City of Clovis. Cannon AFB occupies 4,320 acres, consisting primarily of the airfield and associated operations, maintenance, and support facilities that are located northwest of the airfield. Housing facilities are located in the northwestern portion of the Base, west of New Mexico Highway 311 and north of U.S. Highway 60. Additional Cannon AFB support facilities, such as the munitions storage area and current fire department training area, are located south and east of the airfield (**Figure 1-1**).

1.2 AUTHORITY

FPM Remediations, Inc. (FPM) has been awarded a Performance Based Remediation (PBR) contract by the Air Force Civil Engineer Center (AFCEC) under Contract Number (No.) FA8903-13-C-0008 to complete remediation activities at Cannon AFB. URS Group, Inc. (URS), as a subcontractor to FPM, has completed this Biennial Groundwater Monitoring Well and Annual Landfill Inspection Report under the Environmental Restoration Program at Cannon AFB. The sites identified in this report are subject to corrective action requirements under the Cannon AFB Hazardous Waste Facility Permit No. NM7572124454.

1.3 PURPOSE AND SCOPE

This report has been prepared to document field activities completed during June and July 2014 in accordance with the Work Plan Addendum (WPA) at Cannon AFB, New Mexico (FPM/URS 2014a). The WPA includes groundwater monitoring at 18 monitoring wells (MW-A, MW-B, MW-C, MW-D, MW-E, MW-F, MW-G, MW-H, MW-Na, MW-Oa, MW-Pa, MW-Rb, MW-S, MW-T, MW-U, MW-V, MW-W, and MW-X) and inspections at six landfills (LF002, LF003, LF004, LF005, LF025, and SI101), all of which are located on Cannon AFB.

1.4 REPORT ORGANIZATION

This report is organized as follows:

Section 1 describes the authority, purpose and scope, and report organization.

Section 2 summarizes landfill inspection and maintenance activities completed at LF002, LF003, LF004, LF005, LF025, and SI101.

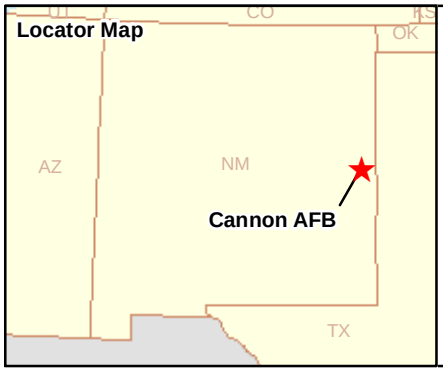
Section 3 summarizes monitoring well maintenance and surveying activities.

Section 4 presents groundwater monitoring procedures, hydrogeology, and groundwater sampling analytical results.

Section 5 describes the laboratory chemical data quality review and analytical result qualification conclusions.

Section 6 presents the conclusions and recommendations of this report.

Section 7 lists the references used to develop this report.



Legend

Base Boundary

N

10,000 5,000 0 10,000 Feet

Map projection: NAD83 State Plane Feet
New Mexico East (FIPS 3001)

Installation Location Map
Cannon Air Force Base, New Mexico

Drawn By:	Date:	Project No.	
DPG	10/29/2014	23446539	Figure 1-1
Checked By:	Revision:		
MS	0		

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This section presents details regarding the inspections and maintenance activities completed at the landfill sites.

2.1 LANDFILL INSPECTIONS

Landfill inspections were completed at six landfills (LF002, LF003, LF004, LF005, LF025, and SI101) at Cannon AFB. The 2013 inspections were completed between December 17, 2013 and December 18, 2013. The 2014 inspections were completed between June 16, 2014 and June 18, 2014. Observations regarding the condition of the landfills were consistent between the 2013 and 2014 inspection events. Daily activities are documented in Daily Quality Control Reports (DQCRs) included in **Appendix A**. Landfill Inspection Sheets presenting the observations during the 2013 and 2014 inspection event are provided in **Appendix B**. **Figure 2-1** provides the location of each landfill, along with monitoring well locations.

A summary of major issues for each landfill is provided below:

- LF003: A 10-foot by 5-foot by approximately 3-foot deep sinkhole was observed within the landfill; likely due to subsidence.
- LF004: Washouts observed on the south side of the landfill were subsequently repaired by Cannon AFB.
- LF005: Multiple areas of fence are in need of repair. Additionally, various debris items were observed within the approximately 30-acre portion of LF005 that is fenced with barbed wire. Debris observed included concrete, telephone pole, scrap metal, and other materials. Several small trees were observed within this fenced portion. The east gate to Cell No. 3 of LF005 did not close properly and a chain and lock were missing from this access gate. An undetermined number of tumble weeds were observed within the larger fenced portion of LF005.
- LF025: The barbed wire perimeter fence surrounding LF0025 was observed to be in need of repairs at some locations. Additionally, a sign at the entrance that identified the site was missing at the time of the inspections. Numerous small to large trees, both dead and living, are present across the site with many located just inside the perimeter fence.
- SI101: Portions of the barbed wire perimeter fence were observed to be in need of repair. Several small trees and shrubs were identified along the west side of the site. Tumble weeds were observed within the landfill.

2.2 LANDFILL MAINTENANCE

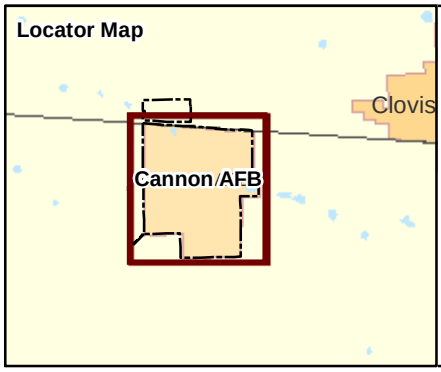
Landfill maintenance activities were completed during site visits to Cannon AFB in June, July, and October 2014. Maintenance activities were completed at LF005, LF025, and SI101, and included:

- Fallen trees and tree limbs were removed from along the fence line at LF005 and LF025 on June 18, 2014.

- Barbed wire fence repairs were completed at LF025 and SI101 on June 19, 2014.
- Four trees were cut down within the LF005 boundary on July 19, 2014.
- New padlocks were placed at the south and northeast entry gate to LF005 and the entry gate at SI101 on July 19, 2014.
- An estimate of the amount of fencing at LF005 in need of repair as well as dimensions for a sign for the entrance to LF005 were measured for replacement purposes on July 19, 2014.
- All remaining trees and bushes were removed from within the boundaries at SI101 and LF005 on October 28 and 29, 2014.
- The east access gate of Cell No. 3, within LF005 was straightened, and a padlock and chain was added to the gate. Additionally, a chain and padlock was added to the north access gate of Cell 3 on October 31, 2014.

The sinkhole previously identified at LF003 was filled in with soil prior to the October 2014 field activities. The sinkhole was reportedly filled by Cannon AFB personnel. The debris observed at LF005 is known to Cannon AFB but is not within the scope of this task order. A request for bids to complete tree removal at LF025 was issued and bids were received. The bids were provided to Cannon AFB and AFCEC to decide a path forward.

Locator Map



Legend

- Monitoring Well Location
- Base Boundary
- Site Boundary

Note:

1) September 11, 2014 survey data by Lydick Engineering, Clovis, New Mexico was used for monitoring well locations.

N

2,000 1,000 0 2,000 Feet

Site Location Map with Groundwater Monitoring Well Locations

Cannon Air Force Base, New Mexico

Drawn By:	Date:	Project No.	
DPG	10/29/2014	23446539	Figure 2-1
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This section presents monitoring well maintenance and surveying activities.

3.1 MONITORING WELL MAINTENANCE ACTIVITIES

Initial monitoring well maintenance activities were completed on June 18 and 19, 2014, and again on October 31, 2014. As part of the well maintenance activities, field personnel:

- Removed all existing dedicated tubing from each monitoring well and dedicated pumps from two wells, MW-Oa and MW-Pa. These pumps were shipped to the manufacturer for refurbishing and reinstalled on October 31, 2014. The dedicated pump and tubing could not be removed from MW-Na.
- Repainted all steel protective well casing and bollards Cannon Brown/Interface Tan.
- Installed new concrete pads at MW-A and MW-B.
- Sealed cracks in concrete pads with concrete crack seal at wells MW-C, MW-D, and MW-F.

Well maintenance activities were also completed on July 18 and 19, 2014. Field personnel:

- Located the correct key to access MW-Rb, and completed an inspection of the well.
- Cut the well riser at four wells such that the riser pipe would fit inside the protective steel casing of each well. Approximately four, nine, one, and six inches of well riser were removed at MW-E, MW-F, MW-G, and MW-H, respectively.
- Installed new locking lids on the steel protective casings at MW-E, MW-F, MW-G, and MW-H, which will allow the wells to be secured with a lock.
- Placed new keyed alike padlocks at all 18 monitoring wells and the access gates to LF005 and SI101. All 18 monitoring wells and the access gates to LF005 and SI101 can be accessed with the same key.
- Installed 4-inch j-plug type well caps at MW-A, MW-E, MW-F, MW-G, MW-H, MW-Oa, and MW-Pa. Currently all 18 wells are sealed with a j-plug.

The maintenance work performed is documented on the DQCRs in **Appendix A**. A summary of monitoring well construction details and comments regarding observed conditions is presented in Table 2 of the Annual Land Use Control Inspections Report (FPM/URS 2014b).

3.2 MONITORING WELL SURVEY

Lydick Engineering of Clovis, New Mexico (licensed surveyor in New Mexico) surveyed the locations and elevations of both the concrete pad and top of casing (TOC) for all 18 monitoring wells. Surveying was completed on September 11, 2014. The survey results are summarized in **Table 3-1**. Horizontal coordinates are reported in New Mexico East State Plan Coordinates, which are referenced to the North American Datum of 1983 to an accuracy of 0.1 feet. Elevations are referenced to the North American Vertical Datum 1988. The surveyor's data submission is included in **Appendix D**.

No major variances were noted between the September 2014 survey data survey and the data reported in the 2012 Biennial Groundwater Monitoring and Annual Landfill Inspection Report (Bhate 2013), with four exceptions; the TOC elevations for MW-E, MW-F, MW-G, and MW-H, which were altered during the monitoring well maintenance activities completed in July.

The location of MW-B, which has been historically placed directly adjacent to MW-T, was inaccurate. The September 2014 survey data indicated the location of MW-B is between MW-T and MW-U. Based on observation by field personnel, this is the correct location for MW-B. Figures in this report and future reports will show the location of all monitoring wells based on September 2014 survey data.

The total depth of each monitoring well was measured during the collection of the groundwater samples. The purpose of the measurement was to collect data to be utilized in conjunction with the 2014 monitoring well survey data to form a baseline of information that would be utilized for all future groundwater monitoring reports at Cannon AFB. The total depth of the well was calculated using the survey data and information from historical boring logs. This revised information is included in **Table 4-1** of this report.

Available monitoring well construction information for all monitoring wells located at Cannon AFB is included in **Appendix F** of this report. Should additional historical information become available for the remaining monitoring wells, this information will be included in the subsequent biennial reports.

TABLE 3-1
MONITORING WELL SURVEY DATA - SEPTEMBER 2014
CANNON AFB, NEW MEXICO

Well Identification	Site Association	Northing (NAD 83)	Easting (NAD 83)	Top of Casing Elevation (feet amsl) (NAVD 88)	Concrete Pad Elevation (feet amsl) (NAVD 88)
MW-A	LF005	1228291.09	850513.24	4268.72	4267.01
MW-B	LF005	1226666.34	852296.60	4266.80	4265.19
MW-C	LF005	1226056.10	851789.72	4268.90	4267.00
MW-D	LF005	1226095.85	851123.70	4266.90	4265.20
MW-E	SI101	1235128.43	850881.46	4284.96	4282.92
MW-F	SI101	1234609.98	851885.22	4280.84	4278.09
MW-G	SI101	1233761.42	852082.68	4281.55	4279.65
MW-H	SI101	1233235.68	851638.44	4281.18	4279.18
MW-Na	LF004	1234314.82	854201.76	4270.51	4269.42
MW-Oa	LF003	1232514.40	853895.37	4273.96	4273.29
MW-Pa	LF025	1233526.85	852403.88	4274.73	4274.07
MW-Rb	LF025	1234803.21	852390.66	4277.73	4275.41
MW-S	LF005	1226092.46	852274.85	4265.75	4263.81
MW-T	LF005	1226404.02	852375.33	4265.72	4263.90
MW-U	LF005	1226884.20	852330.10	4267.30	4265.43
MW-V	Background	1240246.97	841913.74	4329.90	4328.27
MW-W	Background	1237389.20	853254.21	4302.22	4300.15
MW-X	Background	1228560.00	844498.66	4269.23	4268.02

Notes:

1) Wells were surveyed on September 11, 2014 by Lydick Engineering, Clovis, New Mexico.

2) Location data are reported in the New Mexico East State Plane coordinate system.

AFB = Air Force Base

amsl = above mean sea level

NAD 83 = North American Horizontal Datum 1983

NAVD 88 = North American Vertical Datum 1988

This section presents the groundwater monitoring activities including water level measurements, potentiometric surface mapping, monitoring well sampling, and analytical results.

4.1 WATER LEVEL MEASUREMENTS

Water levels were measured by URS during two separate events. The first event was completed on June 17 and 18, 2014 and the second event was completed on July 14 through the 21, 2014, when the wells were sampled. Water level measurements were not collected by URS during the 2013 landfill inspections. However, water level measurements were collected by the USGS in July 2013 and are included in **Table 4-1**. Well locations are shown on **Figure 2-1.**

Monitoring wells MW-B and MW-D were not sampled in 2012 due to excessive silt accumulation in the bottom of the wells. It was recommended that those wells be redeveloped and a determination made regarding their integrity and viability as groundwater quality sampling points. This work was to be performed in advance of the October 2014 sampling event. No evidence of siltation was observed by URS at the time the field work was completed. Water levels and groundwater samples were collected without issues during the 2014 sampling event. Water levels measured during the completion of field work are provided in **Table 4-1**.

Water levels were measured at 16 of 18 monitoring wells during the June event. The water level at MW-Na could not be measured because the dedicated pump installed in the well could not be removed and due to an undetermined obstruction at 238 feet below top of casing (BTOC). A water level at MW-Rb was not measured because the key to access the well could not be located.

Water levels were measured at all 18 wells during the July event. At MW-Na, a tubing extension provided by Cannon AFB allowed the dedicated pump in the well to be lowered into the water column such that a water level measurement could be taken. The key for MW-Rb, provided by Cannon AFB, allowed access to the well for a water level measurement. Water level measurements for both events, along with historic TOC elevations for the monitoring wells are provided in **Table 4-1**. Water level measurement activities are documented on the DQCRs in **Appendix A**.

Water levels measured in June ranged from 286.60 to 349.31 feet BTOC, while June groundwater elevations ranged from 3,931.90 feet above mean seal level (amsl) at MW-T to 3,982.60 feet amsl at MW-X. Water levels measured in July ranged from 287.04 to 349.79 feet BTOC, with groundwater elevations ranging from 3,930.12 amsl to 3,982.19 amsl. Water levels dropped between the two events, with a geometric mean decline of 0.83 feet. Historical reports for this area report that local groundwater levels have dropped an average of two to three feet per year due to groundwater extraction for agricultural (primarily irrigation), municipal, and domestic use.

Potentiometric surface maps were generated from the July 2013 (**Figure 4-1**), June 2014 (**Figure 4-2**), and July 2014 (**Figure 4-3**) field measurements. Groundwater elevations for **Figure 4-1** were based on field data obtained from the USGS for the July 2013 field event and calculated using the monitoring well TOC elevations from the 2012 Biennial Groundwater report (Bhate

2013). Groundwater elevations for **Figures 4-2** and **4-3** were based on field data collected during the June 2014 sampling event and the July 2014 field event. Groundwater elevations for these figures were calculated based on the September 2014 survey data for the monitoring wells."

As shown on **Figure 4-1**, the direction of groundwater flow is to the east in the western part of the Base, near MW-V. In the vicinity of MW-E, groundwater flow changes direction, resulting in a southeast trend towards MW-S. Interpreted groundwater elevations near MW-Oa, MW-Na, and MW-Pa depict a distinct change in groundwater flow to due south.

Figure 1-1 shows the distinct circular patterns associated with center pivot irrigation systems that are abundant around Cannon AFB, with the greatest density of center pivot systems southeast of the Base. This concentration of center pivot systems likely explains the sharp southern turn of groundwater flow direction in the vicinity of MW-Oa.

4.2 GROUNDWATER SAMPLING

In accordance with the WPA (FPM/URS 2014a), groundwater samples were collected at 18 monitoring wells from July 14 to 21, 2014. All 18 groundwater samples were collected from the middle of the screened interval of each well. Additionally, one duplicate sample and one matrix spike/matrix spike duplicate (MS/MSD) sample were collected at MW-Oa and MW-F, respectively. The monitoring well locations are shown on **Figure 2-1**. The DQCRs describing the work completed during the sampling event are provided in **Appendix A.**

4.2.1 Groundwater Sampling Procedures

Well purging and sampling were completed using low flow sampling procedures. Purging and sampling were completed using a Geotech bladder pump at a discharge rate of less than 500 milliliters per minute. Compressed nitrogen supplied in K cylinders was used to operate the bladder pumps. Purging and sampling of well MW-Na were completed using the dedicated bladder pump and tubing that were present in the well.

During purging, groundwater quality parameters were monitored to determine the presence of formation water in the well casing. Monitored groundwater quality parameters included pH, specific conductance, dissolved oxygen, oxidation-reduction potential (ORP), and temperature, and were measured using a YSI-556 multi-parameter probe and flow-through cell. Turbidity was measured using a LaMotte 2020e portable turbidity meter. Purging continued until three stabilized water quality parameters readings were recorded. Once purging was completed, the discharge line was disconnected from the flow through cell and samples were collected from the discharge line.

After purging and sampling activities were complete, the pump and tubing were removed from the well and the tubing was reinstalled for future use. The pump was decontaminated before moving to the next well.

A summary of sample identifications, sampling dates, and laboratory analytical parameters are presented in **Table 4-2.** Groundwater Sample Collection Field Sheets, which document field water quality parameter measurements, sampling dates and time, sample identification, associated Quality Control/Quality Assurance sampling, sample container types and preservatives, and sampling equipment, are presented in **Appendix C**.

4.2.2 Field Documentation

Observations and data acquired in the field were documented to provide information on the acquisition of the samples and provide a permanent record of field activities. The observations and data were recorded with waterproof ink in a permanently bound, weatherproof field logbook with consecutively numbered pages.

Field water quality measurements, including temperature, pH, specific conductance, dissolved oxygen, ORP, and turbidity were recorded on Sample Collection Field Sheets which are included in **Appendix C**.

Samples were tracked from the time they were collected until the samples reached the analytical laboratory. Information on the dates of sampling, sample types, required analysis, handling, custody transfer and shipping of samples to the laboratory was recorded on the chain of custody (CoC) form.

4.2.3 Sample Handling

Samples were collected in laboratory-supplied containers with required preservatives. An identification label was attached to each sample container and completed using waterproof, permanent ink with the following information: sampler's initials, sample identification number, date and time of sample collection, preservative type, and analysis required. During daily sampling activities and for shipment, sample containers were placed into laboratory-cleaned coolers and packed on ice.

A copy of the CoC for the samples was included in each cooler for laboratory use upon receipt. Sample coolers were sealed with tape and custody seals to ensure security during shipping. A copy of the CoC form was maintained to document sample handling between the field and laboratory. Sample coolers were generally shipped daily via overnight courier service to the contracted laboratory.

4.2.4 Decontamination

A temporary decontamination area was set up at each sampling location. Sampling equipment was decontaminated between use in a five-gallon bucket containing Liquinox soap and potable water by scrubbing with a bristle brush. Equipment was then rinsed with potable water in an additional bucket followed by a deionized water rinse. Rinse and detergent water were replaced with new solutions between sampling locations. Investigation-Derived Waste (IDW) handling procedures are described below.

4.2.5 Investigation-Derived Waste

IDW included monitoring well purge water and decontamination water. All IDW collected during groundwater sampling was temporarily stored in five-gallon buckets then transferred to bulk liquid storage tanks located adjacent to each monitoring well. If a bulk liquid storage tank was not present at the monitoring well, the IDW was transferred to the closest available storage tank.

Some investigative groundwater samples associated with the IDW exceeded the screening criteria (United States Environmental Protection Agency [USEPA] Maximum Contaminant Levels [MCL], New Mexico Groundwater Quality Standards [NMGWQS] or New Mexico Tap Water) as presented in **Table 4-3**. As a result, all IDW associated with the exceedances will be consolidated into drums. These drums will be sampled and the samples analyzed for the compounds that exceeded their respective screening criteria. The results will be compared to the Toxicity Characteristic Leaching Procedure Regulatory Limits (40 CFR 261.24). New Mexico Environmental Department (NMED) will be contacted with the IDW characterization results to determine disposal options.

4.3 ANALYTICAL RESULTS

The groundwater sampling analytical results were compared to current USEPA MCLs, and NMGWQS (20 New Mexico Administrative Code 6.2). If no screening criteria are listed for an analyte in the USEPA MCLs or the NMGWQS, the results were compared to the criteria specified in the NMED Risk Assessment Guidance (NMED 2012). Reported detections and comparisons to MCLs, NMGWQSs, or the NMED Risk Assessment Guidance, are provided in **Table 4-3**. Detections exceeding applicable screening levels are depicted on **Figure 4-4**.

Groundwater analytical results from three previous groundwater sampling events in 2008 (Tetra Tech 2008), 2010 (Trinity 2010), and 2012 (Bhate 2013) are provided in **Table 4-4**, **Table 4-5**, and **Table 4-6**, respectively. The current screening criteria (USEPA MCLs, NMGWQS, and NMED Tap Water) are also listed on these historical results tables for comparison.

Volatile Organic Compounds, Target Analyte List metals, perchlorate, chloride, sulfate, nitrite, and ammonia were not detected above screening criteria. Nitrite was reported as nondetect for all samples. Reported concentrations for hexavalent chromium and nitrate were detected above at least one screening criteria. Reported total organic carbon concentrations ranged from 0.2 micrograms per liter (µg/L) to 1.4 µg/L.

Hexavalent chromium was detected in 16 of 17 groundwater samples with reported concentrations ranging from 0.20 µg/L to 1.20 µg/L. The sample from well MW-V was rejected due to exceedance of the holding time. No MCL or NMGWQS has been established for hexavalent chromium. Hexavalent chromium exceeded its New Mexico Tap Water screening level of 0.431 µg/L in 14 of 17 wells (**Table 4-3**). The distribution of reported concentrations does not indicate any distinct trends or patterns indicating a point source or a release. Additionally, two of the exceedances were in background wells (MW-X and MW-W) indicating

the hexavalent chromium is naturally occurring. Publications from the State of California have identified hexavalent chromium as naturally occurring in groundwater in California, Nevada, New Mexico, and Arizona.

Hexavalent chromium concentrations in 2010 ranged from 4.1 µg/L to 19.0 µg/L in MW-F, MW-G, and MW-H and exceeded the hexavalent chromium New Mexico Tap Water screening level of 0.431 µg/L. Analytical results from 2008 and 2012 resulted in no groundwater samples exceeding the New Mexico Tap Water screening level for hexavalent chromium. A review of the analytical results from previous reports (**Table 4-4**, **Table 4-5**, and **Table 4-6**) indicated analytical reporting limits for hexavalent chromium were 20 µg/L in 2008 and 2010, and 4 µg/L in 2012. The limit of quantification (LOQ), for the June 2014 sampling round was 0.5 µg/L. The reduced LOQ would account for the detection of hexavalent chromium in 2014 that was not identified by previous sampling events.

The 2012 report (Bhate 2013) recommended future hexavalent chromium samples should be analyzed via EPA method 218.6. However, this method is not a Department of Defense approved method. Discussions with the laboratory determined that USEPA Method 7199 is equivalent to EPA Method 218.6 when preservatives are added to the samples. Therefore, the laboratory agreed to a modification of the method to allow preservatives to be added to 7199 to extend the hold time equivalent to EPA Method 218.6. Preservatives were intended to be added to the laboratory samples during the collection of the field work. No preservatives were included in the first nine samples collected during the field work (MW-B, MW-C, MW-D, MW-Na, MW-S, MW-T, MW-U, MW-V, and MW-X) due to an oversight by field sampling personnel. The preservative was included in the remaining nine samples collected by the field crew. The hexavalent chromium results for eight of the nine affected samples were analyzed within two times the holding time criteria and therefore were qualified estimated (J). Sample MW-V was the only hexavalent chromium result that was rejected due to analysis at more than two times the holding time.

The 2014 groundwater sampling data indicates the range of hexavalent chromium concentrations present in the preserved samples (0.21 µg/L to 1.1 µg/L) is comparable to the unpreserved samples (0.2 µg/L to 1.2 µg/L). This includes exceedances in background wells MW-W (0.75 µg/L) and MW-X (0.66 µg/L). Based on a review of the data, the exceedance of the holding time does not appear to have impacted the data. As discussed previously in this section of the report, there is no indication of a point source or a release of hexavalent chromium and two of the exceedances were in background wells (MW-X and MW-W) indicating the hexavalent chromium is naturally occurring. Based on the detections of hexavalent chromium at the site, the exceedance of the holding time does not alter the conclusions regarding hexavalent chromium in this report.

Nitrate was detected above at least one screening criterion in MW-Oa, which is located south of the former sewage lagoon overflow pond (SWMU 103). Nitrate has been reported in this well in previous rounds of sampling. An upward trend in nitrate concentrations at MW-Oa is apparent when reviewing historical and current data.

Perchlorate was detected in 13 of 18 wells, with reported concentrations ranging from nondetect to 2.0 µg/L. All reported concentrations for perchlorate were an order of magnitude below the NMED Tap Water screening criteria of 25.6 µg/L (see **Table 4-3**). The laboratory analyzed for perchlorate using USEPA Method 314.0 rather than SW-846 Method 6860 as requested. Method 6860 will be used for future sampling events.

As shown in **Tables 4-4 through 4-6**, some exceedances of current screening levels are apparent when screened against historical groundwater analytical results. However, nitrates in MW-Oa are the only consistent detections above screening criteria. Sporadic reported detections of lead, arsenic, and vanadium in previous sampling events may be related to turbidity issues or laboratory errors.

TABLE 4-1
WATER LEVELS - JUNE AND JULY 2014
CANNON AFB, NEW MEXICO

Well Identification	Site Association	Well Diameter (interior well casing diameter in inches)	Screen Length (feet)	Well Depth (feet bgs)	Top of Screened Interval (feet BTOC)	Bottom of Screened Interval (feet BTOC)	Historical TOC Elevation (feet amsl) (NAVD 88)[1]	Date Water Level Measured	July 2013 Depth to Water (feet BTOC)[7]	July 2013 Water Elevation (feet amsl)[7]	Date Water Level Measured	June 2014 Depth to Water (feet BTOC)	June 2014 Water Elevation (feet amsl)[2]	September 2014 TOC Elevation (feet amsl) (NAVD 88)	Date Water Level Measured	July 2014 Depth to Water (feet BTOC)	July 2014 Water Elevation (feet amsl)[3]
MW-A	LF005	4.0	15	365	326.84	341.84	4269.2	--	NM	NM	6/18/2014	318.42	3950.30	4268.72	7/17/2014	318.77	3949.95
MW-B	LF005	4.0	15	362.3	349.50	364.50	4268.1	7/22/2013	330.78	3936.20	6/17/2014	330.35	3936.45	4266.80	7/16/2014	330.49	3936.31
MW-C	LF005	4.0	15	362	348.50	363.50	4269.2	7/22/2013	334.15	3934.88	6/17/2014	333.42	3935.48	4268.90	7/15/2014	333.87	3935.03
MW-D	LF005	4.0	15	365.75	341.70	356.70	4267.6	7/22/2013	327.08	3939.98	6/17/2014	327.53	3939.37	4266.90	7/15/2014	327.71	3939.19
MW-E [4]	SI101	4.0	15	373	336.14	351.14	4285.9	7/22/2013	318.26	3966.71	6/18/2014	319.50	3965.46	4284.96	7/21/2014	319.65	3965.31
MW-F [4]	SI101	4.0	15	375	357.30	372.30	4282.3	7/22/2013	316.93	3964.07	6/18/2014	317.32	3963.52	4280.84	7/21/2014	317.80	3963.04
MW-G [4]	SI101	4.0	15	372	352.80	367.80	4283.1	7/22/2013	320.81	3960.80	6/18/2014	321.56	3959.99	4281.55	7/20/2014	321.16	3960.39
MW-H [4]	SI101	4.0	20	375	331.80	351.80	4282.6	7/22/2013	320.68	3960.55	6/18/2014	320.95	3960.23	4281.18	7/20/2014	321.44	3959.74
MW-Na	LF004	4.0	60	358	296.90	356.90	4271.0	7/22/2013	311.43	3959.15	6/18/2014	NM [5]	NA	4270.51	7/21/2014	312.35	3958.16
MW-Oa	LF003	4.0	60	365	306.87	366.87	4273.7	7/22/2013	325.51	3948.68	6/18/2014	324.66	3949.30	4273.96	7/17/2014	325.12	3948.84
MW-Pa	LF025	4.0	60	360	302.20	362.20	4274.8	7/22/2013	314.35	3960.50	6/18/2014	315.31	3959.42	4274.73	7/17/2014	315.60	3959.13
MW-Rb	LF025	4.0	30	350	303.71	331.71	4278.4	--	NM	NM	6/18/2014	NM [6]	NA	4277.73	7/20/2014	315.14	3962.59
MW-S	LF005	4.0	40	365	326.80	366.80	4266.7	--	NM	NM	6/17/2014	332.60	3933.15	4265.75	7/16/2014	332.98	3932.77
MW-T	LF005	4.0	40	365	326.40	366.40	4266.6	7/22/2013	335.15	3930.94	6/17/2014	334.70	3931.02	4265.72	7/16/2014	335.60	3930.12
MW-U	LF005	4.0	40	365	326.00	366.00	4267.9	7/22/2013	333.24	3934.12	6/17/2014	330.73	3936.57	4267.30	7/16/2014	330.95	3936.35
MW-V	Background	4.0	60	365	311.74	371.74	4329.8	7/22/2013	347.48	3983.53	6/17/2014	349.31	3980.59	4329.90	7/14/2014	349.79	3980.11
MW-W	Background	4.0	60	365	308.00	368.00	4302.1	7/22/2013	332.90	3969.44	6/17/2014	334.74	3967.48	4302.22	7/20/2014	335.50	3966.72
MW-X	Background	4.0	60	336	277.85	337.85	4269.2	7/22/2013	286.25	3983.31	6/17/2014	286.60	3982.63	4269.23	7/15/2014	287.04	3982.19

Notes:

[1] = Historical top of casing elevation from the 2012 Biennial Groundwater Monitoring and Annual Landfill Inspection Report (Bhate 2013).

[2] = June 2014 water elevation was calculated using top of casing elevations from the September 2014 TOC elevation data.

[3] = July 2014 water elevation was calculated using top of casing elevation collected in September 2014.

[4] = Top of casing elevation was altered during the July 2014 maintenance activities. Depth to water in July 2014 was measured after the alteration.

[5] = Dedicated pump could not be removed and water level indicator could not be lowered past a depth of 268 feet BTOC.

[6] = Did not have key to access at time of June 2014 maintenance activities.

[7] = Data was provided by the United States Geological Survey

AFB = Air Force Base

amsl = above mean sea level

bgs = below ground surface

BTOC = below top of casing

NA = not applicable

NAVD 88 = North American Vertical Datum 1988

NM = not measured

TOC = top of casing

TABLE 4-2
GROUNDWATER SAMPLE SUMMARY
CANNON AFB, NEW MEXICO

Well Identification	Sample Identification [1]	Site Association	Sample Date	Analysis									
				Water Level	VOCs (USEPA Method 8260C)	TAL Metals (USEPA Method 7470A/6020A)	Hexavalent Chromium (USEPA Method 7199)	Perchlorate (Method 314.0)	Chloride, Sulfate, Nitrate, Nitrite (USEPA Method 9056)	Ammonia (USEPA Method SM 4500 NH3)	Total Organic Carbon (USEPA Method 9060A)	Duplicate	MS/MSD
MW-A	MWA-7-14	LF005	7/17/2014	X	X	X	X	X	X	X	X		
MW-B	MWB-7-14	LF005	7/16/2014	X	X	X	X	X	X	X	X		
MW-C	MWC-7-14	LF005	7/15/2014	X	X	X	X	X	X	X	X		
MW-D	MWD-7-14	LF005	7/15/2014	X	X	X	X	X	X	X	X		
MW-E	MWE-7-14	SI101	7/21/2014	X	X	X	X	X	X	X	X		
MW-F	MWF-7-14	SI101	7/21/2014	X	X	X	X	X	X	X	X		X
MW-G	MWG-7-14	SI101	7/20/2014	X	X	X	X	X	X	X	X		
MW-H	MWH-7-14	SI101	7/20/2014	X	X	X	X	X	X	X	X		
MW-Na	MWNa-7-14	LF004	7/21/2014	X	X	X	X	X	X	X	X		
MW-Oa	MWOa-7-14	LF003	7/17/2014	X	X	X	X	X	X	X	X	X	
MW-Pa	MWPa-7-14	LF025	7/17/2014	X	X	X	X	X	X	X	X		
MW-Rb	MWRb-7-14	LF025	7/20/2014	X	X	X	X	X	X	X	X		
MW-S	MWS-7-14	LF005	7/16/2014	X	X	X	X	X	X	X	X		
MW-T	MWT-7-14	LF005	7/16/2014	X	X	X	X	X	X	X	X		
MW-U	MWU-7-14	LF005	7/16/2014	X	X	X	X	X	X	X	X		
MW-V	MWV-7-14	Background	7/14/2014	X	X	X	X	X	X	X	X		
MW-W	MWW-7-14	Background	7/20/2014	X	X	X	X	X	X	X	X		
MW-X	MWX-7-14	Background	7/15/2014	X	X	X	X	X	X	X	X		

Notes:

[1] Sample identification uses the following naming scheme : well identification-sample month-sample year

AFB = Air Force Base

MS/MSD = Matrix Spike/Matrix Spike Duplicate

TAL = Target Analyte List

USEPA = United States Environmental Protection Agency

VOC = volatile organic compound

TABLE 4-3
SUMMARY OF ANALYTICAL RESULTS – JULY 2014
CANNON AFB, NEW MEXICO

LOCATION IDENTIFICATION						MW-A			MW-B			MW-C			MW-D			MW-E			MW-F		
FIELD IDENTIFICATION						MWA-7-14			MWB-7-14			MWC-7-14			MWD-7-14			MWE-7-14			MWF-7-14		
DATE COLLECTED						July 17, 2014			July 16, 2014			July 15, 2014			July 15, 2014			July 21, 2014			July 21, 2014		
	Maximum	Frequency	USEPA MCL	NMGWQS[2]	New Mexico Tap Water[3]	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual
VOLATILE ORGANIC COMPOUNDS- USEPA Method 8260C (µg/L)																							
1,1-Dichloroethane	4.60E-01	2 / 18	NE	2.50E+01	NA	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Chloroform	4.00E-01	3 / 18	NE	1.00E+02	NA	<	5.00E+00	U	<	5.00E+00	U	4.00E-01	5.00E+00	J	3.90E-01	5.00E+00	J	<	5.00E+00	U	<	5.00E+00	U
Dichlorodifluoromethane	1.10E+00	2 / 18	NE	NE	2.03E+02	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
Trichloroethene	6.50E-01	1 / 18	5.00E+00	NE	NA	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
METALS - USEPA Method 7470A/6010B/6020A (µg/L)																							
Aluminum	3.00E+02	15 / 18	NE	NE	3.65E+04	1.30E+02	1.00E+02		5.30E+01	1.00E+02	J	7.80E+01	1.00E+02	J	7.10E+01	1.00E+02	J	5.50E+01	1.00E+02	J	1.60E+02	1.00E+02	
Antimony	6.20E-01	5 / 18	6.00E+00	NE	NA	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Arsenic	7.80E+00	17 / 18	1.00E+01	1.00E+02	NA	5.10E+00	1.00E+00		4.90E+00	1.00E+00		5.70E+00	1.00E+00		6.00E+00	1.00E+00		3.50E+00	1.00E+00		4.40E+00	1.00E+00	
Barium	9.20E+01	17 / 18	2.00E+03	1.00E+03	NA	5.50E+01	2.00E+00		5.40E+01	2.00E+00		8.00E+01	2.00E+00		9.20E+01	2.00E+00		3.50E+01	2.00E+00		4.70E+01	2.00E+00	
Beryllium	2.70E-01	5 / 18	4.00E+00	NE	NA	<	1.00E+00	U	<	1.00E+00	U	2.00E-01	1.00E+00	J	2.10E-01	1.00E+00	J	<	1.00E+00	U	1.80E-01	1.00E+00	J
Cadmium	2.50E-01	7 / 18	5.00E+00	1.00E+01	NA	1.80E-01	5.00E-01	J	<	5.00E-01	U	<	5.00E-01	U	<	5.00E-01	U	<	5.00E-01	U	<	5.00E-01	U
Calcium	9.30E+04	17 / 18	NE	NE	NE	3.90E+04	1.00E+03		3.80E+04	1.00E+03		3.60E+04	1.00E+03		2.80E+04	1.00E+03		4.40E+04	1.00E+03		4.90E+04	1.00E+03	J
Chromium	5.00E+00	15 / 18	1.00E+02	5.00E+01	NA	1.80E+00	2.00E+00	J	1.50E+00	2.00E+00	J	8.90E-01	2.00E+00	J	<	2.00E+00	U	<	2.00E+00	U	4.80E+00	2.00E+00	
Cobalt	4.90E-01	4 / 18	NE	5.00E+01	NE	4.10E-01	1.00E+00	J	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	4.90E-01	1.00E+00	J
Copper	5.30E+00	17 / 18	1.30E+03	1.00E+03	NA	1.20E+00	2.00E+00	J	1.80E+00	2.00E+00	J	1.20E+00	2.00E+00	J	8.20E-01	2.00E+00	J	1.20E+00	2.00E+00	J	1.90E+00	2.00E+00	J
Iron	5.20E+02	17 / 18	NE	1.00E+03	NA	1.40E+02	1.00E+02		3.50E+02	1.00E+02		1.60E+02	1.00E+02		1.00E+02	1.00E+02		7.20E+01	1.00E+02	J	3.70E+02	1.00E+02	
Lead	8.40E+00	12 / 18	1.50E+01	5.00E+01	NE	8.50E-01	1.00E+00	J	1.20E+00	1.00E+00		5.30E-01	1.00E+00	J	2.80E-01	1.00E+00	J	8.40E+00	1.00E+00		1.70E+00	1.00E+00	
Magnesium	8.10E+04	17 / 18	NE	NE	NE	3.70E+04	1.00E+03		3.60E+04	1.00E+03		3.50E+04	1.00E+03		2.80E+04	1.00E+03		4.00E+04	1.00E+03		4.50E+04	1.00E+03	J
Manganese	3.70E+01	17 / 18	NE	2.00E+02	NA	1.00E+01	2.00E+00		3.70E+01	2.00E+00		1.60E+01	2.00E+00		1.80E+01	2.00E+00		5.10E+00	2.00E+00		1.80E+01	2.00E+00	
Nickel	2.20E+01	17 / 18	NE	2.00E+02	NA	1.60E+00	1.00E+00		1.00E+00	1.00E+00		7.80E-01	1.00E+00	J	6.90E-01	1.00E+00	J	1.30E+00	1.00E+00		1.20E+00	1.00E+00	
Potassium	1.00E+04	17 / 18	NE	NE	NE	6.40E+03	1.00E+03		6.30E+03	1.00E+03		6.00E+03	1.00E+03		5.20E+03	1.00E+03		6.90E+03	1.00E+03		7.80E+03	1.00E+03	
Selenium	2.00E+01	17 / 18	5.00E+01	5.00E+01	NA	7.70E+00	1.00E+00		6.30E+00	1.00E+00		1.70E+00	1.00E+00		9.70E-01	1.00E+00	J	9.10E+00	1.00E+00		1.00E+01	1.00E+00	
Silver	3.60E+00	1 / 18	NE	5.00E+01	NA	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	3.60E+00	1.00E+00	
Sodium	1.30E+05	17 / 18	NE	NE	NE	5.00E+04	1.00E+03		5.00E+04	1.00E+03		5.30E+04	1.00E+03		4.40E+04	1.00E+03		5.10E+04	1.00E+03		5.70E+04	1.00E+03	
Vanadium	4.90E+01	17 / 18	NE	NE	1.83E+02	3.40E+01	2.00E+00		2.70E+01	2.00E+00		3.90E+01	2.00E+00		4.00E+01	2.00E+00		2.10E+01	2.00E+00		2.10E+01	2.00E+00	
Zinc	3.10E+02	17 / 18	NE	1.00E+04	NA	1.40E+01	1.00E+01		6.60E+00	1.00E+01	J	7.60E+00	1.00E+01	J	4.50E+00	1.00E+01	J	1.50E+01	1.00E+01		1.20E+01	1.00E+01	
Other Parameters (mg/L)																							
Chromium, Hexavalent - USEPA Method 7199 (µg/L)	1.20E+00	16 / 17	NE	NE	4.31E-01	9.20E-01	5.00E-01		8.10E-01	5.00E-01	J	2.00E-01	5.00E-01	J	3.20E-01	5.00E-01	J	8.90E-01	5.00E-01		9.00E-01	5.00E-01	
Perchlorate - EPA Method 314.0 (µg/L)	2.00E+00	13 / 17	NE	NE	2.56E+01	1.70E+00	5.00E-01		1.70E+00	5.00E-01		<	5.00E-01	U	<	5.00E-01	U	1.80E+00	5.00E-01		1.80E+00	5.00E-01	
Ammonia as Nitrogen - EPA Method 350.1	7.80E-02	10 / 18	NE	1.00E+01	NE	7.80E-02	2.50E-01	J	<	2.50E-01	U	<	2.50E-01	U	<	2.50E-01	U	5.40E-02	2.50E-01	J	5.70E-02	2.50E-01	J
Nitrate - USEPA Method 9056	1.50E+01	17 / 18	1.00E+01	1.00E+01	NA	1.90E+00	1.00E-01		1.30E+00	1.00E-01		2.00E+00	1.00E-01		1.30E+00	1.00E-01		1.40E+00	1.00E-01		1.20E+00	1.00E-01	
Chloride - USEPA Method 9056	2.00E+02	17 / 18	NE	2.50E+02	NE	5.00E+01	1.00E+00		4.30E+01	1.00E+00		1.30E+01	1.00E+00		4.50E+00	1.00E+00		4.80E+01	1.00E+00		6.70E+01	1.00E+00	
Sulfate - USEPA Method 9056	3.80E+02	17 / 18	NE	6.00E+02	NE	7.20E+01	5.00E+00		9.30E+01	5.00E+00		4.30E+01	5.00E+00		3.00E+01	5.00E+00		1.30E+02	2.50E+01		1.50E+02	2.50E+01	
Total Organic Carbon - USEPA Method 9060A	1.40E+00	16 / 18	NE	NE	NE	3.50E-01	1.00E+00	J	2.40E-01	1.00E+00	J	3.20E-01	1.00E+00	J	2.20E-01	1.00E+00	J	1.20E-01	1.00E+00	J	2.60E-01	1.00E+00	J

Notes:

[1] = USEPA Maximum Contaminant Levels (May 2009).

[2] = New Mexico Standards for Groundwater of 10,000 mg/L Total Dissolved Solids Concentration or Less (20 New Mexico Administrative Code 6.2).

[3] = New Mexico Environment Department Risk Assessment Guidance for Investigations and Remediation, Appendix A, Table A-1 June 2012

Shading indicates the value is greater than the MCL or NMGWQS. If no evaluation criteria is listed for MCL or NMGWQS, the value is screened against New Mexico Soil Screening Levels for tap water.

µg/L = microgram per liter
< = Not Detected
J = Estimated
LOQ = Limit of Quantitation
MCL = Maximum Contaminant Level
mg/L = milligram per liter
NA = Not Applicable
NE = Not Established
NMGWQS = New Mexico Groundwater Quality Standards
Qual = Qualifier
R = Rejected
U = Nondetect
USEPA = United States Environmental Protection Agency

TABLE 4-3
SUMMARY OF ANALYTICAL RESULTS – JULY 2014
CANNON AFB, NEW MEXICO

LOCATION IDENTIFICATION						MW-G			MW-H			MW-Na			MW-Oa			MW-Pa			MW-Rb		
FIELD IDENTIFICATION						MWG-7-14			MWH-7-14			MWNA-7-14			MWOA-7-14			MWPA-7-14			MWRB-7-14		
DATE COLLECTED						July 20, 2014			July 20, 2014			July 21, 2014			July 17, 2014			July 17, 2014			July 20, 2014		
	Maximum	Frequency	USEPA MCL	NMGWQS[2]	New Mexico Tap Water[3]	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual
VOLATILE ORGANIC COMPOUNDS- USEPA Method 8260C (µg/L)																							
1,1-Dichloroethane	4.60E-01	2 / 18	NE	2.50E+01	NA	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Chloroform	4.00E-01	3 / 18	NE	1.00E+02	NA	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
Dichlorodifluoromethane	1.10E+00	2 / 18	NE	NE	2.03E+02	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
Trichloroethene	6.50E-01	1 / 18	5.00E+00	NE	NA	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
METALS - USEPA Method 7470A/6010B/6020A (µg/L)																							
Aluminum	3.00E+02	15 / 18	NE	NE	3.65E+04	7.20E+01	1.00E+02	J	7.20E+01	1.00E+02	J	4.80E+01	1.00E+02	J	7.00E+01	1.00E+02	J	1.40E+02	1.00E+02		5.50E+01	1.00E+02	J
Antimony	6.20E-01	5 / 18	6.00E+00	NE	NA	3.50E-01	1.00E+00	J	6.20E-01	1.00E+00	J	3.50E-01	1.00E+00	J	<	1.00E+00	U	<	1.00E+00	U	4.30E-01	1.00E+00	J
Arsenic	7.80E+00	17 / 18	1.00E+01	1.00E+02	NA	3.80E+00	1.00E+00		3.40E+00	1.00E+00		5.00E+00	1.00E+00		2.60E+00	1.00E+00		3.60E+00	1.00E+00		1.40E+00	1.00E+00	
Barium	9.20E+01	17 / 18	2.00E+03	1.00E+03	NA	3.00E+01	2.00E+00		4.70E+01	2.00E+00		4.40E+01	2.00E+00		6.10E+01	2.00E+00		4.40E+01	2.00E+00		2.80E+01	2.00E+00	
Beryllium	2.70E-01	5 / 18	4.00E+00	NE	NA	<	1.00E+00	U	<	1.00E+00	U	1.80E-01	1.00E+00	J	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Cadmium	2.50E-01	7 / 18	5.00E+00	1.00E+01	NA	1.80E-01	5.00E-01	J	2.30E-01	5.00E-01	J	<	5.00E-01	U	1.80E-01	5.00E-01	J	1.80E-01	5.00E-01	J	1.90E-01	5.00E-01	J
Calcium	9.30E+04	17 / 18	NE	NE	NE	4.70E+04	1.00E+03		5.00E+04	1.00E+03		3.40E+04	1.00E+03		8.70E+04	1.00E+03		5.30E+04	1.00E+03		4.00E+04	1.00E+03	
Chromium	5.00E+00	15 / 18	1.00E+02	5.00E+01	NA	1.80E+00	2.00E+00	J	1.20E+00	2.00E+00	J	1.90E+00	2.00E+00	J	8.90E-01	2.00E+00	J	1.40E+00	2.00E+00	J	8.00E-01	2.00E+00	J
Cobalt	4.90E-01	4 / 18	NE	5.00E+01	NE	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	4.20E-01	1.00E+00	J	<	1.00E+00	U	<	1.00E+00	U
Copper	5.30E+00	17 / 18	1.30E+03	1.00E+03	NA	2.80E+00	2.00E+00		4.60E+00	2.00E+00		5.30E+00	2.00E+00		1.40E+00	2.00E+00	J	1.60E+00	2.00E+00	J	1.60E+00	2.00E+00	J
Iron	5.20E+02	17 / 18	NE	1.00E+03	NA	3.40E+02	1.00E+02		2.50E+02	1.00E+02		2.50E+01	1.00E+02	J	6.70E+01	1.00E+02	J	1.00E+02	1.00E+02		5.00E+01	1.00E+02	J
Lead	8.40E+00	12 / 18	1.50E+01	5.00E+01	NE	1.20E+00	1.00E+00		9.60E-01	1.00E+00	J	<	1.00E+00	U	<	1.00E+00	U	5.30E-01	1.00E+00	J	<	1.00E+00	U
Magnesium	8.10E+04	17 / 18	NE	NE	NE	4.30E+04	1.00E+03		3.50E+04	1.00E+03		3.10E+04	1.00E+03		7.90E+04	1.00E+03		4.80E+04	1.00E+03		3.80E+04	1.00E+03	
Manganese	3.70E+01	17 / 18	NE	2.00E+02	NA	5.80E+00	2.00E+00		1.80E+01	2.00E+00		3.30E+00	2.00E+00		3.60E+00	2.00E+00		5.90E+00	2.00E+00		2.00E+00	2.00E+00	
Nickel	2.20E+01	17 / 18	NE	2.00E+02	NA	2.80E+00	1.00E+00		2.20E+01	1.00E+00		4.70E-01	1.00E+00	J	3.00E+00	1.00E+00		1.40E+00	1.00E+00		2.40E+00	1.00E+00	
Potassium	1.00E+04	17 / 18	NE	NE	NE	7.60E+03	1.00E+03		6.60E+03	1.00E+03		7.40E+03	1.00E+03		9.90E+03	1.00E+03		7.50E+03	1.00E+03		7.00E+03	1.00E+03	
Selenium	2.00E+01	17 / 18	5.00E+01	5.00E+01	NA	1.00E+01	1.00E+00		9.40E+00	1.00E+00		8.10E+00	1.00E+00		9.00E+00	1.00E+00		1.10E+01	1.00E+00		1.00E+01	1.00E+00	
Silver	3.60E+00	1 / 18	NE	5.00E+01	NA	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Sodium	1.30E+05	17 / 18	NE	NE	NE	5.30E+04	1.00E+03		4.90E+04	1.00E+03		4.40E+04	1.00E+03		1.30E+05	1.00E+03		3.70E+04	1.00E+03		4.20E+04	1.00E+03	
Vanadium	4.90E+01	17 / 18	NE	NE	1.83E+02	1.80E+01	2.00E+00		1.60E+01	2.00E+00		2.40E+01	2.00E+00		1.60E+01	2.00E+00		1.90E+01	2.00E+00		2.00E+01	2.00E+00	
Zinc	3.10E+02	17 / 18	NE	1.00E+04	NA	6.10E+01	1.00E+01		3.10E+02	1.00E+01		3.70E+00	1.00E+01	J	6.00E+00	1.00E+01	J	1.30E+01	1.00E+01		7.10E+00	1.00E+01	J
Other Parameters (mg/L)																							
Chromium, Hexavalent - USEPA Method 7199 (µg/L)	1.20E+00	16 / 17	NE	NE	4.31E-01	1.10E+00	5.00E-01		2.10E-01	5.00E-01	J	1.10E+00	5.00E-01		6.80E-01	5.00E-01		1.10E+00	5.00E-01		5.90E-01	5.00E-01	
Perchlorate - EPA Method 314.0 (µg/L)	2.00E+00	13 / 17	NE	NE	2.56E+01	2.00E+00	5.00E-01		1.70E+00	5.00E-01		1.50E+00	5.00E-01		<	5.00E-01	U	1.50E+00	5.00E-01		1.80E+00	5.00E-01	
Ammonia as Nitrogen - EPA Method 350.1	7.80E-02	10 / 18	NE	1.00E+01	NE	7.40E-02	2.50E-01	J	7.00E-02	2.50E-01	J	4.90E-02	2.50E-01	J	7.00E-02	2.50E-01	J	6.40E-02	2.50E-01	J	5.70E-02	2.50E-01	J
Nitrate - USEPA Method 9056	1.50E+01	17 / 18	1.00E+01	1.00E+01	NA	1.40E+00	1.00E-01		2.30E+00	1.00E-01		1.40E+00	1.00E-01		1.50E+01	5.00E-01		1.60E+00	1.00E-01		1.10E+00	1.00E-01	
Chloride - USEPA Method 9056	2.00E+02	17 / 18	NE	2.50E+02	NE	6.60E+01	1.00E+00		5.00E+01	1.00E+00		3.90E+01	1.00E+00		1.90E+02	5.00E+00		6.80E+01	1.00E+00		5.80E+01	1.00E+00	
Sulfate - USEPA Method 9056	3.80E+02	17 / 18	NE	6.00E+02	NE	1.30E+02	1.00E+01		1.20E+02	1.00E+01		7.80E+01	5.00E+00		1.60E+02	2.50E+01		1.20E+02	1.00E+01		1.20E+02	2.50E+01	
Total Organic Carbon - USEPA Method 9060A	1.40E+00	16 / 18	NE	NE	NE	2.30E-01	1.00E+00	J	3.60E-01	1.00E+00	J	1.20E+00	1.00E+00		9.00E-01	1.00E+00	J	2.30E-01	1.00E+00	J	<	1.00E+00	U

Notes:

[1] = USEPA Maximum Contaminant Levels (May 2009).

[2] = New Mexico Standards for Groundwater of 10,000 mg/L Total Dissolved Solids Concentration or Less (20 New Mexico Administrative Code 6.2).

[3] = New Mexico Environment Department Risk Assessment Guidance for Investigations and Remediation, Appendix A, Table A-1 June 2012

Shading indicates the value is greater than the MCL or NMGWQS. If no evaluation criteria is listed for MCL or NMGWQS, the value is screened against New Mexico Soil Scr

µg/L = microgram per liter
< = Not Detected
J = Estimated
LOQ = Limit of Quantitation
MCL = Maximum Contaminant Level
mg/L = milligram per liter
NA = Not Applicable
NE = Not Established
NMGWQS = New Mexico Groundwater Quality Standards
Qual = Qualifier
R = Rejected
U = Nondetect
USEPA = United States Environmental Protection Agency

TABLE 4-3
SUMMARY OF ANALYTICAL RESULTS – JULY 2014
CANNON AFB, NEW MEXICO

LOCATION IDENTIFICATION						MW-S			MW-T			MW-U			MW-V			MW-W			MW-X		
FIELD IDENTIFICATION						MWS-7-14			MWT-7-14			MWU-7-14			MWV-7-14			MWW-7-14			MWX-7-14		
DATE COLLECTED						July 16, 2014			July 16, 2014			July 16, 2014			July 14, 2014			July 20, 2014			July 15, 2014		
	Maximum	Frequency	USEPA MCL	NMGWQS[2]	New Mexico Tap Water[3]	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	6.00E+00	LOQ	Qual
VOLATILE ORGANIC COMPOUNDS- USEPA Method 8260C (µg/L)																							
1,1-Dichloroethane	4.60E-01	2 / 18	NE	2.50E+01	NA	<	1.00E+00	U	4.60E-01	1.00E+00	J	3.60E-01	1.00E+00	J	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Chloroform	4.00E-01	3 / 18	NE	1.00E+02	NA	<	5.00E+00	U	3.50E-01	5.00E+00	J	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	3.80E-01	5.00E+00	J
Dichlorodifluoromethane	1.10E+00	2 / 18	NE	NE	2.03E+02	<	5.00E+00	U	6.70E-01	5.00E+00	J	1.10E+00	5.00E+00	J	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
Trichloroethene	6.50E-01	1 / 18	5.00E+00	NE	NA	<	1.00E+00	U	<	1.00E+00	U	6.50E-01	1.00E+00	J	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
METALS - USEPA Method 7470A/6010B/6020A (µg/L)																							
Aluminum	3.00E+02	15 / 18	NE	NE	3.65E+04	<	1.00E+02	U	4.80E+01	1.00E+02	J	<	1.00E+02	U	1.40E+02	1.00E+02		1.40E+02	1.00E+02		3.00E+02	1.00E+02	
Antimony	6.20E-01	5 / 18	6.00E+00	NE	NA	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	4.20E-01	1.00E+00	J	<	1.00E+00	U
Arsenic	7.80E+00	17 / 18	1.00E+01	1.00E+02	NA	4.40E+00	1.00E+00		3.80E+00	1.00E+00		4.30E+00	1.00E+00		4.60E+00	1.00E+00		2.20E+00	1.00E+00		7.80E+00	1.00E+00	
Barium	9.20E+01	17 / 18	2.00E+03	1.00E+03	NA	3.40E+01	2.00E+00		3.80E+01	2.00E+00		6.10E+01	2.00E+00		2.80E+01	2.00E+00		1.40E+01	2.00E+00		8.50E+01	2.00E+00	
Beryllium	2.70E-01	5 / 18	4.00E+00	NE	NA	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	2.70E-01	1.00E+00	J	<	1.00E+00	U	2.60E-01	1.00E+00	J
Cadmium	2.50E-01	7 / 18	5.00E+00	1.00E+01	NA	<	5.00E-01	U	<	5.00E-01	U	<	5.00E-01	U	<	5.00E-01	U	2.50E-01	5.00E-01	J	<	5.00E-01	U
Calcium	9.30E+04	17 / 18	NE	NE	NE	4.90E+04	1.00E+03		4.90E+04	1.00E+03		8.10E+04	1.00E+03		9.30E+04	1.00E+03		5.90E+04	1.00E+03		3.00E+04	1.00E+03	
Chromium	5.00E+00	15 / 18	1.00E+02	5.00E+01	NA	1.70E+00	2.00E+00	J	3.00E+00	2.00E+00		5.00E+00	2.00E+00		5.70E-01	2.00E+00	J	5.50E-01	2.00E+00	J	1.70E+00	2.00E+00	J
Cobalt	4.90E-01	4 / 18	NE	5.00E+01	NE	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	3.20E-01	1.00E+00	J	<	1.00E+00	U	2.90E-01	1.00E+00	J
Copper	5.30E+00	17 / 18	1.30E+03	1.00E+03	NA	2.10E+00	2.00E+00		2.30E+00	2.00E+00		2.00E+00	2.00E+00	J	2.00E+00	2.00E+00	J	2.90E+00	2.00E+00		5.70E+00	2.00E+00	
Iron	5.20E+02	17 / 18	NE	1.00E+03	NA	2.80E+01	1.00E+02	J	5.20E+02	1.00E+02		2.30E+01	1.00E+02	J	6.90E+01	1.00E+02	J	1.20E+02	1.00E+02		2.20E+02	1.00E+02	
Lead	8.40E+00	12 / 18	1.50E+01	5.00E+01	NE	3.40E-01	1.00E+00	J	<	1.00E+00	U	<	1.00E+00	U	4.20E-01	1.00E+00	J	3.20E-01	1.00E+00	J	8.10E-01	1.00E+00	J
Magnesium	8.10E+04	17 / 18	NE	NE	NE	4.60E+04	1.00E+03		3.80E+04	1.00E+03		5.60E+04	1.00E+03		8.10E+04	1.00E+03		4.60E+04	1.00E+03		2.70E+04	1.00E+03	
Manganese	3.70E+01	17 / 18	NE	2.00E+02	NA	3.10E+00	2.00E+00		1.50E+01	2.00E+00		6.40E+00	2.00E+00		3.60E+01	2.00E+00		2.00E+00	2.00E+00	J	1.30E+01	2.00E+00	
Nickel	2.20E+01	17 / 18	NE	2.00E+02	NA	1.30E+00	1.00E+00		7.30E+00	1.00E+00		4.50E+00	1.00E+00		1.40E+00	1.00E+00		2.40E+00	1.00E+00		6.80E-01	1.00E+00	J
Potassium	1.00E+04	17 / 18	NE	NE	NE	6.60E+03	1.00E+03		6.60E+03	1.00E+03		7.30E+03	1.00E+03		8.40E+03	1.00E+03		1.00E+04	1.00E+03		5.80E+03	1.00E+03	
Selenium	2.00E+01	17 / 18	5.00E+01	5.00E+01	NA	7.00E+00	1.00E+00		1.80E+00	1.00E+00		7.40E+00	1.00E+00		2.00E+01	1.00E+00		6.70E+00	1.00E+00		4.80E+00	1.00E+00	
Silver	3.60E+00	1 / 18	NE	5.00E+01	NA	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Sodium	1.30E+05	17 / 18	NE	NE	NE	4.60E+04	1.00E+03		5.10E+04	1.00E+03		5.60E+04	1.00E+03		6.70E+04	1.00E+03		1.30E+05	1.00E+03		4.70E+04	1.00E+03	
Vanadium	4.90E+01	17 / 18	NE	NE	1.83E+02	2.80E+01	2.00E+00		2.30E+01	2.00E+00		2.30E+01	2.00E+00		2.10E+01	2.00E+00		6.40E+00	2.00E+00		4.90E+01	2.00E+00	
Zinc	3.10E+02	17 / 18	NE	1.00E+04	NA	7.80E+01	1.00E+01		9.80E+01	1.00E+01		9.20E+01	1.00E+01		4.70E+01	1.00E+01		2.00E+01	1.00E+01		5.90E+01	1.00E+01	
Other Parameters (mg/L)																							
Chromium, Hexavalent - USEPA Method 7199 (µg/L)	1.20E+00	16 / 17	NE	NE	4.31E-01	9.90E-01	5.00E-01	J	1.20E+00	5.00E-01	J	1.00E+00	5.00E-01	J			R	7.50E-01	5.00E-01		6.60E-01	5.00E-01	
Perchlorate - EPA Method 314.0 (µg/L)	2.00E+00	13 / 17	NE	NE	2.56E+01	1.30E+00	5.00E-01		1.30E+00	5.00E-01		1.30E+00	5.00E-01		<	5.00E-01	U	<	5.00E-01	U	<	5.00E-01	U
Ammonia as Nitrogen - EPA Method 350.1	7.80E-02	10 / 18	NE	1.00E+01	NE	<	2.50E-01	U	<	2.50E-01	U	<	2.50E-01	U	<	2.50E-01	U	7.50E-02	2.50E-01	J	<	2.50E-01	U
Nitrate - USEPA Method 9056	1.50E+01	17 / 18	1.00E+01	1.00E+01	NA	1.60E+00	1.00E-01		1.10E+00	1.00E-01		1.30E+00	1.00E-01		7.20E+00	1.00E-01		5.70E-01	1.00E-01		1.70E+00	1.00E-01	
Chloride - USEPA Method 9056	2.00E+02	17 / 18	NE	2.50E+02	NE	5.90E+01	1.00E+00		4.90E+01	1.00E+00		6.90E+01	1.00E+00		2.00E+02	5.00E+00		1.20E+02	5.00E+00		3.00E+01	1.00E+00	
Sulfate - USEPA Method 9056	3.80E+02	17 / 18	NE	6.00E+02	NE	1.00E+02	1.00E+01		1.00E+02	1.00E+01		1.10E+02	1.00E+01		2.30E+02	2.50E+01		3.80E+02	2.50E+01		4.70E+01	5.00E+00	
Total Organic Carbon - USEPA Method 9060A	1.40E+00	16 / 18	NE	NE	NE	7.40E-01	1.00E+00	J	4.40E-01	1.00E+00	J	3.70E-01	1.00E+00	J	1.40E+00	1.00E+00		2.00E-01	1.00E+00	J	2.20E-01	1.00E+00	J

Notes:

[1] = USEPA Maximum Contaminant Levels (May 2009).

[2] = New Mexico Standards for Groundwater of 10,000 mg/L Total Dissolved Solids Concentration or Less (20 New Mexico Administrative Code 6.2).

[3] = New Mexico Environment Department Risk Assessment Guidance for Investigations and Remediation, Appendix A, Table A-1 June 2012

Shading indicates the value is greater than the MCL or NMGWQS. If no evaluation criteria is listed for MCL or NMGWQS, the value is screened against New Mexico Soil Scr

µg/L = microgram per liter
< = Not Detected
J = Estimated
LOQ = Limit of Quantitation
MCL = Maximum Contaminant Level
mg/L = milligram per liter
NA = Not Applicable
NE = Not Established
NMGWQS = New Mexico Groundwater Quality Standards
Qual = Qualifier
R = Rejected
U = Nondetect
USEPA = United States Environmental Protection Agency

TABLE 4-4
SUMMARY OF ANALYTICAL RESULTS – OCTOBER 2008
CANNON AFB, NEW MEXICO

LOCATION IDENTIFICATION				MW-Oa			MW-Na			MW-Pa			MW-Ra		
DATE COLLECTED				October-08			October-08			October-08			October-08		
	USEPA MCL[1]	NMGWQS[2]	New Mexico Tap Water[3]	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual
VOLATILE ORGANIC COMPOUNDS-USEPA Method 8260B (µg/L)															
Tetrachloroethene	5.00E+00	NE	NA	<	1.00E+00	U	<	1.00E+00	U	2.80E-01	1.00E+00	J	<	1.00E+00	U
All other analytes	Various	Various	Various	<	NA	U	<	NA	U	<	NA	U	<	NA	U
TOTAL METALS- USEPA Method 6020 (µg/L)															
Antimony	6.00E+00	NE	NA	<	6.00E+00	U	<	6.00E+00	U	<	6.00E+00	U	<	6.00E+00	U
Arsenic	1.00E+01	1.00E+02	NA	2.20E+00	5.00E+00	J	4.10E+00	5.00E+00	J	2.60E+00	5.00E+00	J	3.80E+00	5.00E+00	J
Barium	2.00E+03	1.00E+03	NA	5.30E+01	3.00E+00		4.40E+01	3.00E+00		3.70E+01	3.00E+00		6.90E+01	3.00E+00	
Beryllium	4.00E+00	NE	NA	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Cadmium	5.00E+00	1.00E+01	NA	<	1.00E+00	U	<	1.00E+00	U	1.20E-01	1.00E+00	J	6.50E-01	1.00E+00	J
Copper	1.30E+03	1.00E+03	NA	8.00E-01	2.00E+00	J	<	2.00E+00	U	2.40E+00	2.00E+00		<	2.00E+00	U
Lead	1.50E+01	5.00E+01	NE	<	3.00E+00	U	<	3.00E+00	U	3.10E-01	3.00E+00	J	6.80E-01	3.00E+00	J
Nickel	NE	2.00E+02	NA	4.70E+00	3.00E+00		7.90E-01	3.00E+00	J	2.50E+00	3.00E+00	J	2.30E+00	3.00E+00	J
Mercury- USEPS Method 7470A	2.00E+00	2.00E+00	NA	<	2.00E-01	U	<	2.00E-01	U	<	2.00E-01	U	<	2.00E-01	U
Selenium	5.00E+01	5.00E+01	NA	3.60E+00	5.00E+00	J	6.90E+00	5.00E+00		4.30E+00	5.00E+00	J	1.00E+01	5.00E+00	
Silver	NE	5.00E+01	NA	<	5.00E+00	U	<	5.00E+00	U	2.10E-01	5.00E+00	J	<	5.00E+00	U
Thallium	2.00E+00	NE	Na	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Zinc	NE	1.00E+04	NA	5.40E+00	2.00E+01	J	5.60E+00	2.00E+01	J	1.10E+01	2.00E+01	J	4.90E+02	2.00E+01	
Trivalent Chromium	NE	NE	NE	<	2.00E+01	U	<	2.00E+01	U	<	2.00E+01	U	<	2.00E+01	U
Other Parameters (mg/L)															
Chromium, Hexavalent- USEPA Method 7196A (µg/L)	NE	NE	4.31E-01	<	2.00E+01	U	<	2.00E+01	U	<	2.00E+01	U	<	2.00E+01	U
Nitrogen (Nitrate)- USEPA Method 300.0	NE	1.00E+01	NA	7.60E+00	5.00E-01		1.30E+00	5.00E-01		1.90E+00	5.00E-01		1.70E+00	5.00E-01	
Nitrate/Nitrite (Nitrogen)- USEPA Method 353.2	1.00E+01	NE	NA	6.60E+00	1.00E-01		1.20E+00	1.00E-01		1.70E+00	1.00E-01		1.60E+00	1.00E-01	
Perchlorate- USEPA Method 6860 (µg/L)	NE	NE	2.56E+01	6.90E-01	5.00E-02		2.10E+00	5.00E-02		1.70E+00	5.00E-02		2.70E+00	5.00E-02	

Notes:
Groundwater analytical result from 2008 Biennial Groundwater Monitoring and Annual Landfill Inspection Report (Tetra Tech 2008).
[1] = USEPA Maximum Contaminant Levels (May 2009).
[2] = New Mexico Standards for Groundwater of 10,000 mg/L Total Dissolved Solids Concentration or Less (20 New Mexico Administrative Code 6.2).
[3] = New Mexico Environment Department Risk Assessment Guidance for Investigations and Remediation, Appendix A, Table A-1 June 2012

Shading indicates the value is greater than the MCL or NMGWQS. If no evaluation criteria is listed for MCL or NMGWQS, the value is screened against New Mexico Soil Screening Levels for tap water.

µg/L = microgram per liter
< = Not Detected
J = Estimated
MCL = Maximum Contaminant Level
mg/L = milligram per liter
NA = Not Applicable
NE = Not established
NMGWQS = New Mexico Groundwater Quality Standards
Qual = Qualifier
U = Nondetect
USEPA = United States Environmental Protection Agency

TABLE 4-5
SUMMARY OF ANALYTICAL RESULTS – NOVEMBER 2010
CANNON AFB, NEW MEXICO

LOCATION IDENTIFICATION				MW-Oa			MW-Na			MW-Pa			MW-E			MW-F		
DATE COLLECTED				November-10			November-10			November-10			November-10			November-10		
	USEPA MCL[1]	NMGWQS[2]	New Mexico Tap Water[3]	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual
VOLATILE ORGANIC COMPOUNDS-USEPA Method 8260B (µg/L)																		
1,2,4-trimethylbenzene	NE	NE	NE	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Naphthalene	NE	NE	1.43E+00	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Toluene	1.00E+03	7.50E+02	NA	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	2.80E-01	1.00E+00	J	<	1.00E+00	U
All other analytes	Various	Various	Various	<	NA	U	<	NA	U	<	NA	U	<	NA	U	<	NA	U
TOTAL METALS- USEPA Method 6020 (µg/L)																		
Antimony	6.00E+00	NE	NA	<	6.00E+00	U	1.40E-01	6.00E+00	J	<	6.00E+00	U	7.10E-02	6.00E+00	J	<	6.00E+00	U
Arsenic	1.00E+01	1.00E+02	NA	2.20E+00	5.00E+00	J	4.20E+00	5.00E+00	J	2.60E+00	5.00E+00	J	3.10E+00	5.00E+00	J	3.30E+00	5.00E+00	J
Barium	2.00E+03	1.00E+03	NA	5.50E+01	3.00E+00		4.70E+01	3.00E+00		3.50E+01	3.00E+00		4.60E+01	3.00E+00		3.80E+01	3.00E+00	
Beryllium	4.00E+00	NE	NA	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Cadmium	5.00E+00	1.00E+01	NA	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	5.70E-02	1.00E+00	J	<	1.00E+00	U
Copper	1.30E+03	1.00E+03	NA	<	2.00E+00	U	3.50E+00	2.00E+00		<	2.00E+00	U	1.51E+00	1.00E+00	J	<	1.00E+00	U
Lead	1.50E+01	5.00E+01	NE	<	3.00E+00	U	4.90E-01	3.00E+00	J	<	3.00E+00	U	2.00E+01	3.00E+00	J	4.40E-01	3.00E+00	J
Nickel	NE	2.00E+02	NA	3.20E+00	3.00E+00		6.80E-01	3.00E+00	J	5.40E-01	3.00E+00	J	2.40E+00	3.00E+00	J	1.10E+00	3.00E+00	J
Mercury-USEPS Method 7470A	2.00E+00	2.00E+00	NA	<	2.00E-01	U	<	2.00E-01	U	<	2.00E-01	U	<	2.00E-01	U	<	2.00E-01	U
Selenium	5.00E+01	5.00E+01	NA	3.30E+00	5.00E+00	J	5.50E+00	5.00E+00		4.50E+00	5.00E+00	J	7.60E+00	5.00E+00		7.50E+00	5.00E+00	
Silver	NE	5.00E+01	NA	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Thallium	2.00E+00	NE	NA	<	1.00E+00	U	3.70E-02	1.00E+00	J	<	1.00E+00	U	2.30E-02	1.00E+00	J	<	1.00E+00	U
Zinc	NE	1.00E+04	NA	<	2.00E+01	U	<	2.00E+01	U	<	2.00E+01	U	1.20E+02	2.00E+01		8.10E+01	2.00E+01	
Trivalent Chromium	NE	NE	NE	<	2.00E+01	U	<	2.00E+01	U	<	2.00E+01	U	<	2.00E+01	U	<	2.00E+01	U
Other Parameters (mg/L)																		
Chromium, Hexavalent- USEPA Method 7196A (µg/L)	NE	NE	4.31E-01	<	2.00E+01	U	<	2.00E+01	J	<	2.00E+01	U	<	2.00E+01	U	4.10E+00	2.00E+01	J
Nitrogen (Nitrate)- USEPA Method 300.0	NE	1.00E+01	NE	1.10E+01	5.00E-01	J	1.30E+00	5.00E-01		1.80E+00	5.00E-01		1.70E+00	5.00E-01		1.30E+00	5.00E-01	
Nitrate/Nitrite (Nitrogen)- USEPA Method 353.2	1.00E+01	NE	NA	1.10E+01	1.00E-01		1.40E+00	1.00E-01		2.00E+00	1.00E-01		1.80E+00	1.00E-01		1.40E+00	1.00E-01	
Perchlorate- USEPA Method 6860 (µg/L)	NE	NE	2.56E+01	9.10E-01	5.00E-02		2.00E+00	5.00E-02		1.70E+00	5.00E-02		3.10E+00	5.00E-02		2.80E+00	5.00E-02	

Notes:

Groundwater analytical result from 2010 Biennial Groundwater Monitoring and Annual Landfill Inspection Report (Trinity 2010).

[1] = USEPA Maximum Contaminant Levels (May 2009).

[2] = New Mexico Standards for Groundwater of 10,000 mg/L Total Dissolved Solids Concentration or Less (20 New Mexico Administrative Code 6.2).

[3] = New Mexico Environment Department Risk Assessment Guidance for Investigations and Remediation, Appendix A, Table A-1 June 2012

Shading indicates the value is greater than the MCL or NMGWQS. If no evaluation criteria is listed for MCL or NMGWQS, the value is screened against New Mexico Soil Screening Levels for tap water.

µg/L = microgram per liter
< = Not Detected
J = Estimated
MCL = Maximum Contaminant Level
mg/L = milligram per liter
NA = Not Applicable
NE = Not established
NMGWQS = New Mexico Groundwater Quality Standards
Qual = Qualifier
U = Nondetect
USEPA = United States Environmental Protection Agency

TABLE 4-5
SUMMARY OF ANALYTICAL RESULTS – NOVEMBER 2010
CANNON AFB, NEW MEXICO

LOCATION IDENTIFICATION				MW-G			MW-H		
DATE COLLECTED				November-10			November-10		
	USEPA MCL[1]	NMGWQS[2]	New Mexico Tap Water[3]	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual
VOLATILE ORGANIC COMPOUNDS-USEPA Method 8260B (µg/L)									
1,2,4-trimethylbenzene	NE	NE	NE	1.70E-01	1.00E+00	J	<	1.00E+00	U
Naphthalene	NE	NE	1.43E+00	6.30E-01	1.00E+00	J	<	1.00E+00	U
Toluene	1.00E+03	7.50E+02	NA	3.30E-01	1.00E+00	J	1.80E+00	1.00E+00	
All other analytes	Various	Various	Various	<	NA	U	<	NA	U
TOTAL METALS- USEPA Method 6020 (µg/L)									
Antimony	6.00E+00	NE	NA	1.30E-01	6.00E+00	J	2.10E-01	6.00E+00	J
Arsenic	1.00E+01	1.00E+02	NA	3.80E+00	5.00E+00	J	4.20E+00	5.00E+00	J
Barium	2.00E+03	1.00E+03	NA	3.90E+01	3.00E+00		4.40E+01	3.00E+00	
Beryllium	4.00E+00	NE	NA	<	1.00E+00	U	<	1.00E+00	U
Cadmium	5.00E+00	1.00E+01	NA	4.90E-02	1.00E+00	J	1.40E-01	1.00E+00	J
Copper	1.30E+03	1.00E+03	NA	1.00E+01	1.00E+00		1.10E+01	1.00E+00	
Lead	1.50E+01	5.00E+01	NE	5.10E+00	3.00E+00		6.20E+00	3.00E+00	
Nickel	NE	2.00E+02	NA	9.00E+00	3.00E+00		2.50E+01	3.00E+00	
Mercury-USEPS Method 7470A	2.00E+00	2.00E+00	NA	<	2.00E-01	U	<	2.00E-01	U
Selenium	5.00E+01	5.00E+01	NA	6.60E+00	5.00E+00		6.80E+00	5.00E+00	
Silver	NE	5.00E+01	NA	2.00E-01	5.00E+00	J	1.10E-01	5.00E+00	J
Thallium	2.00E+00	NE	NA	<	1.00E+00	U	<	1.00E+00	U
Zinc	NE	1.00E+04	NA	9.90E+01	2.00E+01		3.80E+02	2.00E+01	
Trivalent Chromium	NE	NE	NE	<	2.00E+01	U	<	2.00E+01	U
Other Parameters (mg/L)									
Chromium, Hexavalent- USEPA Method 7196A (µg/L)	NE	NE	4.31E-01	7.50E+00	2.00E+01	J	1.90E+01	2.00E+01	J
Nitrogen (Nitrate)- USEPA Method 300.0	NE	1.00E+01	NE	1.30E+00	5.00E-01		1.70E+00	5.00E-01	
Nitrate/Nitrite (Nitrogen)- USEPA Method 353.2	1.00E+01	NE	NA	1.40E+00	1.00E-01		1.90E+00	1.00E-01	
Perchlorate- USEPA Method 6860 (µg/L)	NE	NE	2.56E+01	2.40E+00	5.00E-02		2.60E+00	5.00E-02	

Notes:

Groundwater analytical result from 2010 Biennial Groundwater Monitoring and Annual Landfill Inspection Report (Trinity 2010).

[1] = USEPA Maximum Contaminant Levels (May 2009).

[2] = New Mexico Standards for Groundwater of 10,000 mg/L Total Dissolved Solids Concentration or Less (20 New Mexico Administrative Code 6.2).

[3] = New Mexico Environment Department Risk Assessment Guidance for Investigations and Remediation, Appendix A, Table A-1 June 2012

Shading indicates the value is greater than the MCL or NMGWQS. If no evaluation criteria is listed for MCL or NMGWQS, the value is screened

µg/L = microgram per liter
< = Not Detected
J = Estimated
MCL = Maximum Contaminant Level
mg/L = milligram per liter
NA = Not Applicable
NE = Not established
NMGWQS = New Mexico Groundwater Quality Standards
Qual = Qualifier
U = Nondetect
USEPA = United States Environmental Protection Agency

TABLE 4-6
SUMMARY OF ANALYTICAL RESULTS – OCTOBER 2012
CANNON AFB, NEW MEXICO

LOCATION IDENTIFICATION				MW-A Total			MW-A Dissolved			MW-C Total			MW-C Dissolved			MW-E Total			MW-E Dissolved		
SAMPLE IDENTIFICATION																					
DATE COLLECTED				October 19, 2012			October 19, 2012			October 29, 2012			October 29, 2012			October 1, 2012			October 1, 2012		
	USEPA MCL[1]	NMGWQS[2]	New Mexico Tap Water[3]	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual
VOLATILE ORGANIC COMPOUNDS- USEPA Method 8260B (µg/L)																					
Dichlorodifluoromethane	NE	NE	2.03E+02	<	1.45E-01	U	NA			<	0.145	U	NA			<	0.145	U	NA		
Trichlorofluoromethane	NE	NE	1.29E+03	<	1.57E-01	U	NA			<	1.57E-01	U	NA			<	1.57E-01	U	NA		
METALS- USEPA 6010C/7470A Method (µg/L)																					
Aluminum	NE	NE	3.65E+04	<	3.03E+01	U	<	3.03E+01	U	<	6.83E+01	UB	<	5.84E+01	UB	<	4.33E+01	UB	<	3.03E+01	U
Antimony	6.00E+00	NE	NA	<	3.11E+00	U	<	3.11E+00	U	<	3.11E+00	U	<	3.11E+00	U	<	3.11E+00	U	<	3.11E+00	U
Arsenic	1.00E+01	1.00E+02	NA	<	3.59E+00	U	4.55E+00		J	<	3.59E+00	U	<	3.59E+00	U	4.75E+00		J	5.55E+00		J
Barium	2.00E+03	1.00E+03	NA	5.56E+01			5.27E+01			8.01E+01			8.40E+01			3.39E+01	3.39E+01	UB	<	3.52E+01	UB
Cadmium	5.00E+00	1.00E+01	NA	<	1.07E+00	UB	7.80E-01		J	8.10E-01		J	7.80E-01		J	6.10E-01	6.10E-01	UB	<	6.40E-01	UB
Calcium	NE	NE	NE	3.48E+04			3.46E+04			3.58E+04			3.76E+04			4.83E+04			5.11E+04		
Chromium	1.00E+02	5.00E+01	NA	3.09E+00		J	1.09E+00		J	1.32E+00		J	1.00E+00		J	2.32E+00		J	<	1.71E+00	UB
Cobalt	NE	5.00E+01	NE	1.85E+00		J	1.07E+00		J	<	5.80E-01	U	<	5.80E-01	U	<	5.80E-01	U	<	5.80E-01	U
Copper	1.30E+03	1.00E+03	NA	8.47E+00		J	6.37E+00		J	8.17E+00		J	7.90E+00		J	7.53E+00		J	7.93E+00		J
Iron	NE	1.00E+03	NA	1.67E+02			<	1.26E+01	U	1.48E+02			<	1.26E+01	U	7.75E+01		J	<	1.26E+01	U
Lead	1.50E+01	5.00E+01	NE	<	1.96E+00	U	<	1.96E+00	U	<	1.96E+00	U	<	1.96E+00	U	3.76E+00		J	<	1.96E+00	U
Magnesium	NE	NE	NE	3.19E+04			3.07E+04			3.46E+04			3.76E+04			4.44E+04			4.67E+04		
Manganese	NE	2.00E+02	NA	3.16E+01			7.10E+00		J	2.49E+01			<	1.31E+00	U	<	6.39E+00	UB	<	3.26E+00	UB
Mercury	2.00E+00	2.00E+00	NA	<	6.80E-02	U	<	6.80E-02	U	6.91E-02		J	9.49E-02		J	<	6.80E-02	U	<	6.80E-02	U
Nickel	NE	2.00E+02	NA	<	2.80E+00	UB	<	2.40E+00	UB	<	1.13E+00	U	<	1.13E+00	U	<	1.13E+00	U	<	1.13E+00	U
Potassium	NE	NE	NE	6.90E+03			6.70E+03			6.57E+03			6.91E+03			7.41E+03			7.82E+03		
Selenium	5.00E+01	5.00E+01	NA	4.69E+00		J	5.70E+00		J	<	4.42E+00	U	4.72E+00		J	1.28E+01		J	1.16E+01		J
Sodium	NE	NE	NE	5.14E+04			5.14E+04			5.14E+04			5.60E+04			<	5.79E+04	UB	<	6.06E+04	UB
Thallium	2.00E+00	NE	NA	<	3.04E+00	U	5.77E+00		J	<	3.04E+00	U	3.51E+00		J	<	3.04E+00	U	<	3.04E+00	U
Vanadium	NE	NE	1.83E+02	4.13E+01			4.14E+01			4.84E+01			5.22E+01			2.81E+01			2.84E+01		
Zinc	NE	1.00E+04	NA	1.04E+03			9.39E+02			1.11E+02			1.29E+02			2.76E+02			2.85E+02		
Other Parameters (mg/L)																					
Ammonia as N- USEPA Method SM 4500 NH3	NE	NE	NE	8.60E-01		J	NA			<	2.40E-01	U	NA			<	2.40E-01	U	NA		
Chloride- USEPA Method 300.0	NE	2.50E+02	NE	3.79E+01			NA			1.97E+01			NA			6.16E+01			NA		
Chromium, Hexavalent- USEPA Method 7196A (µg/L)	NE	NE	4.31E-01	<	4.00E+00	UJ	NA			<	4.00E+00	U	NA			<	4.00E+00	UJ	NA		
Nitrogen (Nitrate)- USEPA Method 300.0	NE	1.00E+01	NE	1.00E-02			NA			<	1.50E-02	U	NA			<	2.00E-03	U	NA		
Nitrate/Nitrite (Nitrogen)- USEPA Method 300.0	1.00E+01	NE	NA	1.55E+00			NA			1.80E+00			NA			1.29E+00			NA		
Perchlorate- USEPA Method 6860	NE	NE	2.56E+01	2.03E-03			NA			5.89E-04			NA			2.92E-03			NA		
Sulfate as SO_4- USEPA Method 300.0	NE	6.00E+02	NE	5.37E+01			NA			3.85E+01			NA			1.38E+02			NA		
Total Organic Carbon- USEPA Method 5310B	NE	NE	NE	4.60E+00			NA			3.20E+00			NA			<	3.10E+00	UB	NA		

Notes:
Groundwater analytical result from 2012 Biennial Groundwater Monitoring and Annual Landfill Inspection Report (Bhate 2013)
Data reported as detected did not include reporting limits.
[1] = USEPA Maximum Contaminant Levels (May 2009)
[2] = New Mexico Standards for Groundwater of 10,000 mg/L Total Dissolved Solids Concentration or Less (20 New Mexico Administrative Code 6.2)
[3] = New Mexico Environment Department Risk Assessment Guidance for Investigations and Remediation, Appendix A, Table A-1 June 2012

Shading indicates the value is greater than the MCL or NMGWQS. If no evaluation criteria is listed for MCL or NMGWQS, the value is screened against New Mexico Soil Screening Levels for tap water

µg/L = microgram per liter
< = Not Detected
J = Estimated
MCL = Maximum Contaminant Level
mg/L = milligram per liter
NA = Not Applicable
NE = Not Established
NMGWQS = New Mexico Groundwater Quality Standards
Qual = Qualifier
U = Nondetect
UB = analyte also found in associated laboratory or field blank, probable blank contaminant
UJ = Estimated Nondetect
USEPA = United States Environmental Protection Agency

TABLE 4-6
SUMMARY OF ANALYTICAL RESULTS – OCTOBER 2012
CANNON AFB, NEW MEXICO

LOCATION IDENTIFICATION				MW-F Total			MW-F Dissolved			MW-G Total			MW-G Dissolved			MW-H Total			MW-H Dissolved		
SAMPLE IDENTIFICATION																					
DATE COLLECTED				October 1, 2012			October 1, 2012			October 1, 2012			October 1, 2012			October 1, 2012			October 1, 2012		
	USEPA MCL[1]	NMGWQS[2]	New Mexico Tap Water[3]	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual
VOLATILE ORGANIC COMPOUNDS- USEPA Method 8260B (µg/L)																					
Dichlorodifluoromethane	NE	NE	2.03E+02	<	0.145	U	NA			<	0.145	U	NA			<	0.145	U	NA		
Trichlorofluoromethane	NE	NE	1.29E+03	<	1.57E-01	U	NA			<	1.57E-01	U	NA			<	1.57E-01	U	NA		
METALS- USEPA 6010C/7470A Method (µg/L)																					
Aluminum	NE	NE	3.65E+04	<	3.03E+01	U	<	3.03E+01	U	3.20E+01		J	<	3.03E+01	U	3.46E+01		J	3.03E+01		J
Antimony	6.00E+00	NE	NA	<	3.11E+00	U	<	3.11E+00	U	<	3.11E+00	U	3.42E+00		J	<	3.11E+00	U	3.11E+00		J
Arsenic	1.00E+01	1.00E+02	NA	<	3.59E+00	U	<	3.59E+00	U	<	3.59E+00	U	<	3.59E+00	U	<	3.59E+00	U	3.59E+00		J
Barium	2.00E+03	1.00E+03	NA	3.60E+01			3.76E+01			3.06E+01			2.91E+01			3.88E+01			3.19E+01		
Cadmium	5.00E+00	1.00E+01	NA	<	9.30E-01	UB	7.00E-01		J	<	1.06E+00	UB	7.10E-01		J	1.03E+00			6.80E-01		J
Calcium	NE	NE	NE	4.45E+04			4.69E+04			4.41E+04			4.48E+04			4.73E+04			4.48E+04		
Chromium	1.00E+02	5.00E+01	NA	1.68E+00		J	1.05E+00			2.33E+00		J	1.04E+00		J	7.55E+00		J	1.06E+00		J
Cobalt	NE	5.00E+01	NE	6.10E-01		J	1.06E+00		J	<	1.47E+00	UB	6.30E-01		J	7.70E-01		J	6.80E-01		J
Copper	1.30E+03	1.00E+03	NA	7.64E+00		J	8.62E+00		J	1.20E+01			8.61E+00		J	1.36E+01			9.24E+00		J
Iron	NE	1.00E+03	NA	5.56E+01		J	2.51E+01		J	5.87E+02			<	1.26E+01	U	6.51E+02			<	1.26E+01	U
Lead	1.50E+01	5.00E+01	NE	<	1.96E+00	U	<	1.96E+00	U	<	1.96E+00	U	<	1.96E+00	U	<	1.96E+00	U	<	1.96E+00	U
Magnesium	NE	NE	NE	3.82E+04			3.97E+04			4.09E+04			4.09E+04			4.03E+04			3.55E+04		
Manganese	NE	2.00E+02	NA	<	1.31E+00	U	<	1.31E+00	U	1.63E+01			<	1.31E+00	U	1.29E+01		J	<	1.31E+00	U
Mercury	2.00E+00	2.00E+00	NA	<	6.80E-02	U	<	6.80E-02	U	<	6.80E-02	U	<	6.80E-02	U	<	6.80E-02	U	<	6.80E-02	U
Nickel	NE	2.00E+02	NA	<	1.51E+00	UB	<	3.55E+00	UB	<	4.06E+00	UB	1.75E+00		J	1.04E+01		J	<	5.30E+00	UB
Potassium	NE	NE	NE	7.47E+03			7.81E+03			7.20E+03			7.31E+03			7.31E+03			6.84E+03		
Selenium	5.00E+01	5.00E+01	NA	9.77E+00		J	6.24E+00		J	<	4.42E+00	U	7.99E+00		J	8.63E+00		J	7.96E+00		J
Sodium	NE	NE	NE	5.38E+04			5.66E+04			4.99E+04			5.10E+04			5.83E+04			5.44E+04		
Thallium	2.00E+00	NE	NA	3.22E+00		J	4.65E+00		J	3.69E+00		J	3.45E+00		J	<	3.04E+00	U	3.06E+00		J
Vanadium	NE	NE	1.83E+02	2.60E+01			2.66E+01			2.86E+01			2.62E+01			2.91E+01			2.65E+01		
Zinc	NE	1.00E+04	NA	1.70E+02			2.54E+02			1.75E+02			1.61E+02			2.17E+02			1.28E+02		
Other Parameters (mg/L)																					
Ammonia as N- USEPA Method SM 4500 NH3	NE	NE	NE	<	2.40E-01	U	NA			<	2.40E-01	U	NA			<	2.40E-01	U	NA		
Chloride- USEPA Method 300.0	NE	2.50E+02	NE	6.03E+01			NA			6.97E+01			NA			7.13E+01			NA		
Chromium, Hexavalent- USEPA Method 7196A (µg/L)	NE	NE	4.31E-01	<	4.00E+00	U	NA			<	4.00E+00	U	NA			<	4.00E+00	UJ	NA		
Nitrogen (Nitrate)- USEPA Method 300.0	NE	1.00E+01	NE	<	2.00E-03	U	NA			7.00E-03			NA			<	1.00E-02	UB	NA		
Nitrate/Nitrite (Nitrogen)- USEPA Method 300.0	1.00E+01	NE	NA	1.21E+00			NA			1.02E+00			NA			1.33E+00			NA		
Perchlorate- USEPA Method 6860	NE	NE	2.56E+01	2.86E-03			NA			2.48E-03			NA			2.85E-03			NA		
Sulfate as SO_4- USEPA Method 300.0	NE	6.00E+02	NE	1.38E+02			NA			1.32E+02			NA			2.72E+03			NA		
Total Organic Carbon- USEPA Method 5310B	NE	NE	NE	2.50E+00			NA			1.80E+00		J	NA			3.40E+00			NA		

Notes:

Groundwater analytical result from 2012 Biennial Groundwater Monitoring and Annual Landfill Inspection Report (Bhate 2013)

Data reported as detected did not include reporting limits.

[1] = USEPA Maximum Contaminant Levels (May 2009)

[2] = New Mexico Standards for Groundwater of 10,000 mg/L Total Dissolved Solids Concentration or Less (20 New Mexico Administrative Code 6.2)

[3] = New Mexico Environment Department Risk Assessment Guidance for Investigations and Remediation, Appendix A, Table A-1 June 2012

Shading indicates the value is greater than the MCL or NMGWQS. If no evaluation criteria is listed for MCL or NMGWQS, the value is screene

µg/L = microgram per liter
< = Not Detected
J = Estimated
MCL = Maximum Contaminant Level
mg/L = milligram per liter
NA = Not Applicable
NE = Not Established
NMGWQS = New Mexico Groundwater Quality Standards
Qual = Qualifier
U = Nondetect
UB = analyte also found in associated laboratory or field blank, probable blank contaminant
UJ = Estimated Nondetect
USEPA = United States Environmental Protection Agency

TABLE 4-6
SUMMARY OF ANALYTICAL RESULTS – OCTOBER 2012
CANNON AFB, NEW MEXICO

LOCATION IDENTIFICATION				MW-Na Total			MW-Na Dissolved			MW-Oa Total			MW-Oa Dissolved			MW-Pa Total			MW-Pa Dissolved		
SAMPLE IDENTIFICATION																					
DATE COLLECTED				October 1, 2012			October 1, 2012			October 17, 2012			October 17, 2012			October 1, 2012			October 1, 2012		
	USEPA MCL[1]	NMGWQS[2]	New Mexico Tap Water[3]	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual
VOLATILE ORGANIC COMPOUNDS- USEPA Method 8260B (µg/L)																					
Dichlorodifluoromethane	NE	NE	2.03E+02	<	0.145	U	NA			0.145	0.145	U	NA			<	0.145	U	NA		
Trichlorofluoromethane	NE	NE	1.29E+03	<	1.57E-01	U	NA			1.57E-01	1.57E-01	U	NA			<	1.57E-01	U	NA		
METALS- USEPA 6010C/7470A Method (µg/L)																					
Aluminum	NE	NE	3.65E+04	2.01E+02			<	3.03E+01	U	<	3.03E+01	U	<	3.03E+01	U	<	3.03E+01	U	<	3.03E+01	U
Antimony	6.00E+00	NE	NA	<	3.11E+00	U	<	3.11E+00	U	<	3.11E+00	U	<	3.11E+00	U	3.25E+00		J	<	3.11E+00	U
Arsenic	1.00E+01	1.00E+02	NA	<	3.59E+00	U	<	3.59E+00	U	<	3.59E+00	U	<	3.59E+00	U	<	3.59E+00	U	<	3.59E+00	U
Barium	2.00E+03	1.00E+03	NA	4.44E+01			3.70E+01			6.03E+01			6.15E+01			3.09E+01			2.99E+01		
Cadmium	5.00E+00	1.00E+01	NA	8.30E-01		J	7.00E-01		J	7.80E-01		J	6.10E-01		J	<	7.90E-01	UB	6.30E-01		
Calcium	NE	NE	NE	3.16E+04			3.03E+04			7.11E+04			7.15E+04			4.40E+04			4.44E+04		J
Chromium	1.00E+02	5.00E+01	NA	1.69E+00		J	1.29E+00		J	1.78E+00		J	1.91E+00		J	2.06E+00		J	1.88E+00		J
Cobalt	NE	5.00E+01	NE	7.00E-01		J	<	7.90E-01	UB	1.12E+00		J	<	1.27E+00	UB	<	1.05E+00	UB	<	8.50E-01	UB
Copper	1.30E+03	1.00E+03	NA	1.36E+01			1.13E+01			1.19E+01			1.17E+01			8.68E+00		J	7.35E+00		J
Iron	NE	1.00E+03	NA	1.11E+02			<	1.26E+01	U	<	1.26E+01	U	<	1.26E+01	U	<	1.26E+01	U	<	1.26E+01	U
Lead	1.50E+01	5.00E+01	NE	<	1.96E+00	U	<	1.96E+00	U	<	1.96E+00	U	<	1.96E+00	U	<	1.96E+00	U	<	1.96E+00	U
Magnesium	NE	NE	NE	2.81E+04			2.75E+04			6.51E+04			6.53E+04			4.11E+04			4.27E+04		
Manganese	NE	2.00E+02	NA	1.05E+01		J	<	1.31E+00	U	<	1.31E+00	U	<	1.31E+00	U	<	1.31E+00	U	<	1.31E+00	U
Mercury	2.00E+00	2.00E+00	NA	<	6.80E-02	U	<	6.80E-02	U	<	6.80E-02	U	<	6.80E-02	U	<	7.65E-02	UB	<	8.57E-02	UB
Nickel	NE	2.00E+02	NA	<	1.13E+00	U	1.21E+00		J	<	1.13E+00	U	<	6.80E-02	U	<	1.13E+00	U	<	1.13E+00	U
Potassium	NE	NE	NE	6.91E+03			6.90E+03			9.24E+03			9.56E+03			6.89E+03			7.08E+03		
Selenium	5.00E+01	5.00E+01	NA	5.50E+00		J	5.07E+00		J	8.00E+00		J	5.05E+00		J	<	4.42E+00	U	9.72E+00		J
Sodium	NE	NE	NE	4.37E+04			4.45E+04			1.31E+05			1.28E+05			3.90E+04			3.92E+04		
Thallium	2.00E+00	NE	NA	<	3.04E+00	U	5.06E+00		J	4.58E+00		J	4.18E+00		J	4.89E+00		J	<	3.04E+00	U
Vanadium	NE	NE	1.83E+02	3.37E+01			3.41E+01			3.23E+01			3.51E+01			3.41E+01			2.49E+01		
Zinc	NE	1.00E+04	NA	9.16E+00		J	<	4.51E+00	U	<	4.51E+00	U	<	4.51E+00	U	<	4.51E+00	U	<	4.51E+00	U
Other Parameters (mg/L)																					
Ammonia as N- USEPA Method SM 4500 NH3	NE	NE	NE	<	2.40E-01	U	NA			<	2.40E-01	U	NA			<	2.40E-01	U	NA		
Chloride- USEPA Method 300.0	NE	2.50E+02	NE	3.89E+01			NA			1.85E+02			NA			7.30E+01			NA		
Chromium, Hexavalent- USEPA Method 7196A (µg/L)	NE	NE	4.31E-01	<	4.00E+00	U	NA			<	4.00E+00	UJ	NA			<	4.00E+00	U	NA		
Nitrogen (Nitrate)- USEPA Method 300.0	NE	1.00E+01	NE	8.00E-03		J	NA			1.00E-02			NA			1.00E-02			NA		
Nitrate/Nitrite (Nitrogen)- USEPA Method 300.0	1.00E+01	NE	NA	1.41E+00			NA			1.18E+01			NA			1.37E+00			NA		
Perchlorate- USEPA Method 6860	NE	NE	2.56E+01	2.08E-03			NA			1.47E-03			NA			2.17E-03			NA		
Sulfate as SO_4- USEPA Method 300.0	NE	6.00E+02	NE	7.99E+01			NA			1.99E+02			NA			1.17E+02			NA		
Total Organic Carbon- USEPA Method 5310B	NE	NE	NE	5.00E+00			NA			6.80E+00			NA			3.20E+00			NA		

Notes:
Groundwater analytical result from 2012 Biennial Groundwater Monitoring and Annual Landfill Inspection Report (Bhate 2013)
Data reported as detected did not include reporting limits.
[1] = USEPA Maximum Contaminant Levels (May 2009)
[2] = New Mexico Standards for Groundwater of 10,000 mg/L Total Dissolved Solids Concentration or Less (20 New Mexico Administrative Code 6.2)
[3] = New Mexico Environment Department Risk Assessment Guidance for Investigations and Remediation, Appendix A, Table A-1 June 2012

Shading indicates the value is greater than the MCL or NMGWQS. If no evaluation criteria is listed for MCL or NMGWQS, the value is screenec

µg/L = microgram per liter
< = Not Detected
J = Estimated
MCL = Maximum Contaminant Level
mg/L = milligram per liter
NA = Not Applicable
NE = Not Established
NMGWQS = New Mexico Groundwater Quality Standards
Qual = Qualifier
U = Nondetect
UB = analyte also found in associated laboratory or field blank, probable blank contaminant
UJ = Estimated Nondetect
USEPA = United States Environmental Protection Agency

TABLE 4-6
SUMMARY OF ANALYTICAL RESULTS – OCTOBER 2012
CANNON AFB, NEW MEXICO

LOCATION IDENTIFICATION				MW-Rb Total			MW-Rb Dissolved			MW-S Total			MW-S Dissolved			MW-T Total			MW-T Dissolved		
SAMPLE IDENTIFICATION																					
DATE COLLECTED				October 1, 2012			October 1, 2012			October 30, 2012			October 30, 2012			October 16, 2012			October 16, 2012		
	USEPA MCL[1]	NMGWQS[2]	New Mexico Tap Water[3]	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual
VOLATILE ORGANIC COMPOUNDS- USEPA Method 8260B (µg/L)																					
Dichlorodifluoromethane	NE	NE	2.03E+02	<	0.145	U	NA			<	0.145	U	NA			<	0.145	U	NA		
Trichlorofluoromethane	NE	NE	1.29E+03	<	1.57E-01	U	NA			<	1.57E-01	U	NA			<	1.57E-01	U	NA		
METALS- USEPA 6010C/7470A Method (µg/L)																					
Aluminum	NE	NE	3.65E+04	<	3.03E+01	U	<	4.68E+01	UB	<	5.68E+01	UB	<	4.55E+01	UB	<	6.10E+01	UB	<	3.05E+01	UB
Antimony	6.00E+00	NE	NA	<	3.11E+00	U	<	3.11E+00	U	<	3.11E+00	U	<	3.11E+00	U	<	3.11E+00	UB	<	3.11E+00	U
Arsenic	1.00E+01	1.00E+02	NA	<	3.59E+00	U	<	3.59E+00	U	3.90E+00		J	<	3.59E+00	U	5.39E+00		J	7.50E+00		J
Barium	2.00E+03	1.00E+03	NA	3.51E+01			3.46E+01			3.90E+01			3.80E+01			<	3.38E+01	UB	<	3.47E+01	UB
Cadmium	5.00E+00	1.00E+01	NA	5.30E-01		J	3.80E-01		J	9.70E-01		J	5.90E-01		J	<	5.10E-01	UB	4.10E-01		J
Calcium	NE	NE	NE	4.20E+04		J	4.22E+04		J	5.17E+04			5.16E+04			3.79E+04			4.07E+04		
Chromium	1.00E+02	5.00E+01	NA	1.36E+00		J	1.32E+00		J	2.99E+00		J	2.32E+00		J	3.33E+00		J	2.24E+00		J
Cobalt	NE	5.00E+01	NE	8.60E-01		J	<	5.80E-01	U	<	5.80E-01	U	<	5.80E-01	U	<	5.80E-01	U	<	5.80E-01	U
Copper	1.30E+03	1.00E+03	NA	8.08E+00		J	6.83E+00		J	9.62E+00		J	9.35E+00		J	7.84E+00		J	7.04E+00		J
Iron	NE	1.00E+03	NA	<	1.26E+01	U	<	1.26E+01	U	<	1.26E+01	U	<	1.26E+01	U	1.39E+02			<	1.26E+01	U
Lead	1.50E+01	5.00E+01	NE	<	1.96E+00	U	<	1.96E+00	U	<	1.96E+00	U	<	1.96E+00	U	<	1.96E+00	U	<	1.96E+00	U
Magnesium	NE	NE	NE	4.08E+04		J	4.10E+04			4.85E+04			4.90E+04			3.51E+04			3.77E+04		
Manganese	NE	2.00E+02	NA	1.98E+00		J	<	1.31E+00	U	4.45E+00		J	<	1.31E+00	U	<	3.28E+00	UB	<	1.31E+00	U
Mercury	2.00E+00	2.00E+00	NA	<	6.80E-02	U	<	6.80E-02	U	7.02E-02		J	7.70E-02		J	<	6.80E-02	U	<	6.80E-02	U
Nickel	NE	2.00E+02	NA	<	1.13E+00	U	<	1.13E+00	U	<	1.13E+00	U	<	1.13E+00	U	5.41E+00		J	4.86E+00		J
Potassium	NE	NE	NE	7.07E+03			7.29E+03			7.65E+03			7.70E+03			6.48E+03			6.97E+03		
Selenium	5.00E+01	5.00E+01	NA	7.75E+00		J	1.12E+01		J	7.84E+00		J	7.14E+00		J	<	4.42E+00	U	<	4.42E+00	U
Sodium	NE	NE	NE	4.14E+04			4.18E+04			5.47E+04			5.49E+04			<	5.37E+04	UB	<	5.70E+04	UB
Thallium	2.00E+00	NE	NA	<	3.04E+00	U	<	3.04E+00	U	<	3.04E+00	U	<	3.04E+00	U	<	3.04E+00	U	3.43E+00		J
Vanadium	NE	NE	1.83E+02	3.02E+01			2.67E+01			4.76E+01			4.89E+01			3.77E+01			3.80E+01		
Zinc	NE	1.00E+04	NA	1.38E+03		J	1.16E+03			8.79E+01			8.42E+01			8.83E+01			9.10E+01		
Other Parameters (mg/L)																					
Ammonia as N- USEPA Method SM 4500 NH3	NE	NE	NE	<	2.40E-01	U	NA			<	2.40E-01	U	NA			<	2.40E-01	U	NA		
Chloride- USEPA Method 300.0	NE	2.50E+02	NE	6.86E+01			NA			6.64E+01			NA			<	4.85E+01	UB	NA		
Chromium, Hexavalent- USEPA Method 7196A (µg/L)	NE	NE	4.31E-01	<	4.00E+00	UJ	NA			<	4.00E+00	U	NA			<	4.00E+00	U	NA		
Nitrogen (Nitrate)- USEPA Method 300.0	NE	1.00E+01	NE	<	1.50E-02	U	NA			<	1.50E-02	U	NA			<	1.50E-02	UB	NA		
Nitrate/Nitrite (Nitrogen)- USEPA Method 300.0	1.00E+01	NE	NA	1.02E+00			NA			1.59E+00			NA			1.20E+00			NA		
Perchlorate- USEPA Method 6860	NE	NE	2.56E+01	1.98E-03			NA			2.20E-03			NA			2.02E-03			NA		
Sulfate as SO_4- USEPA Method 300.0	NE	6.00E+02	NE	1.01E+02			NA			1.03E+02			NA			9.85E+01			NA		
Total Organic Carbon- USEPA Method 5310B	NE	NE	NE	5.20E+00			NA			<	3.00E-01	U	NA			<	3.30E+00	UB	NA		

Notes:
Groundwater analytical result from 2012 Biennial Groundwater Monitoring and Annual Landfill Inspection Report (Bhate 2013)
Data reported as detected did not include reporting limits.
[1] = USEPA Maximum Contaminant Levels (May 2009)
[2] = New Mexico Standards for Groundwater of 10,000 mg/L Total Dissolved Solids Concentration or Less (20 New Mexico Administrative Code 6.2)
[3] = New Mexico Environment Department Risk Assessment Guidance for Investigations and Remediation, Appendix A, Table A-1 June 2012

Shading indicates the value is greater than the MCL or NMGWQS. If no evaluation criteria is listed for MCL or NMGWQS, the value is screene

µg/L = microgram per liter
< = Not Detected
J = Estimated
MCL = Maximum Contaminant Level
mg/L = milligram per liter
NA = Not Applicable
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NMGWQS = New Mexico Groundwater Quality Standards
Qual = Qualifier
U = Nondetect
UB = analyte also found in associated laboratory or field blank, probable blank contaminant
UJ = Estimated Nondetect
USEPA = United States Environmental Protection Agency

TABLE 4-6
SUMMARY OF ANALYTICAL RESULTS – OCTOBER 2012
CANNON AFB, NEW MEXICO

LOCATION IDENTIFICATION				MW-U Total			MW-U Dissolved			MW-V Total			MW-V Dissolved			MW-X Total			MW-X Dissolved		
SAMPLE IDENTIFICATION																					
DATE COLLECTED				October 30, 2012			October 30, 2012			October 30, 2012			October 30, 2012			October 30, 2012			October 30, 2012		
	USEPA MCL[1]	NMGWQS[2]	New Mexico Tap Water[3]	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual	Result	Reporting Limit	Qual
VOLATILE ORGANIC COMPOUNDS- USEPA Method 8260B (µg/L)																					
Dichlorodifluoromethane	NE	NE	2.03E+02	0.832		J	NA			<	0.145	U	NA			<	0.145	U	NA		
Trichlorofluoromethane	NE	NE	1.29E+03	5.59E-01		J	NA			<	1.57E-01	U	NA			<	1.57E-01	U	NA		
METALS- USEPA 6010C/7470A Method (µg/L)																					
Aluminum	NE	NE	3.65E+04	<	4.41E+01	UB	<	4.17E+01	UB	<	3.03E+01	U	<	3.58E+01	UB	<	1.14E+02	UB	<	3.87E+01	UB
Antimony	6.00E+00	NE	NA	<	3.11E+00	U	<	3.11E+00	U	<	3.11E+00	U	<	3.11E+00	U	<	3.11E+00	U	<	3.11E+00	U
Arsenic	1.00E+01	1.00E+02	NA	<	3.59E+00	U	<	3.59E+00	U	<	3.59E+00	U	5.52E+00		J	8.84E+00		J	1.14E+01		
Barium	2.00E+03	1.00E+03	NA	4.40E+01			4.19E+01			<	2.03E+01	UB	<	1.98E+01	UB	6.24E+01			6.29E+01		
Cadmium	5.00E+00	1.00E+01	NA	8.40E-01		J	6.50E-01		J	<	4.60E-01	UB	4.10E-01		J	<	6.20E-01	UB	<	6.30E-01	UB
Calcium	NE	NE	NE	5.98E+04			5.82E+04			9.64E+04			9.41E+04			2.79E+04		J	2.92E+04		
Chromium	1.00E+02	5.00E+01	NA	4.86E+00		J	2.14E+00		J	1.26E+00		J	1.28E+00		J	1.64E+00		J	<	1.39E+00	UB
Cobalt	NE	5.00E+01	NE	<	5.80E-01	U	<	5.80E-01	U	<	5.80E-01	U	<	5.80E-01	U	<	5.80E-01	U	<	5.80E-01	U
Copper	1.30E+03	1.00E+03	NA	1.02E+01			1.02E+01			9.97E+00		J	9.69E+00		J	8.62E+00		J	<	6.52E+00	UB
Iron	NE	1.00E+03	NA	<	1.26E+01	U	<	1.26E+01	U	<	1.26E+01	U	<	1.26E+01	U	5.83E+01		J	<	1.26E+01	U
Lead	1.50E+01	5.00E+01	NE	<	1.96E+00	U	<	1.96E+00	U	<	1.96E+00	U	<	1.96E+00	U	<	1.96E+00	U	<	1.96E+00	U
Magnesium	NE	NE	NE	5.47E+04			5.42E+04			8.10E+04			7.91E+04			2.31E+04		J	2.52E+04		
Manganese	NE	2.00E+02	NA	2.04E+01			1.66E+01			<	1.31E+00	U	<	1.31E+00	U	<	4.15E+00	UB	<	1.31E+00	U
Mercury	2.00E+00	2.00E+00	NA	<	6.80E-02	U	<	6.80E-02	U	<	6.80E-02	U	<	6.80E-02	U	<	6.80E-02	U	<	6.80E-02	U
Nickel	NE	2.00E+02	NA	3.97E+00		J	3.19E+00		J	<	1.13E+00	U	<	1.13E+00	U	<	1.13E+00	U	<	1.13E+00	U
Potassium	NE	NE	NE	8.25E+03			8.11E+03			9.79E+03			9.47E+03			5.70E+03			6.10E+03		
Selenium	5.00E+01	5.00E+01	NA	9.93E+00		J	7.82E+00		J	2.41E+01		J	2.43E+01			7.89E+00		J	7.34E+00		J
Sodium	NE	NE	NE	6.12E+04			6.00E+04			<	8.46E+04	UB	<	8.12E+04	UB	<	4.42E+04	UB	<	4.69E+04	UB
Thallium	2.00E+00	NE	NA	<	3.04E+00	U	3.40E+00		J	<	3.04E+00	U	<	3.04E+00	U	<	3.04E+00	U	<	3.04E+00	U
Vanadium	NE	NE	1.83E+02	4.24E+01			4.27E+01			<	3.44E+01	UB	3.30E+01			5.33E+01			5.99E+01		
Zinc	NE	1.00E+04	NA	3.35E+02			3.30E+02			5.29E+02			5.49E+02			2.21E+02			2.48E+02		
Other Parameters (mg/L)																					
Ammonia as N- USEPA Method SM 4500 NH3	NE	NE	NE	<	2.40E-01	U	NA			<	2.40E-01	U	NA			<	2.40E-01	U	NA		
Chloride- USEPA Method 300.0	NE	2.50E+02	NE	8.27E+01			NA			1.92E+02			NA			<	2.47E+01	UB	NA		
Chromium, Hexavalent- USEPA Method 7196A (µg/L)	NE	NE	4.31E-01	<	4.00E+00	UJ	NA			<	4.00E+00	UJ	NA			<	4.00E+00	U	NA		
Nitrogen (Nitrate)- USEPA Method 300.0	NE	1.00E+01	NE	<	1.50E-02	U	NA			<	3.00E-02	U	NA			<	7.00E-03	UB	NA		
Nitrate/Nitrite (Nitrogen)- USEPA Method 300.0	1.00E+01	NE	NA	1.57E+00			NA			8.35E+00			NA			1.39E+00			NA		
Perchlorate- USEPA Method 6860	NE	NE	2.56E+01	2.47E-03			NA			6.82E-03			NA			1.51E-03			NA		
Sulfate as SO_4- USEPA Method 300.0	NE	6.00E+02	NE	1.05E+02			NA			2.61E+02			NA			4.39E+01			NA		
Total Organic Carbon- USEPA Method 5310B	NE	NE	NE	1.30E+00			NA			<	4.80E+00	UB	NA			<	2.00E+00	UB	NA		

Notes:
Groundwater analytical result from 2012 Biennial Groundwater Monitoring and Annual Landfill Inspection Report (Bhate 2013)
Data reported as detected did not include reporting limits.
[1] = USEPA Maximum Contaminant Levels (May 2009)
[2] = New Mexico Standards for Groundwater of 10,000 mg/L Total Dissolved Solids Concentration or Less (20 New Mexico Administrative Code 6.2)
[3] = New Mexico Environment Department Risk Assessment Guidance for Investigations and Remediation, Appendix A, Table A-1 June 2012

Shading indicates the value is greater than the MCL or NMGWQS. If no evaluation criteria is listed for MCL or NMGWQS, the value is screene

µg/L = microgram per liter
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J = Estimated
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mg/L = milligram per liter
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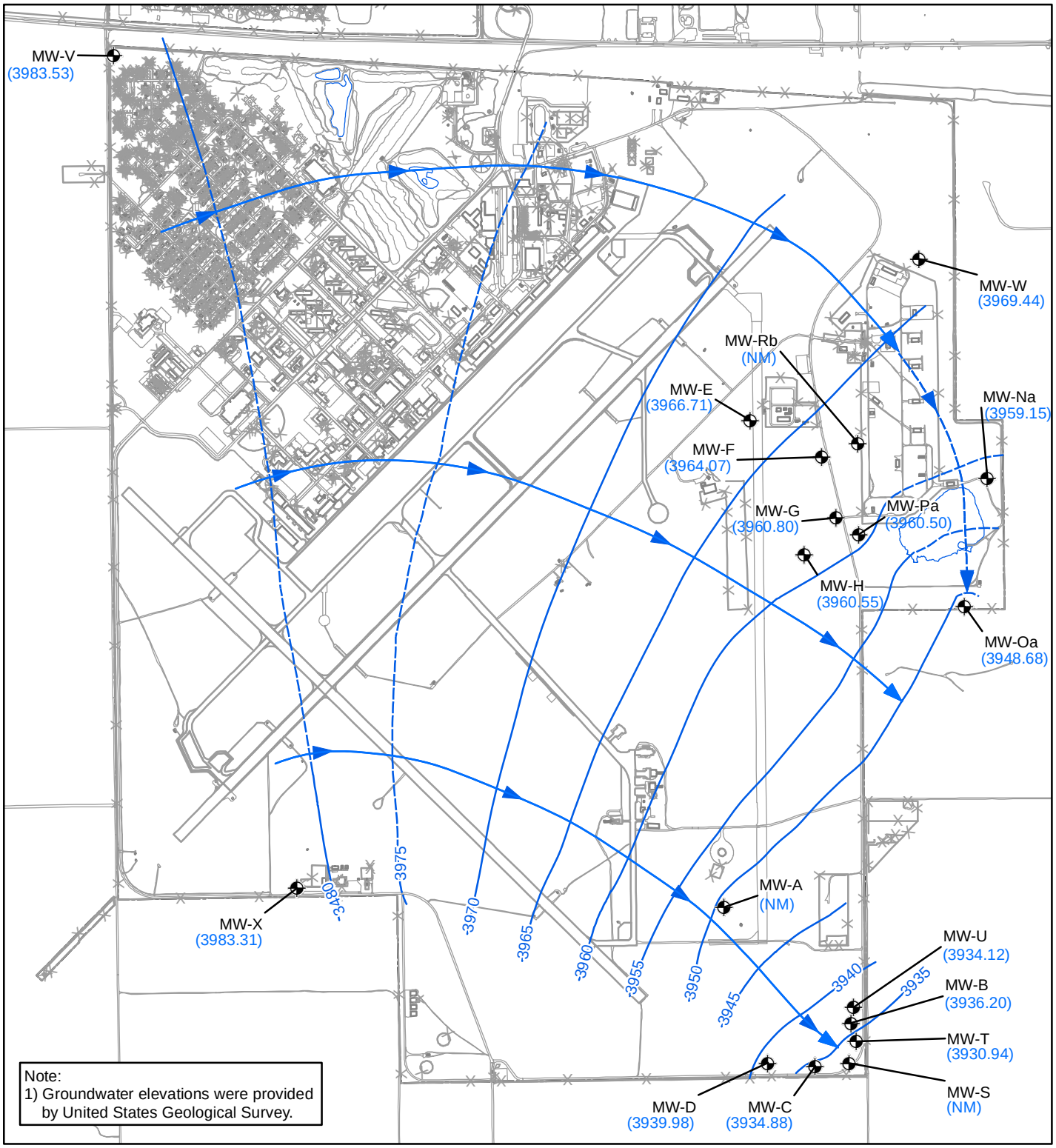
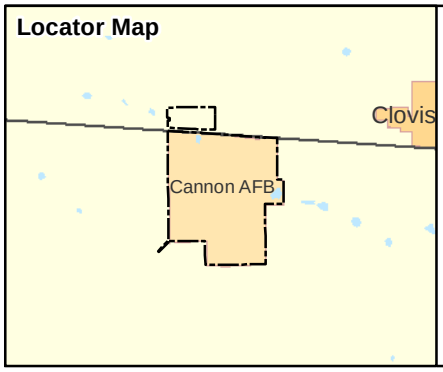
NMGWQS = New Mexico Groundwater Quality Standards
Qual = Qualifier
U = Nondetect
UB = analyte also found in associated laboratory or field blank, probable blank contaminant
UJ = Estimated Nondetect
USEPA = United States Environmental Protection Agency



Locator Map



Legend

- Monitoring Well Location
- Interpreted Groundwater Elevation (ft amsl)
- Groundwater Elevation (ft amsl)
- Groundwater Flow Direction
- Interpreted Groundwater Flow Direction
- Base Boundary

amsl = above mean sea level
ft = feet
NM = not measured

N

0 1,000 2,000 4,000 Feet

Potentiometric Surface Map - July 2013

Cannon Air Force Base, New Mexico

Drawn By: JM	Date: 10/20/2015	**Figure 4-1**
Checked By: KK	Project No. 23446539	

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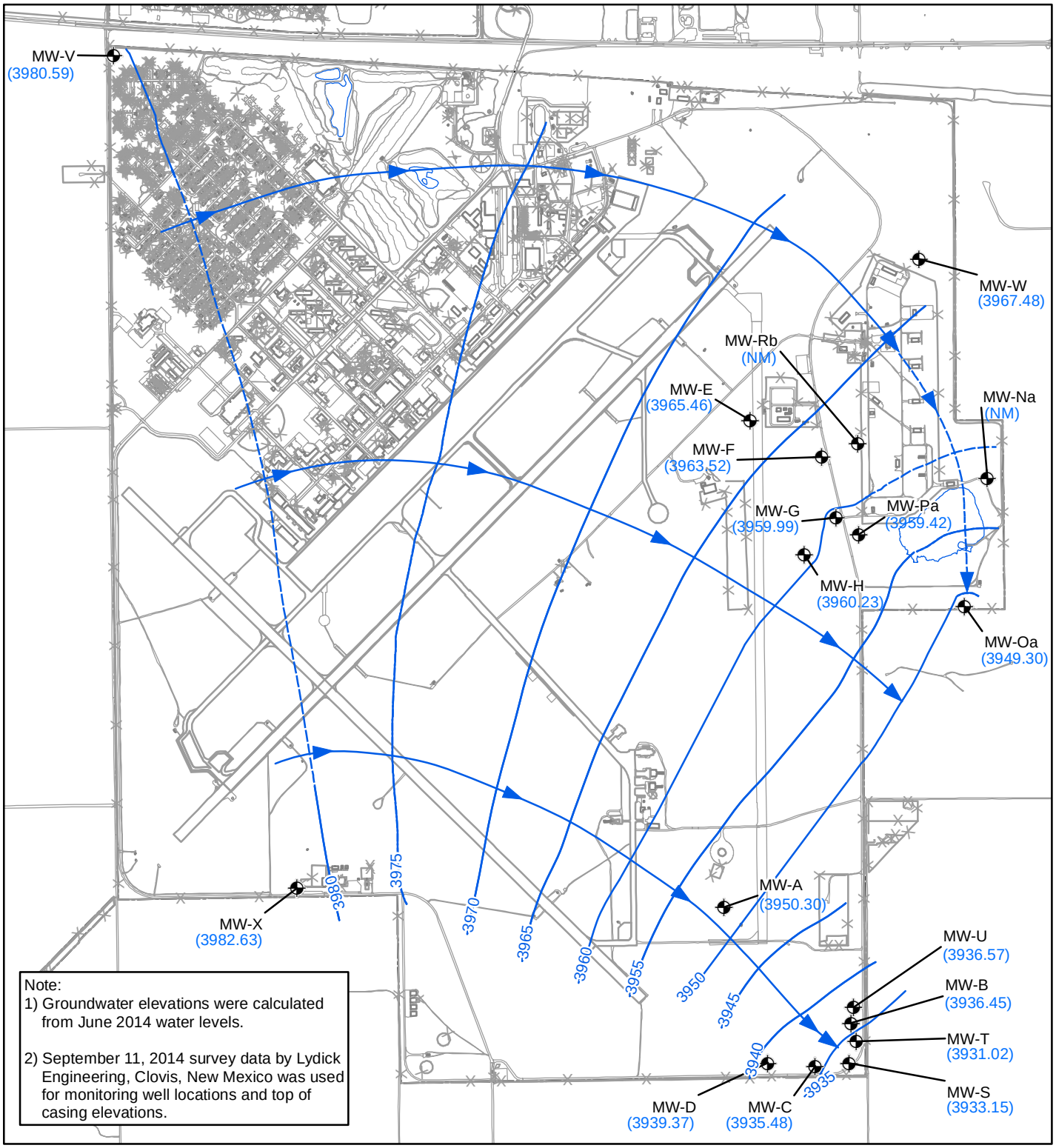
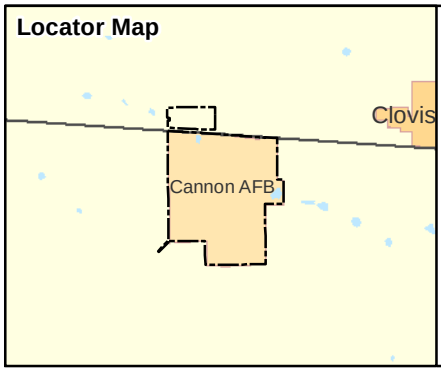


Note:
1) Groundwater elevations were calculated from June 2014 water levels.

2) September 11, 2014 survey data by Lydick Engineering, Clovis, New Mexico was used for monitoring well locations and top of casing elevations.

Locator Map



Legend

- Monitoring Well Location
- Interpreted Groundwater Elevation (ft amsl)
- Groundwater Elevation (ft amsl)
- Base Boundary

amsl = above mean sea level
ft = feet
NM = not measured

N

0 1,000 2,000 4,000 Feet

Potentiometric Surface Map - June 2014

Cannon Air Force Base, New Mexico

Drawn By: LLS	Date: 10/20/2015	**Figure 4-2**
Checked By: KK	Project No. 23446539	

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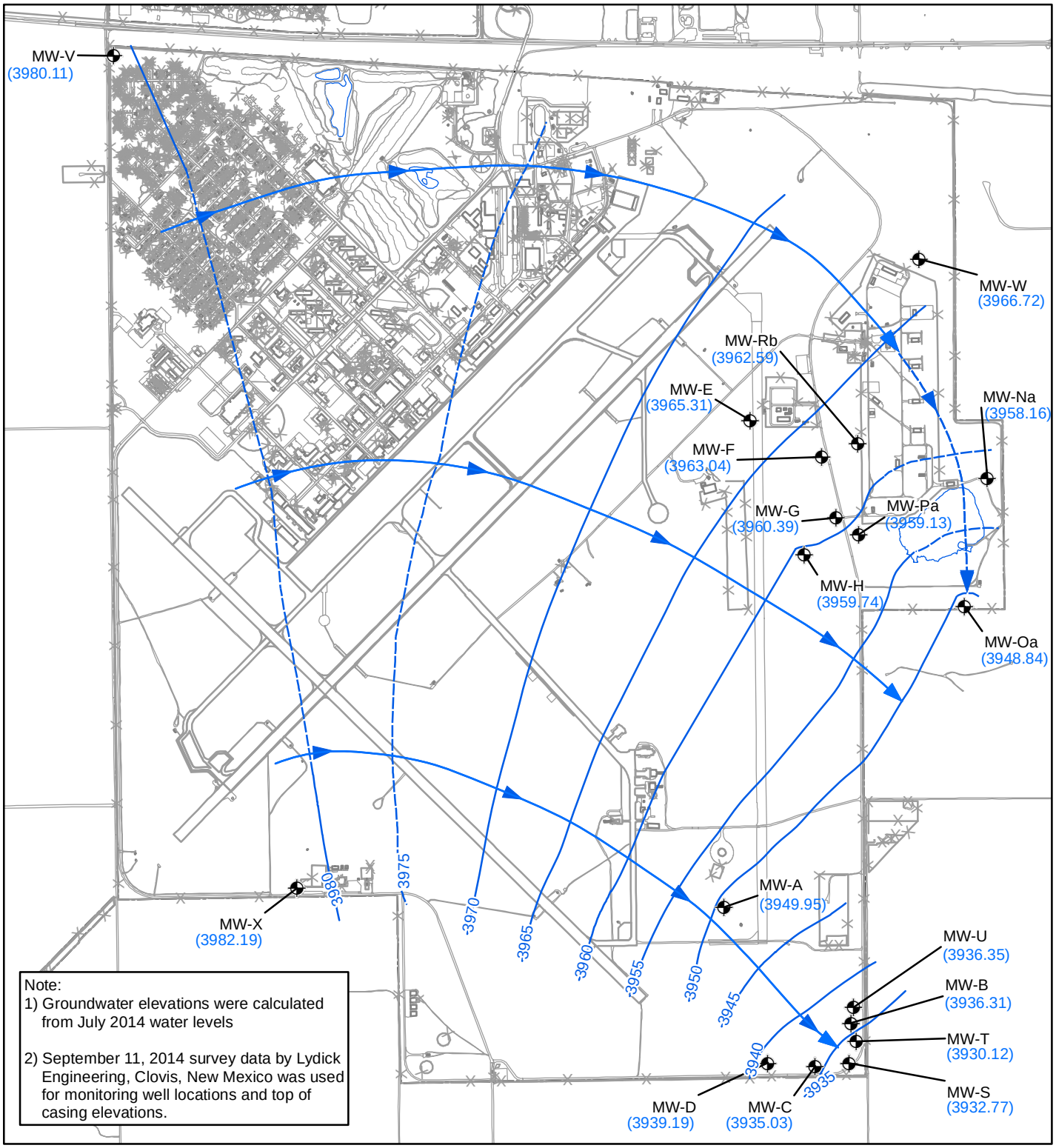
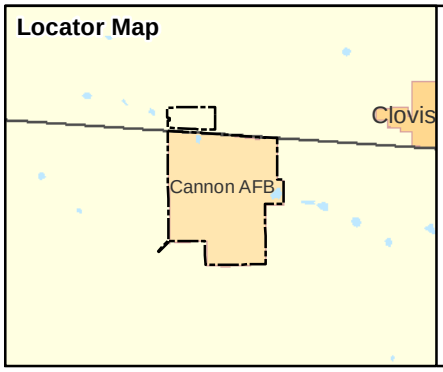


Locator Map



Legend

- Monitoring Well Location
- Interpreted Groundwater Elevation (ft amsl)
- Groundwater Elevation (ft amsl)
- Groundwater Flow Direction
- Interpreted Groundwater Flow Direction
- Base Boundary

amsl = above mean sea level
ft = feet

N

0 1,000 2,000 4,000 Feet

Potentiometric Surface Map - July 2014

Cannon Air Force Base, New Mexico

Drawn By: LLS	Date: 10/21/2015	**Figure 4-3**
Checked By: KK	Project No. 23446539	

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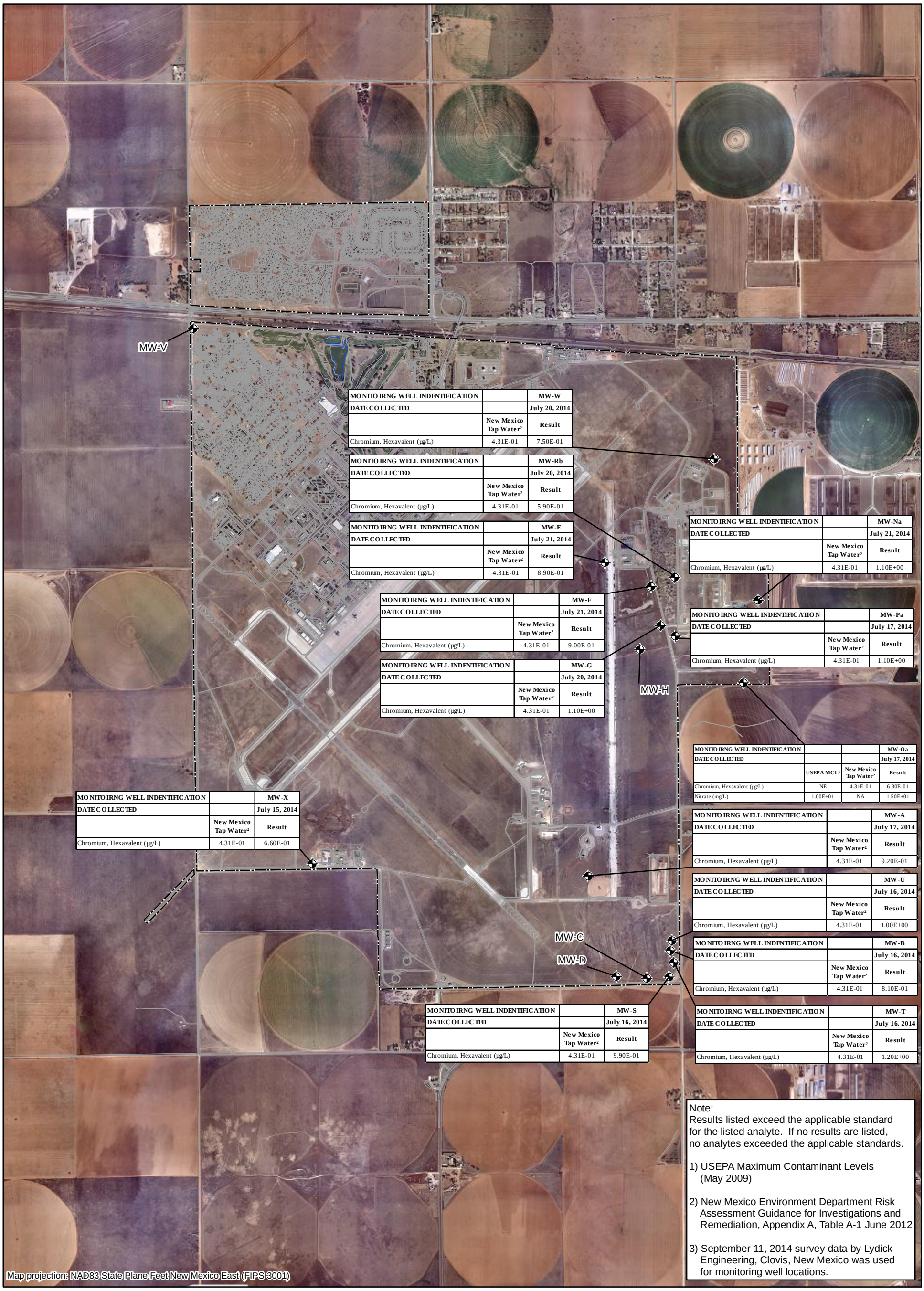


MONITORING WELL IDENTIFICATION		MW-W
DATE COLLECTED		July 20, 2014
	New Mexico Tap Water[2]	Result
Chromium, Hexavalent (µg/L)	4.31E-01	7.50E-01

MONITORING WELL IDENTIFICATION		MW-Rb
DATE COLLECTED		July 20, 2014
	New Mexico Tap Water[2]	Result
Chromium, Hexavalent (µg/L)	4.31E-01	5.90E-01

MONITORING WELL IDENTIFICATION		MW-E
DATE COLLECTED		July 21, 2014
	New Mexico Tap Water[2]	Result
Chromium, Hexavalent (µg/L)	4.31E-01	8.90E-01

MONITORING WELL IDENTIFICATION		MW-Na
DATE COLLECTED		July 21, 2014
	New Mexico Tap Water[2]	Result
Chromium, Hexavalent (µg/L)	4.31E-01	1.10E+00

MONITORING WELL IDENTIFICATION		MW-F
DATE COLLECTED		July 21, 2014
	New Mexico Tap Water[2]	Result
Chromium, Hexavalent (µg/L)	4.31E-01	9.00E-01

MONITORING WELL IDENTIFICATION		MW-Pa
DATE COLLECTED		July 17, 2014
	New Mexico Tap Water[2]	Result
Chromium, Hexavalent (µg/L)	4.31E-01	1.10E+00

MONITORING WELL IDENTIFICATION		MW-G
DATE COLLECTED		July 20, 2014
	New Mexico Tap Water[2]	Result
Chromium, Hexavalent (µg/L)	4.31E-01	1.10E+00

MONITORING WELL IDENTIFICATION			MW-Oa
DATE COLLECTED			July 17, 2014
	USEPA MCL[1]	New Mexico Tap Water[2]	Result
Chromium, Hexavalent (µg/L)	NE	4.31E-01	6.80E-01
Nitrate (mg/L)	1.00E+01	NA	1.50E+01

MONITORING WELL IDENTIFICATION		MW-X
DATE COLLECTED		July 15, 2014
	New Mexico Tap Water[2]	Result
Chromium, Hexavalent (µg/L)	4.31E-01	6.60E-01

MONITORING WELL IDENTIFICATION		MW-A
DATE COLLECTED		July 17, 2014
	New Mexico Tap Water[2]	Result
Chromium, Hexavalent (µg/L)	4.31E-01	9.20E-01

MONITORING WELL IDENTIFICATION		MW-U
DATE COLLECTED		July 16, 2014
	New Mexico Tap Water[2]	Result
Chromium, Hexavalent (µg/L)	4.31E-01	1.00E+00

MONITORING WELL IDENTIFICATION		MW-B
DATE COLLECTED		July 16, 2014
	New Mexico Tap Water[2]	Result
Chromium, Hexavalent (µg/L)	4.31E-01	8.10E-01

MONITORING WELL IDENTIFICATION		MW-S
DATE COLLECTED		July 16, 2014
	New Mexico Tap Water[2]	Result
Chromium, Hexavalent (µg/L)	4.31E-01	9.90E-01

MONITORING WELL IDENTIFICATION		MW-T
DATE COLLECTED		July 16, 2014
	New Mexico Tap Water[2]	Result
Chromium, Hexavalent (µg/L)	4.31E-01	1.20E+00

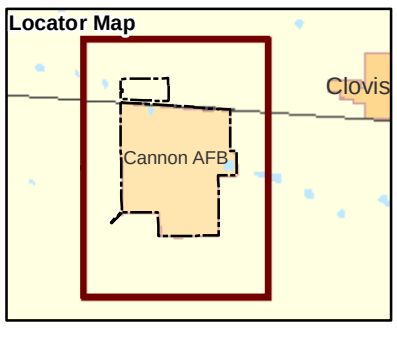
Note:
Results listed exceed the applicable standard for the listed analyte. If no results are listed, no analytes exceeded the applicable standards.

1) USEPA Maximum Contaminant Levels (May 2009)

2) New Mexico Environment Department Risk Assessment Guidance for Investigations and Remediation, Appendix A, Table A-1 June 2012

3) September 11, 2014 survey data by Lydick Engineering, Clovis, New Mexico was used for monitoring well locations.

Locator Map



Legend

Monitoring Well Location

Base Boundary

µg/L = Micrograms Per Liter
MCL = Maximum Contaminant Level
mg/L = Milligram Per Liter
NA = Not Applicable
NE = Not Established
USEPA = United States Environmental Protection Agency

N

2,000 1,000 0 2,000 Feet

Groundwater Results Exceeding Applicable Standards - July 2014
Cannon Air Force Base, New Mexico

Drawn By: JM	Date: 11/2/2015	Project No. 23446539	Figure 4-4
Checked By: KK	Revision: 0		

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5.1 DATA REVIEW PROCESS

Analytical data were reviewed and verified by URS in accordance with the Work Plan Addendum for Landfill and Institutional Control inspections Report (FPM/URS 2014a). The data review process included evaluations of the following elements and verification of raw data by a URS chemist:

- Laboratory case narrative/cooler receipt form
- Sample documentation
- Sample preservation and holding time compliance
- Instrument performance check (tuning)
- Initial calibration
- Initial calibration verification second source
- Continuing calibration verification
- Blank samples
- Laboratory control samples
- Surrogate compounds
- Internal standards
- MS/MSD
- Dilution tests
- Post digestion spikes
- Interference check solutions
- Laboratory duplicates
- Field duplicates
- Sensitivity
- Additional qualifications (professional judgment)

5.2 COMPLETENESS AND ANALYTICAL RESULTS VERIFICATION

The laboratory data reports and URS data verification reports are provided in **Appendix E**. **Table 5-1** presents all qualifications in tabular format. Qualifications applied to the analytical results based on the data review findings are summarized as follows.

- For results less than two times the limit of quantitation, professional judgment was used to qualify the common laboratory contaminants acetone in one sample and methylene chloride in three samples as nondetect (**U**).

- The total organic carbon results for the parent sample / field duplicate pair MWOA-7-14 / MWOA-7-14-A were qualified as estimated (**J**) due to field duplicate relative percent difference above evaluation criteria.
- The hexavalent chromium result for sample MWV-7-14 was rejected due to analysis 72 hours outside the 24 hour holding time criteria.
- The hexavalent chromium results for four samples were qualified as **J** due to analysis less than 24 hours outside the 24 hour holding time criteria.
- The 2-chloroethyl vinyl ether results for three samples, the hexavalent chromium result for one sample, the calcium result for one sample, and the magnesium result for one sample were qualified as **J** due to MS/MSD recoveries below evaluation criteria.

5.3 CONCLUSIONS OF DATA QUALITY REVIEW

The analytical data were found to be acceptable for their intended use based on the data reviews. Completeness, defined to be the percentage of analytical results judged to be valid, including estimated (**J/U**) data, was 98.9 percent for the July 2014 groundwater samples from Cannon AFB.

TABLE 5-1
SUMMARY OF ANALYTICAL DATA QUALIFICATIONS - JULY 2014
CANNON AFB, NEW MEXICO

SDG	Field ID	Matrix	Analysis	Analyte	URS Qual.	Comments
L709935	MWV-7-14	Aq	VOCs	2-Chloroethyl vinyl ether	UJ	Low MS/MSD recovery
L709935	MWV-7-14	Aq	Hexavalent chromium	Hexavalent chromium	R	Analyzed 3 days outside 24 hour criteria
L709935	MWV-7-14	Aq	Perchlorate	Perchlorate	R	Analyzed via Method 314.0, not 6850
L710204	MWC-7-14	Aq	VOCs	Methylene chloride	U	Common laboratory contaminant
L710204	MWC-7-14	Aq	Perchlorate	Perchlorate	R	Analyzed via Method 314.0, not 6850
L710204	MWD-7-14	Aq	Hexavalent Chromium	Hexavalent Chromium	J	Low MS/MSD recovery
L710204	MWD-7-14	Aq	VOCs	Methylene chloride	U	Common laboratory contaminant
L710204	MWD-7-14	Aq	Perchlorate	Perchlorate	R	Analyzed via Method 314.0, not 6850
L710204	MWX-7-14	Aq	VOCs	Methylene chloride	U	Common laboratory contaminant
L710204	MWX-7-14	Aq	Perchlorate	Perchlorate	R	Analyzed via Method 314.0, not 6850
L710491	MWB-7-14	Aq	Hexavalent Chromium	Hexavalent Chromium	J	Analyzed 1 day outside 24 hour criteria
L710491	MWB-7-14	Aq	Perchlorate	Perchlorate	R	Analyzed via Method 314.0, not 6850
L710491	MWS-7-14	Aq	Hexavalent Chromium	Hexavalent Chromium	J	Analyzed 1 day outside 24 hour criteria
L710491	MWS-7-14	Aq	Perchlorate	Perchlorate	R	Analyzed via Method 314.0, not 6850
L710491	MWT-7-14	Aq	Hexavalent Chromium	Hexavalent Chromium	J	Analyzed 1 day outside 24 hour criteria
L710491	MWT-7-14	Aq	Perchlorate	Perchlorate	R	Analyzed via Method 314.0, not 6850
L710491	MWU-7-14	Aq	Hexavalent Chromium	Hexavalent Chromium	J	Analyzed 1 day outside 24 hour criteria
L710491	MWU-7-14	Aq	Perchlorate	Perchlorate	R	Analyzed via Method 314.0, not 6850
L711018	MWA-7-14	Aq	Perchlorate	Perchlorate	R	Analyzed via Method 314.0, not 6850
L711018	MWOA-7-14	Aq	Perchlorate	Perchlorate	R	Analyzed via Method 314.0, not 6850
L711018	MWOA-7-14	Aq	TOC	TOC	J	Field duplicate RPD >30%
L711018	MWOA-7-14-A	Aq	Perchlorate	Perchlorate	R	Analyzed via Method 314.0, not 6850
L711018	MWOA-7-14-A	Aq	TOC	TOC	J	Field duplicate RPD >30%
L711018	MWPA-7-14	Aq	Perchlorate	Perchlorate	R	Analyzed via Method 314.0, not 6850
L711295	MWNA-7-14	Aq	VOCs	2-Chloroethyl vinyl ether	UJ	Low MS/MSD recovery
L711295	MWNA-7-14	Aq	Perchlorate	Perchlorate	R	Analyzed via Method 314.0, not 6850
L711300	MWF-7-14	Aq	VOCs	2-Chloroethyl vinyl ether	UJ	Low MS/MSD recovery
L711300	MWF-7-14	Aq	Metals	Calcium	J	Low MS/MSD recovery
L711300	MWF-7-14	Aq	Metals	Magnesium	J	Low MS/MSD recovery
L711300	MWF-7-14	Aq	Perchlorate	Perchlorate	R	Analyzed via Method 314.0, not 6850
L711329	MWE-7-14	Aq	Perchlorate	Perchlorate	R	Analyzed via Method 314.0, not 6850
L711384	MWRb-7-14	Aq	Perchlorate	Perchlorate	R	Analyzed via Method 314.0, not 6850
L711384	MWW-7-14	Aq	Perchlorate	Perchlorate	R	Analyzed via Method 314.0, not 6850
L711387	MWG-7-14	Aq	VOCs	Acetone	U	Common laboratory contaminant
L711387	MWG-7-14	Aq	Perchlorate	Perchlorate	R	Analyzed via Method 314.0, not 6850
L711387	MWH-7-14	Aq	Perchlorate	Perchlorate	R	Analyzed via Method 314.0, not 6850

Notes:

AFB = Air Force Base
Aq = Aqueous
ID = Identification
J = Estimated
LOQ = Limit of Quantitation
MS/MSD = Matrix Spike/Matrix Spike Duplicate
R = Rejected
RPD = Relative Percent Difference
SDG = Sample Delivery Group
TOC = Total Organic Carbon
Qual = Qualifier
U = Estimated
UJ = Estimated Nondetect
URS = URS Group Inc.
VOCs = Volatile Organic Compound

6.1 CONCLUSIONS

The nitrate/nitrite concentrations have historically exceeded the MCL of 10 milligrams per liter (mg/L) at MW-Oa, according to the 2010 (Trinity 2010) and the 2012 (Bhate 2013) Biennial Groundwater Monitoring and Annual Landfill Inspection Report. Nitrate/nitrite analytical results from MW-Oa in July 2014 indicated an increase in concentration from 11.8 mg/L in 2012 to 15.0 mg/L in 2014. Groundwater depicts an interpreted groundwater flow direction to the south in the vicinity of MW-Oa. This is likely due to groundwater being pulled south from beneath the Playa Lake by irrigation and residual nitrate contamination related to sanitary waste treatment practices associated with the Playa Lake.

Hexavalent chromium concentrations from July 2014 were above the NMED Risk Assessment Guidance screening criteria of 0.431 µg/L in 14 monitoring wells. Historically, the detection of hexavalent chromium above screening criteria was limited to MW-F, MW-G, and MW-H. The increase in detections could be the result of using USEPA hexavalent chromium method 7196A and a high historical reporting limit of 20.0 µg/L in 2008 (Tetra Tech 2008) and in 2010 (Trinity 2010). The 2012 Biennial Groundwater Monitoring and Annual Landfill Inspection Report (Bhate 2013) also utilized USEPA hexavalent chromium method 7196A and a reporting limit of 4.0 µg/L for analysis. Hexavalent chromium has been shown to be naturally occurring in some areas and these low levels, including in background wells, indicate that hexavalent chromium in groundwater is not related to activities at Cannon AFB.

Low levels of perchlorate below screening criteria and in background wells indicates the low levels of perchlorate reported in groundwater samples is naturally occurring and is not related to site activities. Also, previous reports used higher reporting limits which likely explains why it was not detected in previous sampling events.

Groundwater sampling analytical results from July 2014 indicated that there are no new contaminant releases to groundwater. Furthermore, proposed new or current Base activities do not pose a threat to groundwater.

6.2 RECOMMENDATIONS

Water levels will be collected in conjunction with the annual landfill and institutional controls inspection to meet NMED requirements. Biennial groundwater sampling will continue in accordance with the WPA (FPM/URS 2014a).

Monitoring well identification tags will be installed for all 18 wells and a sign identifying LF025 with be installed during the 2015 annual inspections. Corrected issues will be documented in future Biennial Groundwater Monitoring Well and Annual Landfill Inspection Reports.

Bhate. 2013. 2012 Biennial Groundwater Monitoring Report and Annual Landfill Inspection Report, Landfills LF-03, LF-04, LF-05, LF-25, and Former Sewage Lagoons. Cannon Air Force Base, New Mexico. April.

Department of Defense (DoD). 2007. The Department of Defense Environmental Data Quality Workgroup. Perchlorate Handbook, Rev 1. August.

FPM Remediations, Inc./URS Group, Inc. (FPM/URS). 2014a. Work Plan Addendum for Landfill and Institutional Control Inspection Sites. Cannon Air Force Base, New Mexico. June.

FPM/URS. 2014b. Annual Land Use Control Inspections Report. Cannon Air Force Base, New Mexico. June.

New Mexico Environmental Department (NMED). 2012. Risk Assessment Guidance for Site Investigations and Remediation, Volume 2. New Mexico Environmental Department, Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program. June.

Tetra Tech EC, Inc. and Brown, Burdine, & Associates, LLC (Tetra Tech). 2008. 2008 Biennial Groundwater Monitoring and Annual Landfill Inspection Report Landfill No. 3 (LF-03/SWMU 105), Landfill No. 4 (LF-04/SWMU 104), and Landfill No. 25 (LF-25/SWMU 97). Cannon Air Force Base, New Mexico. Final. December.

Tetra Tech EC, Inc. and Trinity Analysis & Development Corp. (Trinity) 2010. 2010 Biennial Groundwater Monitoring and Annual Landfill Inspection Report Landfill No. 3 (LF-03/SWMU 105), Landfill No. 4 (LF-04/SWMU 104), Landfill No. 25 (LF-25/SWMU 97), and Sewage Lagoons (SWMU 101). Cannon Air Force Base, New Mexico. Final. December.

DAILY QUALITY CONTROL REPORT

Date	**06/16/14**

Day	S	M	T	W	TH	F	S
		X					

On Site Hours	4
Travel Time	6
Office Time	0

Site Name and Location	Cannon Air Force Base
URS Project Manager	Corey Anderson
Project	NM-AZ Group PBR
Project No.	23446539/23449540
Contract No.	FA8903-13-C-0088

Weather	Bright Sun	Clear X	Overcast	Rain	Snow
Temp	To 32	32-50	50-70	70-85 X	85 up
Wind	Still	Moderate X	High	**Report No.**	
Humidity	Dry X	Moderate	Humid	1	

Subcontractors on Site:
None.

Equipment on Site:
Rental truck and car.

Visitors on Site:
Sheen Kottkamp and Laura Peters (Cannon AFB base contacts).

URS Personnel on Site:
Kyle Kloewer, Paul Wilson, Jenn Allen, James Conradi

Field Work Performed (including sampling):
Arrived at Cannon AFB. Acquired base passes.
Obtained supplies for monitoring well maintenance.
Conducted institutional controls for SD015, SW002, SW004, and SW006.

Quality Control Activities (including field calibration):
None.

Health and Safety and Activities:
Had the initial H&S meeting with all personnel on site. Discussed H&S procedures including, PPE, hazards with fire, heat stress, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures - including lightning, and dust storms, trains and RR track safety.

Observations/Problems Encountered/Corrective Action Taken:
None.

By James Conradi **Title** Field Manager

DAILY QUALITY CONTROL REPORT

Date	**06/17/14**

Day	S	M	T	W	TH	F	S
			X				

On Site Hours	11
Travel Time	0
Office Time	0

Site Name and Location	Cannon Air Force Base
URS Project Manager	Corey Anderson
Project	NM-AZ Group PBR
Project No.	23446539/23449540
Contract No.	FA8903-13-C-0088

Weather	Bright Sun	Clear	Overcast	Rain	Snow
		X			

Temp	To 32	32-50	50-70	70-85	85 up
				X	

Wind	Still	Moderate	High
		X	

Humidity	Dry	Moderate	Humid
	X		

Report No.

2

Subcontractors on Site:

None.

Equipment on Site:

Rental truck / car, Heron Dipper T 500ft. water level meter, cameras, decontamination supplies (DI water, brushes, spray bottles, buckets).

Visitors on Site:

Sheen Kottkamp (Cannon AFB base contact).

URS Personnel on Site:

Kyle Kloewer, Paul Wilson, Jenn Allen, James Conradi.

Field Work Performed (including sampling):

Water level / depth to bottom measured at monitoring wells D, C, S, T, B, U, X, V, and W.
Replaced missing well plugs at B, S, and X.
Pulled tubing out of S, B, and W.
Conducted Landfill inspections at LF005, LF025, LF003, LF004, LF002, and SI101.
Conducted institutional controls at FT006.

Quality Control Activities (including field calibration):

None.

Health and Safety and Activities:

Had the morning H&S meeting with all personnel on site. Discussed H&S procedures including, PPE, hazards with fire, heat stress, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures - including lightning, and dust storms, trains and RR track safety.

Observations/Problems Encountered/Corrective Action Taken:

Encountered Western Prairie Rattlesnake near MW-D. Short term corrective actions taken to avoid rattle snakes included: avoid walking long distances in tall grass, sweeping the ground with object, and making presence be known. Long term corrective actions will include the use a snake proof clothing, or snake chaps.

Depth to bottom of monitoring wells was difficult to determine due to depths of wells (up to 365 ft). Purchased steel fully-threaded rod to add weight to water level meter probe. Used zip-ties to attach steel rod to bottom of probe.

By James Conradi **Title** Field Manager

DAILY QUALITY CONTROL REPORT

Date	06/18/14

Day	S	M	T	W	TH	F	S
				X			

On Site Hours	10
Travel Time	0
Office Time	0

Site Name and Location	Cannon Air Force Base
URS Project Manager	Corey Anderson
Project	NM-AZ Group PBR
Project No.	23446539/23449540
Contract No.	FA8903-13-C-0088

Weather	Bright Sun	Clear	Overcast	Rain	Snow
		X			
Temp	To 32	32-50	50-70	70-85	85 up
				X	

Wind	Still	Moderate	High	**Report No.**
		X		
Humidity	Dry	Moderate	Humid	3
	X			

Subcontractors on Site:

None.

Equipment on Site:

Rental truck / car, Heron Dipper T 500ft. water level meter, cameras, decontamination supplies (DI water, brushes, spray bottles, buckets) Concrete installation tools (Shovels, pick axe, etc.).

Visitors on Site:

Sheen Kottkamp (Cannon AFB base contact).

URS Personnel on Site:

Kyle Kloewer, Paul Wilson, Jenn Allen, James Conradi

Field Work Performed (including sampling):

Water level / depth to bottom measured at monitoring wells E, H, G, F, Pa, Oa, and A.
Pulled tubing out of Pa, Oa, F, G, H, A.
Removed pumps from monitoring wells Pa and Oa.
Concrete well pads dug at monitoring wells A and B.
Cut fallen tree and removed from fence at LF025anf LF005.
Revisited institutional controls SD015 and Landfill LF04 for further inspections.
Conduct instituational controls at WL102, SD017,and SDO20.
Painted 4 wells, including bollards.

Quality Control Activities (including field calibration):

None.

Health and Safety and Activities:

Had the morning H&S meeting with all personnel on site. Discussed H&S procedures including, PPE, hazards with fire, heat stress, slip-trip-falls, and lifting hazards. Discussed route to hospital, snake safety, severe weather procedures - including lightning, and dust storms, trains and RR track safety.

Observations/Problems Encountered/Corrective Action Taken:

Lock on monitoring well Rb did not match key used on other wells, no water level or depth to bottom recorded. Notified base contact (Sheen K.) and he will acquire necessary key to unlock well.

Dedicated pump and tubing at monitoring well Na was not able to be removed. Water level and depth to bottom were not recorded.

By James Conradi **Title** Field Manager

DAILY QUALITY CONTROL REPORT

Date	**06/19/14**

Day	S	M	T	W	TH	F	S
					X		

On Site Hours	10
Travel Time	0
Office Time	0

Site Name and Location	Cannon Air Force Base
URS Project Manager	Corey Anderson
Project	NM-AZ Group PBR
Project No.	23446539/23449540
Contract No.	FA8903-13-C-0088

Weather	Bright Sun	Clear X	Overcast	Rain	Snow
Temp	To 32	32-50	50-70	70-85 X	85 up
Wind	Still	Moderate X	High	**Report No.**	
Humidity	Dry X	Moderate	Humid	4	

Subcontractors on Site:

None.

Equipment on Site:

Rental truck / car, Heron Dipper T 500ft. water level meter, cameras, decontamination supplies (DI water, brushes, spray bottles, buckets), Quickrete concrete crack filler crack seal, Concrete installation tools (Shovels, pick axe, bags of concrete, trowels, mixing water)

Visitors on Site:

Sheen Kottkamp (Cannon AFB base contact).

URS Personnel on Site:

Kyle Kloewer, Paul Wilson, Jenn Allen, James Conradi

Field Work Performed (including sampling):

Poured and finished concrete at monitoring wells A and B.
Painted remaining 14 wells including bollards.
Sealed cracks in concrete pads at monitoring wells C, D, and F.
Mended barbed wire fence at SI101 and LF025.

Quality Control Activities (including field calibration):

None

Health and Safety and Activities:

Had the morning H&S meeting with all personnel on site. Discussed H&S procedures including, PPE, hazards with fire, heat stress, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures - including lightning, and dust storms, trains and RR track safety.

Observations/Problems Encountered/Corrective Action Taken:

None.

By James Conradi **Title** Field Manager

DAILY QUALITY CONTROL REPORT

Date	**06/20/14**

Day	S	M	T	W	TH	F	S
						X	

On Site Hours	4
Travel Time	0
Office Time	0

Site Name and Location	Cannon Air Force Base
URS Project Manager	Corey Anderson
Project	NM-AZ Group PBR
Project No.	23446539/23449540
Contract No.	FA8903-13-C-0088

Weather	Bright Sun	Clear	Overcast	Rain	Snow
		X			

Temp	To 32	32-50	50-70	70-85	85 up
				X	

Wind	Still	Moderate	High
		X	

Humidity	Dry	Moderate	Humid
	X		

Report No.

5

Subcontractors on Site:

None.

Equipment on Site:

Rental truck / car, Heron Dipper T 500ft. water level meter, cameras, decontamination supplies (DI water, brushes, spray bottles, buckets)

Visitors on Site:

Sheen Kottkamp (Cannon AFB base contact).

URS Personnel on Site:

Kyle Kloewer, Paul Wilson, Jenn Allen, James Conradi

Field Work Performed (including sampling):

Staked locations for DP sampling at FL070 and AT109.

Acquired signatures from base personnel for dig permit.

Quality Control Activities (including field calibration):

None.

Health and Safety and Activities:

Had the morning H&S meeting with all personnel on site. Discussed H&S procedures including, PPE, hazards with fire, heat stress, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures - including lightning, and dust storms, trains and RR track safety.

Observations/Problems Encountered/Corrective Action Taken:

None.

By James Conradi **Title** Field Manager

DAILY QUALITY CONTROL REPORT

Date	07/14/14

Day	S	M	T	W	TH	F	S
		X					

On Site Hours	11
Travel Time	0
Office Time	0

Site Name and Location	Cannon Air Force Base
URS Project Manager	Mike Sonderman
Project	NM-AZ Group PBR
Project No.	23446539/23449540
Contract No.	FA8903-13-C-0088

Weather	Bright Sun	Clear	Overcast	Rain	Snow
	X				
Temp	To 32	32-50	50-70	70-85	85 up
					X
Wind	Still	Moderate	High	**Report No.**	
		X		1	
Humidity	Dry	Moderate	Humid		
	X				

Subcontractors on Site:

None.

Equipment on Site:

Geotech Pump, nitrogen tanks, Heron "Dipper T" 500ft. water level meter, YSI-556 MPS and flow-through cell, Lamotte 2020e turbidity meter, decontamination supplies (liquinox, brushes, spray bottles, buckets) sampling supplies, coolers, various tools (hammer, nut driver, tubing cutter) camera, IDW buckets, rental truck.

Visitors on Site:

None.

URS Personnel on Site:

Kyle Kloewer and James Conradi

Field Work Performed (including sampling):

-Acquired base passes.

-Acquired supplies and tools for sampling.

-Collected groundwater samples from monitoring well MW-V. Groundwater samples were collected from all monitoring wells were analyzed for VOC EPA Method 8260B, Tal metals 7470A/6020A, hexavalent chromium 7199, Perchlorate 6850, chloride/sulfate/nitrate/nitrite 9056, ammonium sm 4500 NM3, and TOC 9060A.

Well Purging

-Low-flow purging was conducted at a pumping rate of less than 500 ml/min with minimal drawdown until parameter stabilization. Field parameters collected included: pH, specific conductance, temperature, dissolved oxygen, oxidation-reduction potential (ORP), and turbidity. Purged groundwater was containerized in 5 gallon buckets, then transferred to a poly container.

Quality Control Activities (including field calibration):

Field Checked the PID with 100 ppb isobutylene. Calibrated Check YSI 556 MPS for pH (4, 7, 10).

Health and Safety and Activities:

Had the initial H&S meeting with all personnel on site. Discussed H&S procedures including, PPE, fire hazards, heat stress, sunburns, slip-trip-falls, lifting hazards, biological hazards including rattlesnakes, insects, and spiders. Discussed route to hospital, severe weather procedures - including lightning.

Observations/Problems Encountered/Corrective Action Taken:

Water would not rise to surface from monitoring well, called Field Environmental and was informed to alter refill/discharge times. Altered refill/discharge times corrected problem.

By James Conradi **Title** Field Manager

DAILY QUALITY CONTROL REPORT

Date	07/15/14

Day	S	M	T	W	TH	F	S
			X				

On Site Hours	11
Travel Time	0
Office Time	0

Site Name and Location	Cannon Air Force Base
URS Project Manager	Mike Sonderman
Project	NM-AZ Group PBR
Project No.	23446539/23449540
Contract No.	FA8903-13-C-0088

Weather	Bright Sun	Clear	Overcast	Rain	Snow
			X		

Temp	To 32	32-50	50-70	70-85	85 up
				X	

Wind	Still	Moderate	High
		X	

Humidity	Dry	Moderate	Humid
	X		

Report No. 2

Subcontractors on Site:
None.

Equipment on Site:
Geotech Pump, nitrogen tanks, Heron "Dipper T" 500ft. water level meter, YSI-556 MPS and flow-through cell, Lamotte 2020e turbidity meter, decontamination supplies (liquinox, brushes, spray bottles, buckets) sampling supplies, coolers, various tools (hammer, nut driver, tubing cutter) camera, IDW buckets, rental truck.

Visitors on Site:
None.

URS Personnel on Site:
Kyle Kloewer and James Conradi

Field Work Performed (including sampling):

-Collected groundwater samples from monitoring wells MW-X, MW-D, and MW-C. Groundwater samples were collected from all monitoring wells were analyzed for VOC EPA Method 8260B, Tal metals 7470A/6020A, hexavalent chromium 7199, Perchlorate 6850, chloride/sulfate/nitrate/nitrite 9056, ammonium sm 4500 NM3, and TOC 9060A.

Well Purging
-Low-flow purging was conducted at a pumping rate of less than 500 ml/min with minimal drawdown until parameter stabilization. Field parameters collected included: pH, specific conductance, temperature, dissolved oxygen, oxidation-reduction potential (ORP), and turbidity. Purged groundwater was containerized in 5 gallon buckets, then transferred to a poly container.

Quality Control Activities (including field calibration):
Field Checked the PID with 100 ppb isobutylene. Calibrated Check YSI 556 MPS for pH (4, 7, 10).

Health and Safety and Activities:
Had the morning H&S meeting with all personnel on site. Discussed H&S procedures including, PPE, fire hazards, heat stress, sunburns, slip-trip-falls, lifting hazards, biological hazards including rattlesnakes, insects, and spiders. Discussed route to hospital, severe weather procedures - including lightning.

Observations/Problems Encountered/Corrective Action Taken:
None.

By James Conradi **Title** Field Manager

DAILY QUALITY CONTROL REPORT

Date	07/16/14

Day	S	M	T	W	TH	F	S
				X			

On Site Hours	10
Travel Time	0
Office Time	0

Site Name and Location	Cannon Air Force Base
URS Project Manager	Mike Sonderman
Project	NM-AZ Group PBR
Project No.	23446539/23449540
Contract No.	FA8903-13-C-0088

Weather	Bright Sun	Clear X	Overcast X	Rain	Snow
Temp	To 32	32-50	50-70	70-85 X	85 up
Wind	Still	Moderate X	High	**Report No.**	
Humidity	Dry X	Moderate	Humid	3	

Subcontractors on Site:
None.

Equipment on Site:
Geotech Pump, nitrogen tanks, Heron "Dipper T" 500ft. water level meter, YSI-556 MPS and flow-through cell, Lamotte 2020e turbidity meter, decontamination supplies (liquinox, brushes, spray bottles, buckets) sampling supplies, coolers, various tools (hammer, nut driver, tubing cutter) camera, IDW buckets, rental truck.

Visitors on Site:
None.

URS Personnel on Site:
Kyle Kloewer and James Conradi

Field Work Performed (including sampling):

-Collected groundwater samples from monitoring wells MW-S, MW-T, MW-B, and MW-U. Groundwater samples were collected from all monitoring wells were analyzed for VOC EPA Method 8260B, Tal metals 7470A/6020A, hexavalent chromium 7199, Perchlorate 6850, chloride/sulfate/nitrate/nitrite 9056, ammonium sm 4500 NM3, and TOC 9060A.

Well Purging
-Low-flow purging was conducted at a pumping rate of less than 500 ml/min with minimal drawdown until parameter stabilization. Field parameters collected included: pH, specific conductance, temperature, dissolved oxygen, oxidation-reduction potential (ORP), and turbidity. Purged groundwater was containerized in 5 gallon buckets, then transferred to a poly container.

Quality Control Activities (including field calibration):
Field Checked the PID with 100 ppb isobutylene. Calibrated Check YSI 556 MPS for pH (4, 7, 10).

Health and Safety and Activities:
Had the morning H&S meeting with all personnel on site. Discussed H&S procedures including, PPE, fire hazards, heat stress, sunburns, slip-trip-falls, lifting hazards, biological hazards including rattlesnakes, insects, and spiders. Discussed route to hospital, severe weather procedures - including lightning.

Observations/Problems Encountered/Corrective Action Taken:
None.

By James Conradi **Title** Field Manager

DAILY QUALITY CONTROL REPORT

Date	07/17/14

Day	S	M	T	W	TH	F	S
					X		

On Site Hours	11
Travel Time	0
Office Time	0

Site Name and Location	Cannon Air Force Base
URS Project Manager	Mike Sonderman
Project	NM-AZ Group PBR
Project No.	23446539/23449540
Contract No.	FA8903-13-C-0088

Weather	Bright Sun	Clear X	Overcast X	Rain	Snow
Temp	To 32	32-50	50-70	70-85 X	85 up
Wind	Still	Moderate X	High	**Report No.**	
Humidity	Dry X	Moderate	Humid	4	

Subcontractors on Site:

None.

Equipment on Site:

Geotech Pump, nitrogen tanks, Heron "Dipper T" 500ft. water level meter, YSI-556 MPS and flow-through cell, Lamotte 2020e turbidity meter, decontamination supplies (liquinox, brushes, spray bottles, buckets) sampling supplies, coolers, various tools (hammer, nut driver, tubing cutter) camera, IDW buckets, rental truck.

Visitors on Site:

None.

URS Personnel on Site:

Kyle Kloewer and James Conradi

Field Work Performed (including sampling):

-Collected groundwater samples from monitoring wells MW-A, MW-Oa, and MW-Pa. Groundwater samples were collected from all monitoring wells were analyzed for VOC EPA Method 8260B, Tal metals 7470A/6020A, hexavalent chromium 7199, Perchlorate 6850, chloride/sulfate/nitrate/nitrite 9056, ammonium sm 4500 NM3, and TOC 9060A.

Well Purging

-Low-flow purging was conducted at a pumping rate of less than 500 ml/min with minimal drawdown until parameter stabilization. Field parameters collected included: pH, specific conductance, temperature, dissolved oxygen, oxidation-reduction potential (ORP), and turbidity. Purged groundwater was containerized in 5 gallon buckets, then transferred to a poly container.

Quality Control Activities (including field calibration):

Field Checked the PID with 100 ppb isobutylene. Calibrated Check YSI 556 MPS for pH (4, 7, 10).

A duplicate groundwater sample was collected from monitoring well MW-Oa (sample ID: MWOa-7-14-A)

Health and Safety and Activities:

Had the morning H&S meeting with all personnel on site. Discussed H&S procedures including, PPE, fire hazards, heat stress, sunburns, slip-trip-falls, lifting hazards, biological hazards including rattlesnakes, insects, and spiders. Discussed route to hospital, severe weather procedures - including lightning.

Observations/Problems Encountered/Corrective Action Taken:

None.

By James Conradi **Title** Field Manager

DAILY QUALITY CONTROL REPORT

Date	07/18/14

Day	S	M	T	W	TH	F	S
						X	

On Site Hours	10
Travel Time	0
Office Time	0

Site Name and Location	Cannon Air Force Base
URS Project Manager	Mike Sonderman
Project	NM-AZ Group PBR
Project No.	23446539/23449540
Contract No.	FA8903-13-C-0088

Weather	Bright Sun	Clear	Overcast	Rain	Snow
		X	X		

Temp	To 32	32-50	50-70	70-85	85 up
			X	X	

Wind	Still	Moderate	High	**Report No.**
	X			

Humidity	Dry	Moderate	Humid	
	X			5

Subcontractors on Site:

None.

Equipment on Site:

Heron "Dipper T" 500ft. water level meter, assorted sizes of well caps, general hand tools for well cap installation, 3/8" and 1/4" tubing and dedicated pumps for MW-OA and Pa, rental truck.

Visitors on Site:

None.

URS Personnel on Site:

Kyle Kloewer and James Conradi

Field Work Performed (including sampling):

-Inspected MW-Rb.
-Installed new well caps on MW-E, MW-F, MW-G, and MW-H.
-Approximately 4 inches of riser PVC was removed from MW-E.
-Approximately 1 inches of riser PVC was removed from MW-F.
-Approximately 9 inches of riser PVC was removed from MW-G.
-Approximately 6 inches of riser PVC was removed from MW-H.
-Removed stakes at AT109.

Quality Control Activities (including field calibration):

None.

Health and Safety and Activities:

Had the morning H&S meeting with all personnel on site. Discussed H&S procedures including, PPE, fire hazards, heat stress, sunburns, slip-trip-falls, lifting hazards, biological hazards including rattlesnakes, insects, and spiders. Discussed route to hospital, severe weather procedures - including lightning.

Observations/Problems Encountered/Corrective Action Taken:

Attempted installation of dedicated pumps at MW-Oa and Pa. Could not find correct fitting to install the pump. Will ship both pumps back to Omaha and order correct fitting and rebuild kits for each. Will then ship pumps back to Cannon AFB to be installed.

By James Conradi **Title** Field Manager

DAILY QUALITY CONTROL REPORT

Date	07/19/14

Day	S	M	T	W	TH	F	S
							X

On Site Hours	4
Travel Time	0
Office Time	0

Site Name and Location	Cannon Air Force Base
URS Project Manager	Mike Sonderman
Project	NM-AZ Group PBR
Project No.	23446539/23449540
Contract No.	FA8903-13-C-0088

Weather	Bright Sun	Clear	Overcast	Rain	Snow
		X	X		
Temp	To 32	32-50	50-70	70-85	85 up
				X	X

Wind	Still	Moderate	High	**Report No.**
		X		
Humidity	Dry	Moderate	Humid	6
	X			

Subcontractors on Site:

None.

Equipment on Site:

Master locks #3QLD, Chainsaw, Chainsaw PPE, rental truck.

Visitors on Site:

None.

URS Personnel on Site:

Kyle Kloewer and James Conradi

Field Work Performed (including sampling):

-Added new locks on all 18 monitoring wells and at LF005 and SI101 gates.
-Recorded dimensions of Landfill signs.
-Determined the amount of fence that needed to be fixed at LF005.

Quality Control Activities (including field calibration):

None.

Health and Safety and Activities:

Had the morning H&S meeting with all personnel on site. Discussed H&S procedures including, PPE (chainsaw PPE and QMS operating procedure), fire hazards, heat stress, sunburns, slip-trip-falls, lifting hazards, biological hazards including rattlesnakes, insects, and spiders. Discussed route to hospital, severe weather procedures - including lightning.

Observations/Problems Encountered/Corrective Action Taken:

Attempted to cut down trees at LF005. After cutting down 4 trees the chain feel off. Did not have to tools to fix the chain. Determined that cutting down the rest of the trees would result in the possibility of encountering a rattlesnake. Did not fix the chainsaw, or cut anymore trees.

By James Conradi **Title** Field Manager

DAILY QUALITY CONTROL REPORT

Date	07/20/14

Day	S	M	T	W	TH	F	S
	X						

On Site Hours	15
Travel Time	0
Office Time	0

Site Name and Location	Cannon Air Force Base
URS Project Manager	Mike Sonderman
Project	NM-AZ Group PBR
Project No.	23446539/23449540
Contract No.	FA8903-13-C-0088

Weather	Bright Sun	Clear	Overcast	Rain	Snow
		X			
Temp	To 32	32-50	50-70	70-85	85 up
					X
Wind	Still	Moderate	High	**Report No.**	
	X				
Humidity	Dry	Moderate	Humid	7	
	X				

Subcontractors on Site:
None.

Equipment on Site:
Geotech Pump, nitrogen tanks, Heron "Dipper T" 500ft. water level meter, YSI-556 MPS and flow-through cell, Lamotte 2020e turbidity meter, decontamination supplies (liquinox, brushes, spray bottles, buckets) sampling supplies, coolers, various tools (hammer, nut driver, tubing cutter) camera, IDW buckets, rental truck.

Visitors on Site:
None.

URS Personnel on Site:
Kyle Kloewer and James Conradi

Field Work Performed (including sampling):

-Collected groundwater samples from monitoring wells MW-H, MW-G, MW-Rb, and MW-W. Groundwater samples were collected from all monitoring wells were analyzed for VOC EPA Method 8260B, Tal metals 7470A/6020A, hexavalent chromium 7199, Perchlorate 6850, chloride/sulfate/nitrate/nitrite 9056, ammonium sm 4500 NM3, and TOC 9060A.

Well Purging
-Low-flow purging was conducted at a pumping rate of less than 500 ml/min with minimal drawdown until parameter stabilization. Field parameters collected included: pH, specific conductance, temperature, dissolved oxygen, oxidation-reduction potential (ORP), and turbidity. Purged groundwater was containerized in 5 gallon buckets, then transferred to a poly container.

Quality Control Activities (including field calibration):
Field Checked the PID with 100 ppb isobutylene. Calibrated Check YSI 556 MPS for pH (4, 7, 10).

Health and Safety and Activities:
Had the morning H&S meeting with all personnel on site. Discussed H&S procedures including, PPE, fire hazards, heat stress, sunburns, slip-trip-falls, lifting hazards, biological hazards including rattlesnakes, insects, and spiders. Discussed route to hospital, severe weather procedures - including lightning.

Observations/Problems Encountered/Corrective Action Taken:
Attempted to Sample at MW-Na. Was not able to purge any water. Informed that MW-Na requires a tubing extension to be sample. Acquired extension and will collected sample on 7-21-2014.

By James Conradi **Title** Field Manager

DAILY QUALITY CONTROL REPORT

Date	07/21/14

Day	S	M	T	W	TH	F	S
		X					

On Site Hours	10
Travel Time	0
Office Time	0

Site Name and Location	Cannon Air Force Base
URS Project Manager	Mike Sonderman
Project	NM-AZ Group PBR
Project No.	23446539/23449540
Contract No.	FA8903-13-C-0088

Weather	Bright Sun	Clear X	Overcast	Rain	Snow
Temp	To 32	32-50	50-70	70-85 X	85 up
Wind	Still X	Moderate	High	**Report No.**	
Humidity	Dry X	Moderate	Humid	8	

Subcontractors on Site:
None.

Equipment on Site:
Geotech Pump, nitrogen tanks, Heron "Dipper T" 500ft. water level meter, YSI-556 MPS and flow-through cell, Lamotte 2020e turbidity meter, decontamination supplies (liquinox, brushes, spray bottles, buckets) sampling supplies, coolers, various tools (hammer, nut driver, tubing cutter) camera, IDW buckets, rental truck.

Visitors on Site:
None.

URS Personnel on Site:
Kyle Kloewer and James Conradi

Field Work Performed (including sampling):

-Collected groundwater samples from monitoring wells MW-F, MW-E, and MW-Na. Groundwater samples were collected from all monitoring wells were analyzed for VOC EPA Method 8260B, Tal metals 7470A/6020A, hexavalent chromium 7199, Perchlorate 6850, chloride/sulfate/nitrate/nitrite 9056, ammonium sm 4500 NM3, and TOC 9060A.

Well Purging
-Low-flow purging was conducted at a pumping rate of less than 500 ml/min with minimal drawdown until parameter stabilization. Field parameters collected included: pH, specific conductance, temperature, dissolved oxygen, oxidation-reduction potential (ORP), and turbidity. Purged groundwater was containerized in 5 gallon buckets, then transferred to a poly container.

Quality Control Activities (including field calibration):
Field Checked the PID with 100 ppb isobutylene. Calibrated Check YSI 556 MPS for pH (4, 7, 10).
A MS/MSD groundwater sample was collected from monitoring well MW-F.

Health and Safety and Activities:
Had the morning H&S meeting with all personnel on site. Discussed H&S procedures including, PPE, fire hazards, heat stress, sunburns, slip-trip-falls, lifting hazards, biological hazards including rattlesnakes, insects, and spiders. Discussed route to hospital, severe weather procedures - including lightning.

Observations/Problems Encountered/Corrective Action Taken:
None.

By James Conradi **Title** Field Manager

DAILY QUALITY CONTROL REPORT

Date	**10/28/14**

Day	S	M	T	W	TH	F	S
			X				

On Site Hours	8
Travel Time	0
Office Time	0

Site Name and Location	Cannon Air Force Base
URS Project Manager	Mike Sonderman
Project	NM-AZ Group PBR
Project No.	23446539/23449540
Contract No.	FA8903-13-C-0088

Weather	Bright Sun	Clear	Overcast	Rain	Snow
		X			
Temp	To 32	32-50	50-70	70-85	85 up
			X		

Wind	Still	Moderate	High	**Report No.**
	X			
Humidity	Dry	Moderate	Humid	1
	X			

Subcontractors on Site:

Bob Rogers (B and D Waste Management).
Charles Stevens (A Cut Above Tree Service).

Equipment on Site:

Rental truck, chainsaw, oil, gas, various tools, roll-off dumpster, PPE (chaps, helmet, earmuffs, gloves).

Visitors on Site:

None.

URS Personnel on Site:

Kyle Kloewer and James Conradi.

Field Work Performed (including sampling):

Cut and cleared trees at SI-101.
Met with roll-off dumpster contractor and placed dumpster near LF005.
Met with tree removal contractor and showed him trees to be removed at LF025.

Quality Control Activities (including field calibration):

None.

Health and Safety and Activities:

Had the initial H&S meeting with all personnel on site. Discussed H&S procedures including, PPE, fire hazards, heat stress, sunburns, slip-trip-falls, lifting hazards, biological hazards including rattlesnakes, insects, and spiders. Discussed route to hospital, severe weather procedures - including lightning.

Observations/Problems Encountered/Corrective Action Taken:

None.

By James Conradi **Title** Field Manager

DAILY QUALITY CONTROL REPORT

Date	**10/29/14**

Day	S	M	T	W	TH	F	S
				X			

On Site Hours	10
Travel Time	0
Office Time	0

Site Name and Location	Cannon Air Force Base
URS Project Manager	Mike Sonderman
Project	NM-AZ Group PBR
Project No.	23446539/23449540
Contract No.	FA8903-13-C-0088

Weather	Bright Sun	Clear	Overcast	Rain	Snow
		X			
Temp	To 32	32-50	50-70	70-85	85 up
			X		
Wind	Still	Moderate	High	**Report No.**	
	X	X			
Humidity	Dry	Moderate	Humid	2	
	X				

Subcontractors on Site:
Steve Dragony (Embassy Landscaping).

Equipment on Site:
Rental truck, chainsaw, oil, gas, various tools, roll-off dumpster, PPE (chaps, helmet, earmuffs, gloves).

Visitors on Site:
None.

URS Personnel on Site:
Kyle Kloewer and James Conradi.

Field Work Performed (including sampling):
Cut and cleared trees at SI-101 and LF005.
Met with mowing contractor and showed him the area that needs to mowed within Cell 3 at LF005.
Mowing contactor removed brush from SI-101 using tractor and shredder.

Quality Control Activities (including field calibration):
None.

Health and Safety and Activities:
Had the morning H&S meeting with all personnel on site. Discussed H&S procedures including, PPE, fire hazards, heat stress, sunburns, slip-trip-falls, lifting hazards, biological hazards including rattlesnakes, insects, and spiders. Discussed route to hospital, severe weather procedures - including lightning.

Observations/Problems Encountered/Corrective Action Taken:
None.

By James Conradi **Title** Field Manager

DAILY QUALITY CONTROL REPORT

Date	10/30/14

Day	S	M	T	W	TH	F	S
					X		

On Site Hours	8
Travel Time	0
Office Time	0

Site Name and Location	Cannon Air Force Base
URS Project Manager	Mike Sonderman
Project	NM-AZ Group PBR
Project No.	23446539/23449540
Contract No.	FA8903-13-C-0088

Weather	Bright Sun	Clear X	Overcast	Rain	Snow
Temp	To 32	32-50	50-70 X	70-85	85 up
Wind	Still	Moderate X	High X	**Report No.**	
Humidity	Dry X	Moderate	Humid	3	

Subcontractors on Site:
None.

Equipment on Site:
Rental truck, various tools, GPS, marking paint and stakes, PPE (level D).

Visitors on Site:
None.

URS Personnel on Site:
Kyle Kloewer and James Conradi.

Field Work Performed (including sampling):
Attended utility clearance meeting on base. Called New Mexico 811 for utility clearance.
Acquired signatures for dig permit clearance for AT109, FL070, and FT006.
Staked boring locations at AT109 and FL070.

Quality Control Activities (including field calibration):
None.

Health and Safety and Activities:
Had the morning H&S meeting with all personnel on site. Discussed H&S procedures including, PPE, fire hazards, heat stress, sunburns, slip-trip-falls, lifting hazards, biological hazards including rattlesnakes, insects, and spiders. Discussed route to hospital, severe weather procedures - including lightning.

Observations/Problems Encountered/Corrective Action Taken:
None.

By James Conradi **Title** Field Manager

DAILY QUALITY CONTROL REPORT

Date	**10/31/14**

Day	S	M	T	W	TH	F	S
						X	

On Site Hours	5
Travel Time	0
Office Time	0

Site Name and Location	Cannon Air Force Base
URS Project Manager	Mike Sonderman
Project	NM-AZ Group PBR
Project No.	23446539/23449540
Contract No.	FA8903-13-C-0088

Weather	Bright Sun	Clear X	Overcast	Rain	Snow
Temp	To 32	32-50	50-70 X	70-85	85 up
Wind	Still	Moderate X	High X	**Report No.**	
Humidity	Dry X	Moderate	Humid	4	

Subcontractors on Site:
None.

Equipment on Site:
Rental truck, various tools, PPE (level D).

Visitors on Site:
None.

URS Personnel on Site:
Kyle Kloewer and James Conradi.

Field Work Performed (including sampling):
Straightened gate on East side of fence at Cell 3 within LF005.
Installed chain and lock at East and North gate of Cell 3 within LF005.
Installed refurbished dedicated pumps in MW-Oa and MW-Pa.

Quality Control Activities (including field calibration):
None.

Health and Safety and Activities:
Had the morning H&S meeting with all personnel on site. Discussed H&S procedures including, PPE, fire hazards, heat stress, sunburns, slip-trip-falls, lifting hazards, biological hazards including rattlesnakes, insects, and spiders. Discussed route to hospital, severe weather procedures - including lightning.

Observations/Problems Encountered/Corrective Action Taken:
None.

By James Conradi **Title** Field Manager

Cover System Inspection Report
LF025 and SI101
Cannon AFB, New Mexico

Inspector Name and Title: Jennifer Allen / Geologist
Days since last rain fall: November 23, 2013
(Contact Base Weather Service) 24 days

Date: 12/18/13
Amount of rainfall: 0.21"

Inspection Type	Check as Appropriate
Annual	
Other (Identify)	

	LF025		SI101	
1. Fences and Gates:	Yes	No	Yes	No
• Structural integrity?	X		X	
• Gates locks in place?	X		X	
• Signage in place?	X		X	
• Tumbleweeds and silt built up?	X		X	

Problems observed with the fences/gates/signage: LF025 None	SI101 Fence is not locked
Maintenance or repairs required: None	None
Maintenance to be performed by (Subcontractor name and date): None	None

	LF025		SI101	
2. Cover:	Yes	No	Yes	No
• Overall structural integrity maintained?	X		X	
• Surface erosion present?		X		X
• Gullies/washouts present?		X		X
• Exposed buried waste?	X			X
• As-constructed contours (topographic highs) intact?	X		X	
• As-constructed contours (depressions) intact?	X		X	
• Stormwater runoff contained within boundaries of site?	X		X	
• Evidence of drainage pathways/diverted runoff?		X		X
• Tumbleweeds or silt built up?	X		X	

Problems observed with the cover: None	None
Maintenance or repair required: None	None

LF25

Vegitation @ LF025 varies, most of the cover is grasses (2ft tell) and sage brush. Some yucca plants were observed @ the base of the high points where water run off occurs. Full grown Trees are present across the site ~~and~~ with average trunk diameter of apx 1'. Vegitation covers apx 75% of area. Sparse areas have concrete rubble and construction debris. Soil is rocky. No animal burrows were observed. Topography varies across the site. From low point to high point is apx 15 ft. The high areas are mostly in the center of the LF. We saw a downed power line that runs W to E across the LF

Maintenance to be performed by (Subcontractor name and date):

None

3. Berms (Indicate NA if not present) N/A	LF025		SI101	
	Yes	No	Yes	No
• Is any erosion present?				
• Is any ponding present?				
• Stormwater runoff contained onsite?				

Describe location and condition:

Problems observed with berms:

Maintenance or repairs required:

Maintenance to be performed by (Subcontractor name and date):

4. Drainage Ditches/Channels (Indicate NA if no channels are present) N/A	LF025		SI101	
	Yes	No	Yes	No
• Is any erosion present?				
• Is buildup of sediment/silt debris present?				
• Is displaced crushed concrete present?				
• Is stormwater runoff contained onsite?				
• Excess accumulation of tumbleweeds present?				

Describe location and condition:

Problems observed with channels:

Maintenance or repair required:

Maintenance to be performed by (Subcontractor name and date):

5. Vegetation	LF025		SI101	
	Yes	No	Yes	No
• Vegetation native perennial?	X		X	
• Vegetation in good condition?	X			X
• Bare/sparse areas?	X		X	

LF025

Describe overall condition: Good condition, topography varies throught the site, most high points are found in the center of the LF

Estimate extent and type of vegetative cover: tall grass, sage brush, trees
vegitation covers apx 75% of area

Maintenance or repairs required:
Observed loose wires from a power line that runs aroross LF25 from W to E

Maintenance to be performed by (Subcontractor name and date):
None

	LF025		SI101	
6. Monitoring Wells	Yes	No	Yes	No
Evidence of tampering?	X			X
Damage?		X	X	

Problems observed with the wells.
None

MW-H has a broken PVC cap. Cap was replaced by a rubber coupler w/ plug

11. Changes required to the Monitoring and Maintenance Plan?

SI 101: Vegitation is sparse @ apx a 50% cover. Vegitation is mostly tall grasses (1'-2') and weeds with a few small shrubs.

Jennifer Allen
Inspector's Name

Inspector's Signature

Date

Cover System Inspection Report
Landfill-03 and Landfill-04
Cannon AFB, New Mexico

Inspector Name and Title: Jennifer Allen, Geologist
Days since last rain fall: November 23, 2013
(Contact Base Weather Service) 24 days

Date: 12/17/18
Amount of rainfall: 0.21"

Inspection Type	Check as Appropriate
Annual	✓
Other (identify)	

	LF003		LF004	
1. Cover:	Yes	No	Yes	No
• Overall structural integrity maintained?	X		X	
• Surface erosion present?	X		X	
• Gullies/washouts present?	X		X	
• Exposed buried waste?	X		X	
• As-constructed contours (topographic highs) intact?	X		X	
• As-constructed contours (depressions) intact?	X		X	
• Stormwater runoff contained within boundaries of site?	X			X
• Evidence of drainage pathways/diverted runoff?		X	X	
• Tumbleweeds or silt built up?		X		X

Describe overall condition:
Good

Problems observed with the cover: LF003 Several small wash outs on North boundary	LF004 Small washout near rip rap on South side
Maintenance or repairs required: LF003 None	None
Maintenance to be performed by (Subcontractor name and date): LF003 None	None

	LF003		LF004	
2. Vegetation:	Yes	No	Yes	No
• Vegetation native perennial?	X		X	
• Vegetation in good condition?	X			X
• Bare/sparse areas?	X		X	

Describe overall condition: Vegitation LF003 covers apx 50%, mostly grasses < 1' and weeds < 0.5'	Poor vegitation cover
Estimate extent and type of vegetative cover: Fair condition, much of LF is sparse (50%)	Sparsly vegitated 25%

LF003

Vegitation covers apx 50% of area with short (less then 1') grasses and weeds. Soil is rocky, some small concrete/ construction debris present. Some small animal burrows. Landfill is built up apx 2-3 ft from boundary w/ high point in center. Topography is generally flat within the LF. Some surface erosion present along Northern boundary (along gravel road to radio tower bldg) Erosion consists of several small wash outs.

LF004

Vegitation is sparse on the landfill @ only 25%. Vegitation is short grass and weeds. Soil is full of small concrete/asphalt debris. No observed animal burrows. Land fill is built up apx 8 ft from boundary and is flat on top. A wash out on the southern boundary has been repaired with rip rap. A few small wash outs can be found around the rip rap.

Maintenance or repairs required:

Re seeding?

Maintenance to be performed by (Subcontractor name and date):

None

3. Berms (Indicate NA if no berms are present) N/A	LF003		LF004	
	Yes	No	Yes	No
• Is any erosion present?				
• Is any ponding present?				
• Stormwater runoff contained onsite?				

Describe location and condition:

Problems observed with berms:

Maintenance or repairs required:

Maintenance to be performed by (Subcontractor name and date):

4. Drainage Ditches/Channels (Indicate NA if no channels are present) N/A	LF003		LF004	
	Yes	No	Yes	No
• Is any erosion present?				
• Is buildup of sediment/silt debris present?				
• Stormwater runoff contained onsite?				
• Excess accumulation of tumbleweeds present?				

Describe location and condition:

Problems observed with channels:

Maintenance or repair required:

Maintenance to be performed by (Subcontractor name and date):

	LF003		LF004	
5. Monitoring Wells	Yes	No	Yes	No
• Evidence of tampering?		X		X
• Damage?	X		X	

Problems observed with wells:	
LF003 Broken metal well cover, broken lock	LF004 2 wells @ LF004, unlabeled

	LF003		LF004	
6. Fences/Gates/Signage (Indicate NA if not present) No Fence or Gate @ LF003/LF004	Yes	No	Yes	No
• Structural integrity?	X		X	
• Gate locks in place?		X		X
• Signage in place?	X		X	
• Tumbleweeds or silt built up?		X		X

Problems observed with fencing/gates/signage: LF003 None, signs on all boundaries	None, signs on all boundaries
Maintenance or repair required: ? LF003 None	None
Maintenance to be performed by (Subcontractor name and date): None LF003	None

11. Changes required to the Monitoring and Maintenance Plan?

Jennifer Allen
Inspector's Name

Inspector's Signature

Date

Cover System Inspection Report
LF005
Cannon AFB, New Mexico

Inspector Name and Title: Jennifer Allen / James Conradi Geologist Date: 12/17/13
Days since last rain fall: November 23, 2013 Amount of rainfall: 0.21"
(Contact Base Weather Service) 24 days

Inspection Type	Check as Appropriate
Annual	✓
Other (Identify)	

	LF005		LF002	
1. Fences and Gates:	Yes	No	Yes	No
• Structural integrity?	X		X	
• Gates locks in place?	X			X
• Signage in place?	X			X
• Tumbleweeds and silt built up? (No silt build up)	X			X

Problems observed with the fences/gates/signage: LF005 None | LF002 None (No Fencing)

Maintenance or repairs required: LF005 Fence broken near MW11, and also near MW-5. Needs minor repair

Maintenance to be performed by (Subcontractor name and date):

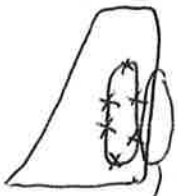
	LF005		LF002	
2. Cover: * See reverse	Yes	No	Yes	No
• Overall structural integrity maintained?	X		X	
• Surface erosion present?		X		X
• Gullies/washouts present?		X		X
• Exposed buried waste?	X			X
• As-constructed contours (topographic highs) intact?				X
• As-constructed contours (depressions) intact?				X
• Stormwater runoff contained within boundaries of site?	X		X	
• Evidence of drainage pathways/diverted runoff?		X		X
• Tumbleweeds or silt built up?	X			X

Problems observed with the cover:
None

Maintenance or repair required:
None

LF005

* Near the LF05 SE corner, running N to S is a fenced off area that is elevated from the surrounding terrain. PVC is visible on top of the 'cap' in multiple places. (pics 43-54)



SE boundary of landfill is elevated along perimeter fence. Some small animal burrows, vegitation is more sparse

NOTE Vegitation is mostly consistent w/ apx 2' tall grasses w/ some yucca + small cactus. Topography is mostly flat but there are some dips and rises which do not seem to be a result of erosion. Soil is rocky w/ surface debris in areas. Trace trees (7) w/ 2"-4" diameter, apx 8' tall

LF002

LF002 lies in a undeveloped grassy field in the NE corner of the base. Vegitation cover is good with mostly 2' tall grasses, weeds and sage/tumbleweed. Surface soil is rocky with some small surface debris. No visable erosion offsite or ponding water. No fencing or signs. LF002 is slightly elevated from the surrounding terrain and is mostly flat.

Maintenance to be performed by (Subcontractor name and date):

None

	LF005		LF002	
3. Berms (Indicate NA if not present) NA	Yes	No	Yes	No
• Is any erosion present?				
• Is any ponding present?				
• Stormwater runoff contained onsite?				

Describe location and condition:

Problems observed with berms:

Maintenance or repairs required:

Maintenance to be performed by (Subcontractor name and date):

	LF005		LF002	
4. Drainage Ditches/Channels (Indicate NA if no channels are present)	Yes	No	Yes	No
• Is any erosion present?				
• Is buildup of sediment/silt debris present?				
• Is displaced crushed concrete present?				
• Is stormwater runoff contained onsite?				
• Excess accumulation of tumbleweeds present?				

Describe location and condition:

Problems observed with channels:

Maintenance or repair required:

Maintenance to be performed by (Subcontractor name and date):

	LF005		LF002	
5. Vegetation	Yes	No	Yes	No
• Vegetation native perennial?	X		X	
• Vegetation in good condition?	X		X	
• Bare/sparse areas?	X		X	

Describe overall condition:	Condition is good, some bare/sparse areas
Estimate extent and type of vegetative cover:	Mostly 2' tall grasses, some yucca and small cactus
Maintenance or repairs required:	None
Maintenance to be performed by (Subcontractor name and date):	None

	LF005		LF002	
6. Monitoring Wells	Yes	No	Yes	No
Evidence of tampering?		X		X
Damage?	X			X

Problems observed with the wells. See well inspection forms

11. Changes required to the Monitoring and Maintenance Plan?

Jennifer Allen
Inspector's Name

Inspector's Signature

Date

Cover System Inspection Report
LF025 and SI101
Cannon AFB, New Mexico

Inspector Name and Title: Paul Wilson Senior Environmental Scientist Date: 6/18/14
Days since last rain fall: 6/13/14 Amount of rainfall: 0.39 inches
(Contact Base Weather Service)

Inspection Type	Check as Appropriate
Annual	X
Other (Identify)	

1. Fences and Gates:	LF025 Yes	LF025 No	SI101 Yes	SI101 No
• Structural integrity?	X		X	
• Gates locks in place?	X		X	
• Signage in place?	X		X	
• Tumbleweeds and silt built up?	X		X	

Problems observed with the fences/gates/signage: Broken areas of fencing at SI101 and LF025. Sign missing on W side to LF025.

Maintenance or repairs required: Repairs to broken sections of fencing throughout. Replace sign on W side to LF025.

Maintenance to be performed by (Subcontractor name and date): TBD

2. Cover:	LF025 Yes	LF025 No	SI101 Yes	SI101 No
• Overall structural integrity maintained?	X		X	
• Surface erosion present?		X		X
• Gullies/washouts present?		X		X
• Exposed buried waste?	X			X
• As-constructed contours (topographic highs) intact?	X		X	
• As-constructed contours (depressions) intact?	X		X	
• Stormwater runoff contained within boundaries of site?	X		X	
• Evidence of drainage pathways/diverted runoff?		X		X
• Tumbleweeds or silt built up?	X		X	

Problems observed with the cover: None

Maintenance or repair required: Remove Tumbleweeds.

Notes LF025 - Numerous dead trees are located along the western fence line. These trees have been allowed to stand as dead trees for a number of years & will likely begin falling on the fence line. Dead trees are located throughout LF025.

Maintenance to be performed by (Subcontractor name and date): TBD

	LF025		SI101	
3. Berms (Indicate NA if not present) N/A	Yes	No	Yes	No
• Is any erosion present?				
• Is any ponding present?				
• Stormwater runoff contained onsite?				

Describe location and condition:
Problems observed with berms:
Maintenance or repairs required:
Maintenance to be performed by (Subcontractor name and date):

	LF025		SI101	
4. Drainage Ditches/Channels (Indicate NA if no channels are present) N/A	Yes	No	Yes	No
• Is any erosion present?				
• Is buildup of sediment/silt debris present?				
• Is displaced crushed concrete present?				
• Is stormwater runoff contained onsite?				
• Excess accumulation of tumbleweeds present?				

Describe location and condition:
Problems observed with channels:
Maintenance or repair required:
Maintenance to be performed by (Subcontractor name and date):

	LF025		SI101	
5. Vegetation	Yes	No	Yes	No
• Vegetation native perennial?	X		X	
• Vegetation in good condition?	X		X	
• Bare/sparse areas?	X			X

Describe overall condition:	Cover in good condition. LF025 shows some areas of sparse vegetation.
Estimate extent and type of vegetative cover:	80% - LF025 90% - SI101
Maintenance or repairs required:	N/A
Maintenance to be performed by (Subcontractor name and date):	N/A

	LF025		SI101	
6. Monitoring Wells	Yes	No	Yes	No
Evidence of tampering?		X		X
Damage?		X		X

Problems observed with the wells. Rb was inaccessible during the inspection. The key to open the well could not be located. Minor repairs were completed during the site inspection.

11. Changes required to the Monitoring and Maintenance Plan?

N/A

Paul Wilson

Inspector's Name

Paul M. Wilson

Inspector's Signature

6/17/14

Date

Cover System Inspection Report
Landfill-03 and Landfill-04
Cannon AFB, New Mexico

Inspector Name and Title: Paul Wilson Senior Environmental Scientist — Date: 6/17/14 + 6/18/14
Days since last rain fall: 6/13/14 — Amount of rainfall: 0.39 inches
(Contact Base Weather Service) 6/18/14 - morning — 1.39 inches

Inspection Type	Check as Appropriate
Annual	X
Other (identify)	

	LF003		LF004	
1. Cover:	Yes	No	Yes	No
• Overall structural integrity maintained?	X		X	
• Surface erosion present?	X		X	
• Gullies/washouts present?	X		X	
• Exposed buried waste?		X		X
• As-constructed contours (topographic highs) intact?	X		X	
• As-constructed contours (depressions) intact?	X		X	
• Stormwater runoff contained within boundaries of site?	X			X
• Evidence of drainage pathways/diverted runoff?		X	X	
• Tumbleweeds or silt built up?		X		X

Describe overall condition: LF003 in generally good condition. LF004 showing absence of vegetative cover + resulting erosion issues.

Problems observed with the cover: LF003 - A sink hole was observed on the west central portion of the landfill. LF004 - Washouts on both sides of rip rap on south end. Washouts forming on East slope.

Maintenance or repairs required: Washouts + gullies need to be repaired. Vegetation needs to be established on the cap. Off-road vehicle traffic needs to cease on landfill.

Maintenance to be performed by (Subcontractor name and date):

	LF003		LF004	
2. Vegetation:	Yes	No	Yes	No
• Vegetation native perennial?	X		X	
• Vegetation in good condition?	X			X
• Bare/sparse areas?	X		X	

Describe overall condition: LF003 is in good condition. 1 large (10'x5') sinkhole and smaller washouts observed. LF004 is in poor condition. Little to no vegetation on slopes resulting in washouts during rain events.

Estimate extent and type of vegetative cover: LF003 has approximately 70% coverage. LF004 has approximately 25% coverage.

Notes for LF004.

Due to the rain event on 6/17-6/18 we revisited LF004. Significant erosion was observed due to the single rain event. The absence of cover & lack of compaction on land fill is resulting in washouts & gullies. Re-seeding is scheduled for August. Erosion gullies will be repaired regularly until reseeding occurs. Gullies were repaired in January 2014 and erosion gullies in the photographs included in this report were repaired on July 7, 2014 (communication from Base RPM)

Notes for LF003

Sinkhole observed may be an indication of subsidence in landfill due to inadequate compaction during installation of the cover.

Maintenance or repairs required: Repair washouts, gullies, and sink hole. Reseed LF004 to establish cover.

Maintenance to be performed by (Subcontractor name and date):
TBD

	LF003		LF004	
3. Berms (Indicate NA if no berms are present) N/A	Yes	No	Yes	No
• Is any erosion present?				
• Is any ponding present?				
• Stormwater runoff contained onsite?				

Describe location and condition:

Problems observed with berms:

Maintenance or repairs required:

Maintenance to be performed by (Subcontractor name and date):

	LF003		LF004	
4. Drainage Ditches/Channels (Indicate NA if no channels are present) N/A	Yes	No	Yes	No
• Is any erosion present?				
• Is buildup of sediment/silt debris present?				
• Stormwater runoff contained onsite?				
• Excess accumulation of tumbleweeds present?				

Describe location and condition:

Problems observed with channels:

Maintenance or repair required:

Maintenance to be performed by (Subcontractor name and date):

	MW-0a		MW-N9	
	LF003		LF004	
5. Monitoring Wells	Yes	No	Yes	No
• Evidence of tampering?		X		X
• Damage?	X		X	

Problems observed with wells: MW-0a needs a new 10 3/4 roller top, and a J plug. MW-N9 could not remove dedicated pump & Tubing. No water levels possible.

	LF003		LF004	
6. Fences/Gates/Signage (Indicate NA if not present) No fence or gates at LF003 or LF004	Yes	No	Yes	No
• Structural integrity? N/A				
• Gate locks in place? N/A				
• Signage in place?	X		X	
• Tumbleweeds or silt built up?		X		X

Problems observed with fencing/gates/signage: N/A

Maintenance or repair required: N/A

Maintenance to be performed by (Subcontractor name and date): N/A

11. Changes required to the Monitoring and Maintenance Plan?

N/A

Paul M. Wilson
Inspector's Name

Paul M. Wilson
Inspector's Signature

6/18/14
Date

Cover System Inspection Report
LF002 and LF005
Cannon AFB, New Mexico

Inspector Name and Title: Paul Wilson Senior Environmental Scientist Date: 6/17/14
Days since last rain fall: 6/13/14 Amount of rainfall: 0.39 inches
(Contact Base Weather Service)

Inspection Type	Check as Appropriate
Annual	X
Other (Identify)	

	LF002		LF005	
1. Fences and Gates:	Yes	No	Yes	No
• Structural integrity?		X		X
• Gates locks in place?		X	X	
• Signage in place?		X	X	
• Tumbleweeds and silt built up?		X	X	

Problems observed with the fences/gates/signage: No fences or signage at LF002. LF005 had large sections of barb wire fence in need of repair. Tumble weeds were observed in interior fenced landfill cell.

Maintenance or repairs required: Repairs to fencing are required.

Maintenance to be performed by (Subcontractor name and date): TBD

	LF002		LF005	
2. Cover:	Yes	No	Yes	No
• Overall structural integrity maintained?	X		X	
• Surface erosion present?		X		X
• Gullies/washouts present?		X		X
• Exposed buried waste?		X	X	
• As-constructed contours (topographic highs) intact?	N/A	N/A	X	
• As-constructed contours (depressions) intact?	N/A	N/A	N/A	N/A
• Stormwater runoff contained within boundaries of site?	X		X	
• Evidence of drainage pathways/diverted runoff?		X		X
• Tumbleweeds or silt built up?		X	X	

Problems observed with the cover: Trees growing throughout LF005. Build up of tumbleweeds in interior fenced area. Low spot/trench in LF002 from NW to SE across landfill

Maintenance or repair required: Remove trees & tumbleweeds. Monitor "trench" area for subsidence.

Notes. for LF005

- Small animal burrows observed in numerous locations.
- Old monitoring wells are still present at LF001 but not shown on current figures. Wells have not been abandoned.
- Engineered cover is located over cell 3 only. This area is marked by fencing surrounding the cell inside LF005.
- Need chain to lock cell 3.
- Debris is located in the northern portion of the landfill, and in the west central portion. Large poles, slabs of concrete, etc.
- Areas of debris & rubble showing through surface throughout
- North fence is in need of complete replacement.

Maintenance to be performed by (Subcontractor name and date): TBD

3. Berms (Indicate NA if not present) N/A	LF002		LF005	
	Yes	No	Yes	No
• Is any erosion present?				
• Is any ponding present?				
• Stormwater runoff contained onsite?				

Describe location and condition:

Problems observed with berms:

Maintenance or repairs required:

Maintenance to be performed by (Subcontractor name and date):

4. Drainage Ditches/Channels (Indicate NA if no channels are present) N/A	LF002		LF005	
	Yes	No	Yes	No
• Is any erosion present?				
• Is buildup of sediment/silt debris present?				
• Is displaced crushed concrete present?				
• Is stormwater runoff contained onsite?				
• Excess accumulation of tumbleweeds present?				

Describe location and condition:

Problems observed with channels:

Maintenance or repair required:

Maintenance to be performed by (Subcontractor name and date):

5. Vegetation	LF002		LF005	
	Yes	No	Yes	No
• Vegetation native perennial?	X		X	
• Vegetation in good condition?	X		X	
• Bare/sparse areas? isolated	X		X	

Describe overall condition: Vegetative cover is in good condition with small areas of bare/sparse growth.

Estimate extent and type of vegetative cover: 95% coverage with native soils

Maintenance or repairs required: None

Maintenance to be performed by (Subcontractor name and date): N/A

	LF002		LF005	
LF002 - None 6. Monitoring Wells LF005: ~~A~~, A, B, C, D, S, T, + U	Yes	No	Yes	No
Evidence of tampering?	N/A			X
Damage?	X			X

Problems observed with the wells. Pads were cracking & wells were missing J-Plugs. Pads were repaired during site work completed during inspections. J-Plugs were added to wells. See attached spreadsheet (Table 2).

11. Changes required to the Monitoring and Maintenance Plan?

N/A

Paul Wilson
Inspector's Name

Paul Wilson
Inspector's Signature

6/17/14
Date

WATER SAMPLE COLLECTION FIELD SHEET

URS

GENERAL INFORMATION

SITE NAME	**CANNON AFB**	PROJECT NO.	**23446540**
SAMPLE NO.	**MWA-7-14**	WELL NO.	**MW-A**
DATE/TIME COLLECTED	7-17-14 / 1110	PERSONNEL	James Conradi
SAMPLE METHOD	Low flow- Bladder Pump		Kyle Kloewer

SAMPLE MEDIA:	**Groundwater**			
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO.	**N/A**
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO.	**N/A**
MS/MSD REQUESTED:	YES	NO		

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 40 mL VOA	4ºC, HCl	Volatile Organic Compounds (8260C)
1 - 500 mL HDPE	4ºC, HNO_3	Total Analyte List (TAL) Metals (7470A) (6020A)
1 - 50 mL HDPE	Ammonia Sulfate buffer solution, 4ºC	Hexavalent Chromium (7199)
1 - 125 mL HDPE	4ºC	Perchlorate (6850)
1 - 250 mL HDPE	4ºC	Chloride, Sulfate, Nitrate, Nitrite (9056)
1 - 125 mL HDPE	4ºC, H_2S0_4	Ammonia (SM 4500 NH3)
1 - 250 mL Amber	4ºC, HCL	Total Organic Carbon (9060A)

WELL PURGING DATA

		Well Depth (ft BTOC)	341.84
Date	7/17/2014	Depth to Water (ft BTOC)	318.77
Time Started	1030	Water Column Length (ft)	23.07
Time Completed	1110	Volume of Water in Well (L)	56.98
PID Measurements		Stabilized Purge Rate (L/min)	0.36
Background	Not Detected	Stabilized Level of Drawdown (ft. BTOC)	318.77
Breathing Zone	Not Detected	Total Amount Purged (L)	12.60
Well Head	Not Detected		
Purge Water	Not Detected		

FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft BTOC)	Purge Rate (L/min)
1035	1.80	7.59	17.31	0.654	9.25	240.5	15.2	318.77	0.36
1045	5.40	6.95	17.06	0.654	8.68	276.8	10.6	318.77	0.36
1050	7.20	7.30	17.23	0.655	6.87	259.3	5.8	318.77	0.36
1055	9.00	7.37	17.37	0.659	7.19	257.0	3.2	318.77	0.36
1100	10.80	7.45	17.26	0.659	7.16	250.0	0.0	318.77	0.36
1105	12.60	7.41	17.31	0.659	7.14	251.0	0.0	318.77	0.36

FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron Dipper T	N/A
Water Quality Meter	YSI 556 Multi-Parameter Probe	Calibration Check

GENERAL COMMENTS

Field Parameters Measured in Flow-Through Cell
Pump Placement Depth = 330.30 ft BTOC
Well Diameter = 4 inches
Screen Interval = 341.84-326.84 ft BTOC

WATER SAMPLE COLLECTION FIELD SHEET

URS

GENERAL INFORMATION

SITE NAME	**CANNON AFB**	PROJECT NO.	**23446540**
SAMPLE NO.	**MWB-7-14**	WELL NO.	**MW-B**
DATE/TIME COLLECTED	7-16-14 / 1315	PERSONNEL	James Conradi
SAMPLE METHOD	Low flow- Bladder Pump		Kyle Kloewer

SAMPLE MEDIA:	**Groundwater**			
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO.	**N/A**
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO.	**N/A**
MS/MSD REQUESTED:	YES	NO		

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 40 mL VOA	4ºC, HCl	Volatile Organic Compounds (8260C)
1 - 500 mL HDPE	4ºC, HNO_3	Total Analyte List (TAL) Metals (7470A) (6020A)
1 - 250 mL HDPE	4ºC	Hexavalent Chromium (7199)
1 - 125 mL HDPE	4ºC	Perchlorate (6850)
1 - 250 mL HDPE	4ºC	Chloride, Sulfate, Nitrate, Nitrite (9056)
1 - 125 mL HDPE	4ºC, H_2S0_4	Ammonia (SM 4500 NH3)
1 - 250 mL Amber	4ºC, HCL	Total Organic Carbon (9060A)

WELL PURGING DATA

		Well Depth (ft BTOC)	364.50
Date	7/16/2014	Depth to Water (ft BTOC)	330.49
Time Started	1230	Water Column Length (ft)	34.00
Time Completed	1315	Volume of Water in Well (L)	83.98
PID Measurements		Stabilized Purge Rate (L/min)	0.36
Background	Not Detected	Stabilized Level of Drawdown (ft. BTOC)	330.55
Breathing Zone	Not Detected	Total Amount Purged (L)	14.40
Well Head	Not Detected		
Purge Water	Not Detected		

FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft BTOC)	Purge Rate (L/min)
1235	1.80	7.74	20.17	0.639	10.53	158.5	12.0	330.50	0.36
1245	5.40	7.62	19.24	0.640	8.28	167.5	11.8	330.50	0.36
1250	7.20	7.56	19.32	0.642	8.07	199.9	8.7	330.50	0.36
1255	9.00	7.63	18.63	0.639	7.15	165.8	7.0	330.50	0.36
1300	10.80	7.69	19.43	0.642	6.18	161.4	4.3	330.50	0.19
1305	12.60	7.74	19.53	0.642	6.18	158.5	0.0	330.50	0.19
1310	14.40	7.78	19.50	0.642	6.07	155.7	0.0	330.50	0.19

FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron Dipper T	N/A
Water Quality Meter	YSI 556 Multi-Parameter Probe	Calibration Check

GENERAL COMMENTS

Field Parameters Measured in Flow-Through Cell
Pump Placement Depth = 347.50 ft BTOC
Well Diameter = 4 inches
Screen Interval = 364.50-349.50 ft BTOC

WATER SAMPLE COLLECTION FIELD SHEET

URS

GENERAL INFORMATION

SITE NAME	**CANNON AFB**	PROJECT NO.	**23446540**
SAMPLE NO.	**MWC-7-14**	WELL NO.	**MW-C**
DATE/TIME COLLECTED	7-15-14 / 1340	PERSONNEL	James Conradi
SAMPLE METHOD	Low flow- Bladder Pump		Kyle Kloewer

SAMPLE MEDIA:	**Groundwater**			
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO.	**N/A**
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO.	**N/A**
MS/MSD REQUESTED:	YES	NO		

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 40 mL VOA	4ºC, HCl	Volatile Organic Compounds (8260C)
1 - 500 mL HDPE	4ºC, HNO_3	Total Analyte List (TAL) Metals (7470A) (6020A)
1 - 250 mL HDPE	4ºC	Hexavalent Chromium (7199)
1 - 125 mL HDPE	4ºC	Perchlorate (6850)
1 - 250 mL HDPE	4ºC	Chloride, Sulfate, Nitrate, Nitrite (9056)
1 - 125 mL HDPE	4ºC, H_2S0_4	Ammonia (SM 4500 NH3)
1 - 250 mL Amber	4ºC, HCL	Total Organic Carbon (9060A)

WELL PURGING DATA

		Well Depth (ft BTOC)	363.50
Date	7/15/2014	Depth to Water (ft BTOC)	333.87
Time Started	1255	Water Column Length (ft)	29.63
Time Completed	1340	Volume of Water in Well (L)	114.37
PID Measurements		Stabilized Purge Rate (L/min)	0.36
Background	Not Detected	Stabilized Level of Drawdown (ft. BTOC)	333.95
Breathing Zone	Not Detected	Total Amount Purged (L)	14.40
Well Head	Not Detected		
Purge Water	Not Detected		

FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft BTOC)	Purge Rate (L/min)
1300	1.80	7.57	19.08	0.598	8.69	167.5	3.2	333.95	0.36
1310	5.40	7.55	18.35	0.599	7.80	175.2	0.0	333.95	0.36
1315	7.20	7.54	18.62	0.603	7.75	170.2	0.0	333.95	0.36
1320	9.00	7.47	18.69	0.611	7.33	170.3	0.0	333.95	0.36
1325	10.80	7.51	18.49	0.611	7.50	167.3	0.0	333.95	0.36
1330	12.60	7.51	18.51	0.611	7.14	166.1	0.0	333.95	0.36
1335	14.40	7.52	18.43	0.611	7.02	165.0	0.0	333.95	0.36

FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron Dipper T	N/A
Water Quality Meter	YSI 556 Multi-Parameter Probe	Calibration Check

GENERAL COMMENTS

Field Parameters Measured in Flow-Through Cell
Pump Placement Depth = 348.69 ft BTOC
Well Diameter = 5 inches
Screen Interval = 363.50-348.50 ft BTOC

WATER SAMPLE COLLECTION FIELD SHEET

URS

GENERAL INFORMATION

SITE NAME	**CANNON AFB**	PROJECT NO.	**23446540**
SAMPLE NO.	**MWD-7-14**	WELL NO.	**MW-D**
DATE/TIME COLLECTED	7-15-14 / 1115	PERSONNEL	James Conradi
SAMPLE METHOD	Low flow- Bladder Pump		Kyle Kloewer

SAMPLE MEDIA:	**Groundwater**			
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO.	**N/A**
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO.	**N/A**
MS/MSD REQUESTED:	YES	NO		

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 40 mL VOA	4ºC, HCl	Volatile Organic Compounds (8260C)
1 - 500 mL HDPE	4ºC, HNO_3	Total Analyte List (TAL) Metals (7470A) (6020A)
1 - 250 mL HDPE	4ºC	Hexavalent Chromium (7199)
1 - 125 mL HDPE	4ºC	Perchlorate (6850)
1 - 250 mL HDPE	4ºC	Chloride, Sulfate, Nitrate, Nitrite (9056)
1 - 125 mL HDPE	4ºC, H_2S0_4	Ammonia (SM 4500 NH3)
1 - 250 mL Amber	4ºC, HCL	Total Organic Carbon (9060A)

WELL PURGING DATA

		Well Depth (ft BTOC)	356.70
Date	7/15/2014	Depth to Water (ft BTOC)	327.71
Time Started	1025	Water Column Length (ft)	28.99
Time Completed	1115	Volume of Water in Well (L)	111.90
PID Measurements		Stabilized Purge Rate (L/min)	0.36
Background	Not Detected	Stabilized Level of Drawdown (ft. BTOC)	327.80
Breathing Zone	Not Detected	Total Amount Purged (L)	16.20
Well Head	Not Detected		
Purge Water	Not Detected		

FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft BTOC)	Purge Rate (L/min)
1030	1.80	7.75	18.99	0.492	9.27	148.5	1.7	327.80	0.36
1040	5.40	7.65	18.02	0.502	8.13	157.3	0.0	327.80	0.36
1045	7.20	7.53	18.16	0.491	8.03	171.4	0.0	327.80	0.36
1050	9.00	7.58	17.87	0.498	7.72	164.5	0.0	327.80	0.36
1055	10.80	7.63	18.10	0.499	7.77	160.9	0.0	327.80	0.36
1100	12.60	7.58	18.42	0.499	7.79	161.2	0.0	327.80	0.36
1105	14.40	7.56	18.50	0.499	7.76	158.9	0.0	327.80	0.36
1110	16.20	7.61	18.60	0.499	7.78	159.4	0.0	327.80	0.36

FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron Dipper T	N/A
Water Quality Meter	YSI 556 Multi-Parameter Probe	Calibration Check

GENERAL COMMENTS

Field Parameters Measured in Flow-Through Cell
Pump Placement Depth = 342.21 ft BTOC
Well Diameter = 5 inches
Screen Interval = 356.70-341.70 ft BTOC

WATER SAMPLE COLLECTION FIELD SHEET

URS

GENERAL INFORMATION

SITE NAME	**CANNON AFB**	PROJECT NO.	**23446540**
SAMPLE NO.	**MWE-7-14**	WELL NO.	**MW-E**
DATE/TIME COLLECTED	7-21-14 / 1215	PERSONNEL	James Conradi
SAMPLE METHOD	Low flow- Bladder Pump		Kyle Kloewer

SAMPLE MEDIA:	**Groundwater**			
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO.	**N/A**
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO.	**N/A**
MS/MSD REQUESTED:	YES	NO		

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 40 mL VOA	4ºC, HCl	Volatile Organic Compounds (8260C)
1 - 500 mL HDPE	4ºC, HNO_3	Total Analyte List (TAL) Metals (7470A) (6020A)
1 - 50 mL HDPE	Ammonia Sulfate buffer solution, 4ºC	Hexavalent Chromium (7199)
1 - 125 mL HDPE	4ºC	Perchlorate (6850)
1 - 250 mL HDPE	4ºC	Chloride, Sulfate, Nitrate, Nitrite (9056)
1 - 125 mL HDPE	4ºC, H_2S0_4	Ammonia (SM 4500 NH3)
1 - 250 mL Amber	4ºC, HCL	Total Organic Carbon (9060A)

WELL PURGING DATA

		Well Depth (ft BTOC)	351.14
Date	7/21/2014	Depth to Water (ft BTOC)	319.65
Time Started	1125	Water Column Length (ft)	31.49
Time Completed	1215	Volume of Water in Well (L)	77.78
PID Measurements		Stabilized Purge Rate (L/min)	0.25
Background	Not Detected	Stabilized Level of Drawdown (ft. BTOC)	319.75
Breathing Zone	Not Detected	Total Amount Purged (L)	11.25
Well Head	Not Detected		
Purge Water	Not Detected		

FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft BTOC)	Purge Rate (L/min)
1130	1.25	7.71	26.05	0.758	15.48	198.6	2.5	319.75	0.25
1135	2.50	7.54	22.82	0.751	5.32	200.1	0.0	319.75	0.25
1140	3.75	7.60	22.67	0.748	6.82	193.2	0.0	319.75	0.25
1145	5.00	7.59	22.08	0.747	6.52	194.6	0.0	319.75	0.25
1150	6.25	7.60	22.12	0.748	4.67	187.2	0.0	319.75	0.25
1155	7.50	7.60	22.12	0.748	4.47	189.5	0.0	319.75	0.25
1200	8.75	7.60	22.19	0.745	4.82	188.4	0.0	319.75	0.25
1205	10.00	7.60	22.08	0.745	4.73	189.0	0.0	319.75	0.25
1210	11.25	7.59	22.12	0.745	4.77	188.9	0.0	319.75	0.25

FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron Dipper T	N/A
Water Quality Meter	YSI 556 Multi-Parameter Probe	Calibration Check

GENERAL COMMENTS

Field Parameters Measured in Flow-Through Cell
Pump Placement Depth = 335.40 ft BTOC
Well Diameter = 4 inches
Screen Interval = 351.14-336.14 ft BTOC

WATER SAMPLE COLLECTION FIELD SHEET

URS

GENERAL INFORMATION

SITE NAME	**CANNON AFB**	PROJECT NO.	**23446540**
SAMPLE NO.	**MWF-7-14**	WELL NO.	**MW-F**
DATE/TIME COLLECTED	7-21-14 / 1000	PERSONNEL	James Conradi
SAMPLE METHOD	Low flow- Bladder Pump		Kyle Kloewer

SAMPLE MEDIA:	**Groundwater**			
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO.	**N/A**
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO.	**N/A**
MS/MSD REQUESTED:	YES	NO		

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
9 - 40 mL VOA	4ºC, HCl	Volatile Organic Compounds (8260C)
3 - 500 mL HDPE	4ºC, HNO_3	Total Analyte List (TAL) Metals (7470A) (6020A)
2 - 50 mL HDPE	Ammonia Sulfate buffer solution, 4ºC	Hexavalent Chromium (7199)
3 - 125 mL HDPE	4ºC	Perchlorate (6850)
3 - 250 mL HDPE	4ºC	Chloride, Sulfate, Nitrate, Nitrite (9056)
3 - 125 mL HDPE	4ºC, H_2S0_4	Ammonia (SM 4500 NH3)
3 - 250 mL Amber	4ºC, HCL	Total Organic Carbon (9060A)

WELL PURGING DATA

		Well Depth (ft BTOC)	372.30
Date	7/21/2014	Depth to Water (ft BTOC)	317.80
Time Started	910	Water Column Length (ft)	54.50
Time Completed	1000	Volume of Water in Well (L)	134.62
PID Measurements		Stabilized Purge Rate (L/min)	0.25
Background	Not Detected	Stabilized Level of Drawdown (ft. BTOC)	317.95
Breathing Zone	Not Detected	Total Amount Purged (L)	11.25
Well Head	Not Detected		
Purge Water	Not Detected		

FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft BTOC)	Purge Rate (L/min)
915	1.25	7.72	22.35	0.810	29.14	161.4	10.2	317.90	0.25
920	2.50	6.95	20.76	0.797	5.80	196.7	6.7	317.95	0.25
925	3.75	7.10	20.69	0.792	6.08	188.0	2.3	317.95	0.25
930	5.00	7.32	21.32	0.797	5.77	173.4	0.0	317.95	0.25
935	6.25	7.47	20.72	0.797	5.66	168.9	0.0	317.95	0.25
940	7.50	7.49	20.74	0.796	5.68	167.1	0.0	317.95	0.25
945	8.75	7.51	20.89	0.796	5.66	166.3	0.0	317.95	0.25
950	10.00	7.48	20.87	0.796	5.65	166.8	0.0	317.95	0.25
955	11.25	7.50	20.88	0.797	5.69	166.6	0	317.95	0.25

FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron Dipper T	N/A
Water Quality Meter	YSI 556 Multi-Parameter Probe	Calibration Check

GENERAL COMMENTS

Field Parameters Measured in Flow-Through Cell
Pump Placement Depth = 345.05 ft BTOC
Well Diameter = 4 inches
Screen Interval = 372.30-357.30 ft BTOC

WATER SAMPLE COLLECTION FIELD SHEET

URS

GENERAL INFORMATION

SITE NAME	**CANNON AFB**	PROJECT NO.	**23446540**
SAMPLE NO.	**MWG-7-14**	WELL NO.	**MW-G**
DATE/TIME COLLECTED	7-20-14 / 1345	PERSONNEL	James Conradi
SAMPLE METHOD	Low flow- Bladder Pump		Kyle Kloewer

SAMPLE MEDIA:	**Groundwater**			
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO.	**N/A**
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO.	**N/A**
MS/MSD REQUESTED:	YES	NO		

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 40 mL VOA	4ºC, HCl	Volatile Organic Compounds (8260C)
1 - 500 mL HDPE	4ºC, HNO_3	Total Analyte List (TAL) Metals (7470A) (6020A)
1 - 50 mL HDPE	Ammonia Sulfate buffer solution, 4ºC	Hexavalent Chromium (7199)
1 - 125 mL HDPE	4ºC	Perchlorate (6850)
1 - 250 mL HDPE	4ºC	Chloride, Sulfate, Nitrate, Nitrite (9056)
1 - 125 mL HDPE	4ºC, H_2S0_4	Ammonia (SM 4500 NH3)
1 - 250 mL Amber	4ºC, HCL	Total Organic Carbon (9060A)

WELL PURGING DATA

		Well Depth (ft BTOC)	367.80
Date	7/20/2014	Depth to Water (ft BTOC)	321.16
Time Started	1255	Water Column Length (ft)	46.64
Time Completed	1345	Volume of Water in Well (L)	115.20
PID Measurements		Stabilized Purge Rate (L/min)	0.36
Background	Not Detected	Stabilized Level of Drawdown (ft. BTOC)	321.55
Breathing Zone	Not Detected	Total Amount Purged (L)	15.20
Well Head	Not Detected		
Purge Water	Not Detected		

FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft BTOC)	Purge Rate (L/min)
1300	1.80	7.20	23.84	0.795	5.36	190.7	2.2	321.55	0.36
1310	5.40	7.23	22.89	0.791	2.36	189.9	0.0	321.55	0.36
1315	7.20	7.29	22.64	0.782	1.07	185.5	0.0	321.55	0.36
1320	9.00	4.72	23.07	0.794	0.97	189.9	0.0	321.55	0.36
1325	10.80	7.31	24.90	0.795	1.58	187.8	0.0	321.55	0.36
1330	12.60	7.39	24.27	0.796	6.03	201.9	0.0	321.55	0.36
1335	14.40	7.33	24.34	0.796	5.97	203.4	0.0	321.55	0.36
1340	16.20	7.40	24.29	0.769	6.01	202.7	0.0	321.55	0.36

FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron Dipper T	N/A
Water Quality Meter	YSI 556 Multi-Parameter Probe	Calibration Check

GENERAL COMMENTS

Field Parameters Measured in Flow-Through Cell
Pump Placement Depth = 344.48 ft BTOC
Well Diameter = 4 inches
Screen Interval = 367.80-352.80 ft BTOC

WATER SAMPLE COLLECTION FIELD SHEET

URS

GENERAL INFORMATION

SITE NAME	**CANNON AFB**	PROJECT NO.	**23446540**
SAMPLE NO.	**MWH-7-14**	WELL NO.	**MW-H**
DATE/TIME COLLECTED	7-20-14 / 1150	PERSONNEL	James Conradi
SAMPLE METHOD	Low flow- Bladder Pump		Kyle Kloewer

SAMPLE MEDIA:	**Groundwater**			
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO.	**N/A**
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO.	**N/A**
MS/MSD REQUESTED:	YES	NO		

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 40 mL VOA	4ºC, HCl	Volatile Organic Compounds (8260C)
1 - 500 mL HDPE	4ºC, HNO_3	Total Analyte List (TAL) Metals (7470A) (6020A)
1 - 50 mL HDPE	Ammonia Sulfate buffer solution, 4ºC	Hexavalent Chromium (7199)
1 - 125 mL HDPE	4ºC	Perchlorate (6850)
1 - 250 mL HDPE	4ºC	Chloride, Sulfate, Nitrate, Nitrite (9056)
1 - 125 mL HDPE	4ºC, H_2S0_4	Ammonia (SM 4500 NH3)
1 - 250 mL Amber	4ºC, HCL	Total Organic Carbon (9060A)

WELL PURGING DATA

		Well Depth (ft BTOC)	351.80
Date	7/20/2014	Depth to Water (ft BTOC)	321.44
Time Started	1020	Water Column Length (ft)	30.36
Time Completed	1150	Volume of Water in Well (L)	74.99
PID Measurements		Stabilized Purge Rate (L/min)	0.36
Background	Not Detected	Stabilized Level of Drawdown (ft. BTOC)	321.45
Breathing Zone	Not Detected	Total Amount Purged (L)	18.00
Well Head	Not Detected		
Purge Water	Not Detected		

FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft BTOC)	Purge Rate (L/min)
1025	1.80	7.54	23.85	0.712	7.35	195.5	2.6	321.45	0.36
1035	5.40	7.58	25.38	0.664	6.24	195.7	0.0	321.45	0.36
1040	7.20	Flowcell not holding water. Pull pump, clean check balls. Install pump. Flowcell holding water again.							
1120	9.00	7.54	22.99	0.724	7.53	194.0	0.0	321.45	0.36
1125	10.80	7.48	21.93	0.725	9.86	196.7	0.0	321.45	0.36
1130	12.60	7.51	21.32	0.713	8.76	199.6	0.0	321.45	0.36
1135	14.40	6.60	19.50	0.726	7.00	243.1	0.0	321.45	0.36
1140	16.20	6.60	19.46	0.726	6.92	241.2	0.0	321.45	0.36
1145	18.00	6.64	19.48	0.726	6.98	242.4	0	321.45	0.36

FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron Dipper T	N/A
Water Quality Meter	YSI 556 Multi-Parameter Probe	Calibration Check

GENERAL COMMENTS

Field Parameters Measured in Flow-Through Cell
Pump Placement Depth = 336.62 ft BTOC
Well Diameter = 4 inches
Screen Interval = 351.80-331.80 ft BTOC

WATER SAMPLE COLLECTION FIELD SHEET

URS

GENERAL INFORMATION

SITE NAME	**CANNON AFB**	PROJECT NO.	**23446540**
SAMPLE NO.	**MWNa-7-14**	WELL NO.	**MW-Na**
DATE/TIME COLLECTED	7-21-14 / 1445	PERSONNEL	James Conradi
SAMPLE METHOD	Low flow- Bladder Pump		Kyle Kloewer

SAMPLE MEDIA:	**Groundwater**			
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO.	**N/A**
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO.	**N/A**
MS/MSD REQUESTED:	YES	NO		

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 40 mL VOA	4ºC, HCl	Volatile Organic Compounds (8260C)
1 - 500 mL HDPE	4ºC, HNO_3	Total Analyte List (TAL) Metals (7470A) (6020A)
1 - 125 mL HDPE	4ºC	Hexavalent Chromium (7199)
1 - 125 mL HDPE	4ºC	Perchlorate (6850)
1 - 250 mL HDPE	4ºC	Chloride, Sulfate, Nitrate, Nitrite (9056)
1 - 125 mL HDPE	4ºC, H_2S0_4	Ammonia (SM 4500 NH3)
1 - 250 mL Amber	4ºC, HCL	Total Organic Carbon (9060A)

WELL PURGING DATA

		Well Depth (ft BTOC)	Unknown
Date	7/21/2014	Depth to Water (ft BTOC)	312.35
Time Started	1400	Water Column Length (ft)	Unknown
Time Completed	1445	Volume of Water in Well (L)	Unknown
PID Measurements		Stabilized Purge Rate (L/min)	0.25
Background	Not Detected	Stabilized Level of Drawdown (ft. BTOC)	312.47
Breathing Zone	Not Detected	Total Amount Purged (L)	10.00
Well Head	Not Detected		
Purge Water	Not Detected		

FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft BTOC)	Purge Rate (L/min)
1405	1.25	7.14	27.32	0.752	16.12	200.3	5.2	312.47	0.25
1410	2.50	7.23	27.03	0.752	15.48	198.8	2.8	312.47	0.25
1415	3.75	7.31	25.28	0.752	6.39	198.6	0.0	312.47	0.25
1420	5.00	7.48	24.32	0.748	5.12	202.1	0.0	312.47	0.25
1425	6.25	7.16	24.19	0.748	6.83	188.4	0.0	312.47	0.25
1430	7.50	7.28	23.20	0.748	5.34	187.3	0.0	312.47	0.25
1435	8.75	7.50	22.32	0.748	5.38	187.3	0.0	312.47	0.25
1440	10.00	7.51	22.35	0.748	5.36	187.6	0.0	312.47	0.25

FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron Dipper T	N/A
Water Quality Meter	YSI 556 Multi-Parameter Probe	Calibration Check

GENERAL COMMENTS

Field Parameters Measured in Flow-Through Cell
Pump Placement Depth = Unknown
Well Diameter = 4 inches
Screen Interval = Unknown

WATER SAMPLE COLLECTION FIELD SHEET

URS

GENERAL INFORMATION

SITE NAME	**CANNON AFB**	PROJECT NO.	**23446540**
SAMPLE NO.	**MWOa-7-14**	WELL NO.	**MW-Oa**
DATE/TIME COLLECTED	7-17-14 / 1445	PERSONNEL	James Conradi
SAMPLE METHOD	Low flow- Bladder Pump		Kyle Kloewer

SAMPLE MEDIA:	**Groundwater**			
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO.	**N/A**
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO.	**MWOa-7-14-A @ 1005**
MS/MSD REQUESTED:	YES	NO		

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
6 - 40 mL VOA	4ºC, HCl	Volatile Organic Compounds (8260C)
2 - 500 mL HDPE	4ºC, HNO_3	Total Analyte List (TAL) Metals (7470A) (6020A)
2 - 50 mL HDPE	Ammonia Sulfate buffer solution, 4ºC	Hexavalent Chromium (7199)
2 - 125 mL HDPE	4ºC	Perchlorate (6850)
2 - 250 mL HDPE	4ºC	Chloride, Sulfate, Nitrate, Nitrite (9056)
2 - 125 mL HDPE	4ºC, H_2S0_4	Ammonia (SM 4500 NH3)
2 - 250 mL Amber	4ºC, HCL	Total Organic Carbon (9060A)

WELL PURGING DATA

		Well Depth (ft BTOC)	366.87
Date	7/17/2014	Depth to Water (ft BTOC)	325.12
Time Started	1405	Water Column Length (ft)	41.75
Time Completed	1445	Volume of Water in Well (L)	103.12
PID Measurements		Stabilized Purge Rate (L/min)	0.36
Background	Not Detected	Stabilized Level of Drawdown (ft. BTOC)	325.12
Breathing Zone	Not Detected	Total Amount Purged (L)	12.60
Well Head	Not Detected		
Purge Water	Not Detected		

FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft BTOC)	Purge Rate (L/min)
1410	1.80	7.97	21.95	1.430	9.42	209.0	12.3	325.14	0.36
1420	5.40	7.12	17.02	1.480	6.06	219.6	1.5	325.14	0.36
1425	7.20	6.94	16.50	1.485	5.52	223.2	0.0	325.14	0.36
1430	9.00	6.97	16.51	1.489	4.96	224.8	0.0	325.14	0.36
1435	10.80	7.03	16.68	1.489	4.75	219.7	0.0	325.14	0.36
1440	12.60	7.01	16.52	1.489	4.90	220.0	0.0	325.14	0.36

FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron Dipper T	N/A
Water Quality Meter	YSI 556 Multi-Parameter Probe	Calibration Check

GENERAL COMMENTS

Field Parameters Measured in Flow-Through Cell
Pump Placement Depth = 345.90 ft BTOC
Well Diameter = 4 inches
Screen Interval = 366.87-306.87 ft BTOC

WATER SAMPLE COLLECTION FIELD SHEET

URS

GENERAL INFORMATION

SITE NAME	**CANNON AFB**	PROJECT NO.	**23446540**
SAMPLE NO.	**MWPa-7-14**	WELL NO.	**MW-Pa**
DATE/TIME COLLECTED	7-17-14 / 1305	PERSONNEL	James Conradi
SAMPLE METHOD	Low flow- Bladder Pump		Kyle Kloewer

SAMPLE MEDIA:	**Groundwater**			
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO.	**N/A**
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO.	**N/A**
MS/MSD REQUESTED:	YES	NO		

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 40 mL VOA	4ºC, HCl	Volatile Organic Compounds (8260C)
1 - 500 mL HDPE	4ºC, HNO_3	Total Analyte List (TAL) Metals (7470A) (6020A)
1 - 50 mL HDPE	Ammonia Sulfate buffer solution, 4ºC	Hexavalent Chromium (7199)
1 - 125 mL HDPE	4ºC	Perchlorate (6850)
1 - 250 mL HDPE	4ºC	Chloride, Sulfate, Nitrate, Nitrite (9056)
1 - 125 mL HDPE	4ºC, H_2S0_4	Ammonia (SM 4500 NH3)
1 - 250 mL Amber	4ºC, HCL	Total Organic Carbon (9060A)

WELL PURGING DATA

		Well Depth (ft BTOC)	362.20
Date	7/17/2014	Depth to Water (ft BTOC)	315.60
Time Started	1220	Water Column Length (ft)	46.60
Time Completed	1305	Volume of Water in Well (L)	115.10
PID Measurements		Stabilized Purge Rate (L/min)	0.36
Background	Not Detected	Stabilized Level of Drawdown (ft. BTOC)	315.80
Breathing Zone	Not Detected	Total Amount Purged (L)	14.40
Well Head	Not Detected		
Purge Water	Not Detected		

FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft BTOC)	Purge Rate (L/min)
1225	1.80	7.61	18.04	0.767	15.50	224.7	23.1	318.80	0.36
1235	5.40	7.53	17.23	0.773	8.54	228.5	7.5	318.80	0.36
1240	7.20	7.52	17.19	0.772	7.69	227.2	3.8	318.80	0.36
1245	9.00	7.52	17.15	0.772	7.47	228.1	1.7	318.80	0.36
1250	10.80	7.54	17.14	0.772	7.32	228.2	0.0	318.80	0.36
1255	12.60	7.51	17.14	0.771	7.33	227.1	0.0	318.80	0.36
1300	14.40	7.53	17.17	0.771	7.30	225.7	0.0	318.80	0.36

FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron Dipper T	N/A
Water Quality Meter	YSI 556 Multi-Parameter Probe	Calibration Check

GENERAL COMMENTS

Field Parameters Measured in Flow-Through Cell
Pump Placement Depth = 338.90 ft BTOC
Well Diameter = 4 inches
Screen Interval = 362.20-302.20 ft BTOC

WATER SAMPLE COLLECTION FIELD SHEET

URS

GENERAL INFORMATION

SITE NAME	**CANNON AFB**	PROJECT NO.	**23446540**
SAMPLE NO.	**MWRb-7-14**	WELL NO.	**MW-Rb**
DATE/TIME COLLECTED	7-20-14 / 1840	PERSONNEL	James Conradi
SAMPLE METHOD	Low flow- Bladder Pump		Kyle Kloewer

SAMPLE MEDIA:	**Groundwater**			
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO.	**N/A**
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO.	**N/A**
MS/MSD REQUESTED:	YES	NO		

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 40 mL VOA	4ºC, HCl	Volatile Organic Compounds (8260C)
1 - 500 mL HDPE	4ºC, HNO_3	Total Analyte List (TAL) Metals (7470A) (6020A)
1 - 50 mL HDPE	Ammonia Sulfate buffer solution, 4ºC	Hexavalent Chromium (7199)
1 - 125 mL HDPE	4ºC	Perchlorate (6850)
1 - 250 mL HDPE	4ºC	Chloride, Sulfate, Nitrate, Nitrite (9056)
1 - 125 mL HDPE	4ºC, H_2S0_4	Ammonia (SM 4500 NH3)
1 - 250 mL Amber	4ºC, HCL	Total Organic Carbon (9060A)

WELL PURGING DATA

		Well Depth (ft BTOC)	333.71
Date	7/20/2014	Depth to Water (ft BTOC)	315.14
Time Started	1805	Water Column Length (ft)	18.57
Time Completed	1840	Volume of Water in Well (L)	45.87
PID Measurements		Stabilized Purge Rate (L/min)	0.25
Background	Not Detected	Stabilized Level of Drawdown (ft. BTOC)	315.17
Breathing Zone	Not Detected	Total Amount Purged (L)	7.50
Well Head	Not Detected		
Purge Water	Not Detected		

FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft BTOC)	Purge Rate (L/min)
1810	1.25	8.14	21.07	0.692	0.86	3.4	0.0	315.17	0.25
1815	2.50	8.11	19.95	0.689	0.34	56.2	0.0	315.17	0.25
1820	3.75	8.17	19.71	0.688	0.22	69.6	0.0	315.17	0.25
1825	5.00	8.20	19.69	0.688	0.24	75.5	0.0	315.17	0.25
1830	6.25	8.24	19.61	0.689	0.23	68.3	0.0	315.17	0.25
1835	7.50	8.21	19.65	0.689	0.24	73.4	0.0	315.17	0.25

FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron Dipper T	N/A
Water Quality Meter	YSI 556 Multi-Parameter Probe	Calibration Check

GENERAL COMMENTS

Field Parameters Measured in Flow-Through Cell
Pump Placement Depth = 324.69 ft BTOC
Well Diameter = 4 inches
Screen Interval = 333.71-303.71 ft BTOC

WATER SAMPLE COLLECTION FIELD SHEET

URS

GENERAL INFORMATION

SITE NAME	**CANNON AFB**	PROJECT NO.	**23446540**
SAMPLE NO.	**MWS-7-14**	WELL NO.	**MW-S**
DATE/TIME COLLECTED	7-16-14 / 0850	PERSONNEL	James Conradi
SAMPLE METHOD	Low flow- Bladder Pump		Kyle Kloewer

SAMPLE MEDIA:	**Groundwater**			
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO.	**N/A**
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO.	**N/A**
MS/MSD REQUESTED:	YES	NO		

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 40 mL VOA	4ºC, HCl	Volatile Organic Compounds (8260C)
1 - 500 mL HDPE	4ºC, HNO_3	Total Analyte List (TAL) Metals (7470A) (6020A)
1 - 250 mL HDPE	4ºC	Hexavalent Chromium (7199)
1 - 125 mL HDPE	4ºC	Perchlorate (6850)
1 - 250 mL HDPE	4ºC	Chloride, Sulfate, Nitrate, Nitrite (9056)
1 - 125 mL HDPE	4ºC, H_2S0_4	Ammonia (SM 4500 NH3)
1 - 250 mL Amber	4ºC, HCL	Total Organic Carbon (9060A)

WELL PURGING DATA

		Well Depth (ft BTOC)	366.80
Date	7/16/2014	Depth to Water (ft BTOC)	332.40
Time Started	745	Water Column Length (ft)	33.82
Time Completed	850	Volume of Water in Well (L)	83.54
PID Measurements		Stabilized Purge Rate (L/min)	0.19
Background	Not Detected	Stabilized Level of Drawdown (ft. BTOC)	339.15
Breathing Zone	Not Detected	Total Amount Purged (L)	16.85
Well Head	Not Detected		
Purge Water	Not Detected		

FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft BTOC)	Purge Rate (L/min)
750	1.80	7.48	17.64	0.005	10.25	203.6	5.2	334.15	0.36
800	5.40	7.61	17.27	0.004	10.14	199.5	0.0	334.77	0.36
805	7.20	7.65	17.27	0.427	9.64	191.3	0.0	335.45	0.36
810	9.00	7.70	17.39	0.760	8.04	190.5	0.0	336.35	0.36
Changed Refill to 80 seconds, Discharge to 40 seconds, PSI to 210, Pumping rate is .33 L/min									
815	10.65	7.64	17.33	0.758	6.00	187.4	0.0	337.30	0.33
Changed Refill to 120 seconds, Discharge to 40 seconds, PSI to 210, Pumping rate is .24 L/min									
820	11.85	7.65	17.51	0.754	5.60	184.4	0.0	337.75	0.24
825	13.05	7.64	17.52	0.759	6.00	184.1	0.0	338.25	0.24
Changed Refill to 160 seconds, Discharge to 40 seconds, PSI to 210, Pumping rate is .19 L/min									
835	14.95	7.65	17.34	0.756	5.78	179.9	0.0	339.15	0.19
840	15.90	7.67	17.54	0.756	5.88	179.4	0.0	339.15	0.19
845	16.85	7.65	17.52	0.756	5.60	178.3	0.0	339.15	0.19

FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron Dipper T	N/A
Water Quality Meter	YSI 556 Multi-Parameter Probe	Calibration Check

GENERAL COMMENTS

Field Parameters Measured in Flow-Through Cell

Pump Placement Depth = 349.98 ft BTOC

Well Diameter = 4 inches

Screen Interval = 366.80-326.80 ft BTOC

WATER SAMPLE COLLECTION FIELD SHEET

URS

GENERAL INFORMATION

SITE NAME	**CANNON AFB**	PROJECT NO.	**23446540**
SAMPLE NO.	**MWT-7-14**	WELL NO.	**MW-T**
DATE/TIME COLLECTED	7-16-14 / 1100	PERSONNEL	James Conradi
SAMPLE METHOD	Low flow- Bladder Pump		Kyle Kloewer

SAMPLE MEDIA:	**Groundwater**			
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO.	**N/A**
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO.	**N/A**
MS/MSD REQUESTED:	YES	NO		

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 40 mL VOA	4ºC, HCl	Volatile Organic Compounds (8260C)
1 - 500 mL HDPE	4ºC, HNO_3	Total Analyte List (TAL) Metals (7470A) (6020A)
1 - 250 mL HDPE	4ºC	Hexavalent Chromium (7199)
1 - 125 mL HDPE	4ºC	Perchlorate (6850)
1 - 250 mL HDPE	4ºC	Chloride, Sulfate, Nitrate, Nitrite (9056)
1 - 125 mL HDPE	4ºC, H_2S0_4	Ammonia (SM 4500 NH3)
1 - 250 mL Amber	4ºC, HCL	Total Organic Carbon (9060A)

WELL PURGING DATA

		Well Depth (ft BTOC)	366.40
Date	7/16/2014	Depth to Water (ft BTOC)	335.60
Time Started	950	Water Column Length (ft)	30.81
Time Completed	1100	Volume of Water in Well (L)	118.93
PID Measurements		Stabilized Purge Rate (L/min)	0.19
Background	Not Detected	Stabilized Level of Drawdown (ft. BTOC)	341.40
Breathing Zone	Not Detected	Total Amount Purged (L)	16.20
Well Head	Not Detected		
Purge Water	Not Detected		

FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft BTOC)	Purge Rate (L/min)
955	1.80	6.86	19.71	0.719	10.18	150.1	6.3	336.30	0.36
1005	5.40	6.80	19.00	0.724	7.18	160.7	3.2	337.15	0.36
1010	7.20	6.80	18.69	0.723	7.23	163.6	0.0	337.95	0.36
1015	9.00	6.81	18.73	0.723	7.16	167.0	0.0	338.55	0.36
Changed Refill to 160 seconds, Discharge to 40 seconds, PSI to 210, Pumping rate is .19 L/min									
1020	10.00	6.83	19.40	0.724	6.79	166.8	0.0	339.55	0.19
1025	11.00	6.86	19.58	0.724	6.99	165.5	0.0	339.85	0.19
1030	12.00	6.85	19.71	0.723	6.75	171.7	0.0	340.15	0.19
1035	13.00	6.88	19.80	0.724	5.50	173.6	0.0	340.80	0.19
Changed Refill to 280 seconds, Discharge to 40 seconds, PSI to 210, Pumping rate is .12 L/min									
1045	14.20	6.89	20.46	0.725	5.44	170.9	0.0	341.40	0.12
1050	15.20	6.90	20.63	0.726	5.44	170.9	0.0	341.40	0.12
1055	16.20	9.91	20.55	0.726	5.50	168.9	0.0	341.40	0.12

FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron Dipper T	N/A
Water Quality Meter	YSI 556 Multi-Parameter Probe	Calibration Check

GENERAL COMMENTS

Field Parameters Measured in Flow-Through Cell

Pump Placement Depth = 351.0 ft BTOC

Well Diameter = 5 inches

Screen Interval = 366.40-326.40 ft BTOC

WATER SAMPLE COLLECTION FIELD SHEET

URS

GENERAL INFORMATION

SITE NAME	**CANNON AFB**	PROJECT NO.	**23446540**
SAMPLE NO.	**MWU-7-14**	WELL NO.	**MW-U**
DATE/TIME COLLECTED	7-16-14 / 1515	PERSONNEL	James Conradi
SAMPLE METHOD	Low flow- Bladder Pump		Kyle Kloewer

SAMPLE MEDIA:	**Groundwater**			
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO.	**N/A**
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO.	**N/A**
MS/MSD REQUESTED:	YES	NO		

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 40 mL VOA	4ºC, HCl	Volatile Organic Compounds (8260C)
1 - 500 mL HDPE	4ºC, HNO_3	Total Analyte List (TAL) Metals (7470A) (6020A)
1 - 250 mL HDPE	4ºC	Hexavalent Chromium (7199)
1 - 125 mL HDPE	4ºC	Perchlorate (6850)
1 - 250 mL HDPE	4ºC	Chloride, Sulfate, Nitrate, Nitrite (9056)
1 - 125 mL HDPE	4ºC, H_2S0_4	Ammonia (SM 4500 NH3)
1 - 250 mL Amber	4ºC, HCL	Total Organic Carbon (9060A)

WELL PURGING DATA

		Well Depth (ft BTOC)	366.00
Date	7/16/2014	Depth to Water (ft BTOC)	330.95
Time Started	1425	Water Column Length (ft)	35.05
Time Completed	1515	Volume of Water in Well (L)	86.57
PID Measurements		Stabilized Purge Rate (L/min)	0.12
Background	Not Detected	Stabilized Level of Drawdown (ft. BTOC)	337.00
Breathing Zone	Not Detected	Total Amount Purged (L)	11.40
Well Head	Not Detected		
Purge Water	Not Detected		

FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft BTOC)	Purge Rate (L/min)
1430	1.80	7.07	18.86	0.961	6.67	165.7	3.8	334.05	0.36
1440	5.40	7.11	18.69	0.963	5.59	170.0	2.4	334.60	0.36
1445	7.20	7.17	19.33	0.961	5.10	164.0	1.4	335.45	0.36
1450	9.00	7.12	20.02	0.964	5.29	166.8	0.0	336.35	0.36
Changed Refill to 280 seconds, Discharge to 40 seconds, PSI to 210, Pumping rate is .19 L/min									
1455	9.60	7.16	19.83	0.961	4.28	170.3	0.0	336.80	0.12
1500	10.20	7.19	19.73	0.961	4.87	168.6	0.0	337.00	0.12
1505	10.80	7.18	19.83	0.961	4.89	168.4	0.0	337.00	0.12
1510	11.40	7.18	19.78	0.961	4.91	167.4	0.0	337.00	0.12

FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron Dipper T	N/A
Water Quality Meter	YSI 556 Multi-Parameter Probe	Calibration Check

GENERAL COMMENTS

Field Parameters Measured in Flow-Through Cell
Pump Placement Depth = 348.48 ft BTOC
Well Diameter = 4 inches
Screen Interval = 366.0-326.0 ft BTOC

WATER SAMPLE COLLECTION FIELD SHEET

URS

GENERAL INFORMATION

SITE NAME	**CANNON AFB**	PROJECT NO.	**23446540**
SAMPLE NO.	**MWV-7-14**	WELL NO.	**MW-V**
DATE/TIME COLLECTED	7-14-14 / 1625	PERSONNEL	James Conradi
SAMPLE METHOD	Low flow- Bladder Pump		Kyle Kloewer

SAMPLE MEDIA:	**Groundwater**			
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO.	**N/A**
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO.	**N/A**
MS/MSD REQUESTED:	YES	NO		

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 40 mL VOA	4ºC, HCl	Volatile Organic Compounds (8260C)
1 - 500 mL HDPE	4ºC, HNO_3	Total Analyte List (TAL) Metals (7470A) (6020A)
1 - 250 mL HDPE	4ºC	Hexavalent Chromium (7199)
1 - 125 mL HDPE	4ºC	Perchlorate (6850)
1 - 250 mL HDPE	4ºC	Chloride, Sulfate, Nitrate, Nitrite (9056)
1 - 125 mL HDPE	4ºC, H_2S0_4	Ammonia (SM 4500 NH3)
1 - 250 mL Amber	4ºC, HCL	Total Organic Carbon (9060A)

WELL PURGING DATA

		Well Depth (ft BTOC)	371.74
Date	7/14/2014	Depth to Water (ft BTOC)	349.79
Time Started	1550	Water Column Length (ft)	21.95
Time Completed	1630	Volume of Water in Well (L)	54.22
PID Measurements		Stabilized Purge Rate (L/min)	0.36
Background	Not Detected	Stabilized Level of Drawdown (ft. BTOC)	349.77
Breathing Zone	Not Detected	Total Amount Purged (L)	12.60
Well Head	Not Detected		
Purge Water	Not Detected		

FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft BTOC)	Purge Rate (L/min)
1555	1.80	7.54	19.25	1.178	10.39	117.8	5.1	349.77	0.36
1600	3.60	7.52	19.78	1.187	10.45	119.1	3.1	350.00	0.36
1605	5.40	7.51	19.34	1.185	9.75	120.1	2.0	349.80	0.36
1610	7.20	7.50	19.31	1.181	8.98	125.9	2.1	349.78	0.36
1615	9.00	7.50	19.29	1.179	8.96	126.2	1.8	349.78	0.36
1620	10.80	7.50	19.28	1.178	8.97	126.7	1.5	349.78	0.36
1625	12.60	7.51	19.29	1.177	8.95	126.8	1.5	349.78	0.36

FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron Dipper T	N/A
Water Quality Meter	YSI 556 Multi-Parameter Probe	Calibration Check

GENERAL COMMENTS

Field Parameters Measured in Flow-Through Cell
Pump Placement Depth = 360.77 ft BTOC
Well Diameter = 4 inches
Screen Interval = 371.74-311.74 ft BTOC

WATER SAMPLE COLLECTION FIELD SHEET

URS

GENERAL INFORMATION

SITE NAME	**CANNON AFB**	PROJECT NO.	**23446540**
SAMPLE NO.	**MWW-7-14**	WELL NO.	**MW-W**
DATE/TIME COLLECTED	7-20-14 / 2035	PERSONNEL	James Conradi
SAMPLE METHOD	Low flow- Bladder Pump		Kyle Kloewer

SAMPLE MEDIA:	**Groundwater**			
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO.	**N/A**
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO.	**N/A**
MS/MSD REQUESTED:	YES	NO		

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 40 mL VOA	4ºC, HCl	Volatile Organic Compounds (8260C)
1 - 500 mL HDPE	4ºC, HNO_3	Total Analyte List (TAL) Metals (7470A) (6020A)
1 - 50 mL HDPE	Ammonia Sulfate buffer solution, 4ºC	Hexavalent Chromium (7199)
1 - 125 mL HDPE	4ºC	Perchlorate (6850)
1 - 250 mL HDPE	4ºC	Chloride, Sulfate, Nitrate, Nitrite (9056)
1 - 125 mL HDPE	4ºC, H_2S0_4	Ammonia (SM 4500 NH3)
1 - 250 mL Amber	4ºC, HCL	Total Organic Carbon (9060A)

WELL PURGING DATA

		Well Depth (ft BTOC)	368.00
Date	7/20/2014	Depth to Water (ft BTOC)	335.50
Time Started	1950	Water Column Length (ft)	32.50
Time Completed	2035	Volume of Water in Well (L)	80.28
PID Measurements		Stabilized Purge Rate (L/min)	0.25
Background	Not Detected	Stabilized Level of Drawdown (ft. BTOC)	335.87
Breathing Zone	Not Detected	Total Amount Purged (L)	10.00
Well Head	Not Detected		
Purge Water	Not Detected		

FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft BTOC)	Purge Rate (L/min)
1955	1.25	8.10	21.08	1.142	16.53	153.1	2.7	335.87	0.25
2000	2.50	7.83	19.31	1.171	4.20	157.2	1.3	335.87	0.25
2005	3.75	7.85	18.84	1.173	1.50	158.8	0.0	335.87	0.25
2010	5.00	7.87	18.69	1.172	1.42	150.3	0.0	335.87	0.25
2015	6.25	7.89	18.62	1.173	0.86	145.0	0.0	335.87	0.25
2020	7.50	7.91	18.65	1.173	1.52	147.2	0.0	335.87	0.25
2025	8.75	7.88	18.67	1.173	1.54	151.4	0.0	335.87	0.25
2030	10.00	7.93	18.64	1.173	1.58	153.1	0.0	335.87	0.25

FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron Dipper T	N/A
Water Quality Meter	YSI 556 Multi-Parameter Probe	Calibration Check

GENERAL COMMENTS

Field Parameters Measured in Flow-Through Cell
Pump Placement Depth = 351.75 ft BTOC
Well Diameter = 4 inches
Screen Interval = 368.00-308.00 ft BTOC

WATER SAMPLE COLLECTION FIELD SHEET

URS

GENERAL INFORMATION

SITE NAME	**CANNON AFB**	PROJECT NO.	**23446540**
SAMPLE NO.	**MWX-7-14**	WELL NO.	**MW-X**
DATE/TIME COLLECTED	7-15-14 / 0845	PERSONNEL	James Conradi
SAMPLE METHOD	Low flow- Bladder Pump		Kyle Kloewer

SAMPLE MEDIA:	**Groundwater**			
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO.	**N/A**
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO.	**N/A**
MS/MSD REQUESTED:	YES	NO		

SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
3 - 40 mL VOA	4ºC, HCl	Volatile Organic Compounds (8260C)
1 - 500 mL HDPE	4ºC, HNO_3	Total Analyte List (TAL) Metals (7470A) (6020A)
1 - 250 mL HDPE	4ºC	Hexavalent Chromium (7199)
1 - 125 mL HDPE	4ºC	Perchlorate (6850)
1 - 250 mL HDPE	4ºC	Chloride, Sulfate, Nitrate, Nitrite (9056)
1 - 125 mL HDPE	4ºC, H_2S0_4	Ammonia (SM 4500 NH3)
1 - 250 mL Amber	4ºC, HCL	Total Organic Carbon (9060A)

WELL PURGING DATA

		Well Depth (ft BTOC)	337.85
Date	7/15/2014	Depth to Water (ft BTOC)	287.04
Time Started	800	Water Column Length (ft)	50.80
Time Completed	845	Volume of Water in Well (L)	125.47
PID Measurements		Stabilized Purge Rate (L/min)	0.36
Background	Not Detected	Stabilized Level of Drawdown (ft. BTOC)	287.04
Breathing Zone	Not Detected	Total Amount Purged (L)	14.40
Well Head	Not Detected		
Purge Water	Not Detected		

FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft BTOC)	Purge Rate (L/min)
805	1.80	7.79	17.28	0.442	9.93	130.9	1.3	287.04	0.36
810	3.60	7.80	17.28	0.517	8.64	137.5	0.0	287.04	0.36
815	5.40	7.78	17.28	0.518	8.86	144.5	0.0	287.04	0.36
820	7.20	7.77	17.36	0.518	8.98	149.1	0.0	287.04	0.36
825	9.00	7.79	17.30	0.518	8.45	150.1	0.0	287.04	0.36
830	10.80	7.79	17.58	0.518	8.30	155.7	0.0	287.04	0.36
835	12.60	7.80	17.73	0.518	8.25	155.7	0.0	287.04	0.36
840	14.40	7.80	17.62	0.518	8.28	155.7	0.0	287.04	0.36

FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron Dipper T	N/A
Water Quality Meter	YSI 556 Multi-Parameter Probe	Calibration Check

GENERAL COMMENTS

Field Parameters Measured in Flow-Through Cell
Pump Placement Depth = 312.44 ft BTOC
Well Diameter = 4 inches
Screen Interval = 337.85-277.85 ft BTOC

LYDICK
ENGINEERS & SURVEYORS
CLOVIS, NEW MEXICO

Robert C. Lydick
Professional Engineer and Land Surveyor
New Mexico-Texas-Oklahoma-Colorado

Monitor Well Locations at Cannon Air Force Base, New Mexico
Survey Date: September 11, 2014

Horizontal Projection: New Mexico (East Zone)
Horizontal Datum: NAD 83 (2011) – US Survey Feet
Vertical Datum: NAVD 88 – Feet

DESIGNATION	NORTHING	EASTING	LATITUDE	LONGITUDE	SURVEY ELEVATION
MW-A-TOP OF BELL	1228291.094	850513.239	34° 22' 18.98116"	-103° 18' 31.40385"	4269.177
MW-A-PLATFORM	1228291.094	850513.239	34° 22' 18.98116"	-103° 18' 31.40385"	4268.963
MW-A-TOP OF CASING	1228291.094	850513.239	34° 22' 18.98116"	-103° 18' 31.40385"	4268.720
MW-A-CONCRETE	1228291.3250	850513.2010	34° 22' 18.983445"	-103° 18' 31.40427"	4267.0090
MW-B-TOP OF CASING	1226666.3410	852296.6010	34° 22' 02.731952"	-103° 18' 10.327517"	4266.7950
MW-B-CONCRETE	1226666.5490	852296.6100	34° 22' 02.734007"	-103° 18' 10.327395"	4265.1940
MW-C-TOP OF CASING	1226056.0990	851789.7220	34° 21' 56.746902"	-103° 18' 16.447442"	4268.9030
MW-C-CONCRETE	1226056.2560	851789.7750	34° 21' 56.748448"	-103° 18' 16.446786"	4267.0040
MW-D-TOP OF CASING	1226095.8520	851123.7030	34° 21' 57.206838"	-103° 18' 24.386807"	4266.8980
MW-D-CONCRETE	1226096.0020	851123.8030	34° 21' 57.208316"	-103° 18' 24.385596"	4265.1950
MW-E-TOP OF CASING	1235128.4320	850881.4560	34° 23' 26.57267"	-103° 18' 26.186447"	4284.9640
MW-E-CONCRETE	1235128.7440	850881.4570	34° 23' 26.575754"	-103° 18' 26.1864"	4282.9180
MW-F-TOP OF CASING	1234609.9800	851885.2160	34° 23' 21.344068"	-103° 18' 14.272998"	4280.8420
MW-F-CONCRETE	1234610.1800	851885.3550	34° 23' 21.346027"	-103° 18' 14.271314"	4278.0920
MW-G-TOP OF CASING	1233761.4160	852082.6830	34° 23' 12.931075"	-103° 18' 12.01979"	4281.5530
MW-G-CONCRETE	1233761.6910	852082.6200	34° 23' 12.933808"	-103° 18' 12.020512"	4279.6510
MW-H-TOP OF CASING	1233235.6820	851638.4360	34° 23' 07.775621"	-103° 18' 17.383624"	4281.1810
MW-H-CONCRETE	1233235.9020	851638.3310	34° 23' 07.77781"	-103° 18' 17.38485"	4279.1810
MW-Na-TOP OF CASING	1234314.8230	854201.7570	34° 23' 18.191277"	-103° 17' 46.670003"	4270.5080
MW-Na-CONCRETE	1234314.9680	854201.8750	34° 23' 18.192702"	-103° 17' 46.668572"	4269.4170
MW-Oa-TOP OF CASING	1232514.3980	853895.3730	34° 23' 00.414221"	-103° 17' 50.544857"	4273.9550
MW-Oa-CONCRETE	1232514.7340	853895.3660	34° 23' 00.417544"	-103° 17' 50.544902"	4273.2880
MW-Pa-TOP OF CASING	1233526.8450	852403.8810	34° 23' 10.578658"	-103° 18' 08.216081"	4274.7270
MW-Pa-CONCRETE	1233527.1800	852403.7310	34° 23' 10.581986"	-103° 18' 08.217825"	4274.0690
MW-Rb-TOP OF CASING	1234803.2050	852390.6610	34° 23' 23.204482"	-103° 18' 08.219015"	4277.7300
MW-Rb-CONCRETE	1234803.4250	852390.6190	34° 23' 23.206657"	-103° 18' 08.219491"	4275.4140
MW-S-TOP OF CASING	1226092.4600	852274.8490	34° 21' 57.057845"	-103° 18' 10.656516"	4265.7480
MW-S-CONCRETE	1226092.9410	852274.8680	34° 21' 57.062602"	-103° 18' 10.656232"	4263.8130

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LYDICK
ENGINEERS & SURVEYORS
CLOVIS, NEW MEXICO

Robert C. Lydick
Professional Engineer and Land Surveyor
New Mexico-Texas-Oklahoma-Colorado

Monitor Well Locations at Cannon Air Force Base, New Mexico
Survey Date: September 11, 2014

Horizontal Projection: New Mexico (East Zone)
Horizontal Datum: NAD 83 (2011) – US Survey Feet
Vertical Datum: NAVD 88 – Feet

DESIGNATION	NORTHING	EASTING	LATITUDE	LONGITUDE	SURVEY ELEVATION
MW-T-TOP OF CASING	1226404.0210	852375.3330	34° 22' 00.12942"	-103° 18' 09.420191"	4265.7240
MW-T-CONCRETE	1226404.5410	852375.3000	34° 22' 00.13456"	-103° 18' 09.420523"	4263.8960
MW-U-TOP OF CASING	1226884.1970	852330.0990	34° 22' 04.883413"	-103° 18' 09.901557"	4267.2970
MW-U-CONCRETE	1226884.5850	852330.0110	34° 22' 04.887259"	-103° 18' 09.902551"	4265.4340
MW-V-TOP OF CASING	1240246.9710	841913.7400	34° 24' 18.084576"	-103° 20' 12.5838"	4329.8950
MW-V-CONCRETE	1240247.4050	841913.9150	34° 24' 18.088848"	-103° 20' 12.581663"	4328.2660
MW-W-TOP OF CASING	1237389.1950	853254.2080	34° 23' 48.695553"	-103° 17' 57.601329"	4302.2180
MW-W-CONCRETE	1237389.7920	853254.3980	34° 23' 48.70144"	-103° 17' 57.598994"	4300.1530
MW-X-TOP OF CASING	1228560.0040	844498.6570	34° 22' 22.236091"	-103° 19' 43.118465"	4269.2300
MW-X-CONCRETE	1228560.7030	844498.8780	34° 22' 22.242982"	-103° 19' 43.115748"	4268.0240

Note: Well coordinates were established by "side-shot" surveying of actual well locations based on a 6 point localization on control points established by Lydick Engineers. Control point data was obtained by "long set" static occupation (over 2 hours) of each point. The resulting static data was uploaded to OPUS for solutions.

Robert Chad Lydick

Robert C. Lydick

P.E. & L.S. No. 5955

REFERENCE NO. 24288

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E.1 Summary of Analytical Results (Dump Table)

SUMMARY OF ANALYSIS
2014 BIENNIAL SAMPLING EVENT
CANNON AIR FORCE BASE, NEW MEXICO

FIELD ID			MWA-7-14			MWB-7-14			MWC-7-14			MWD-7-14			MWE-7-14			MWF-7-14			MWG-7-14		
DATE COLLECTED			July 17, 2014			7/16/2014			7/15/2014			7/15/2014			7/21/2014			7/21/2014			7/20/2014		
	Maximum	Frequency	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual
VOLATILE ORGANIC COMPOUNDS (µg/L)																							
1,1,1,2-Tetrachloroethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1,1-Trichloroethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1,2,2-Tetrachloroethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1,2-Trichloroethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1,2-Trichlorotrifluoroethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1-Dichloroethane	4.60E-01	2 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1-Dichloroethene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1-Dichloropropene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2,3-Trichlorobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2,3-Trichloropropane	ND	0 / 18	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U
1,2,3-Trimethylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2,4-Trichlorobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2,4-Trimethylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2-Dibromo-3-Chloropropane	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
1,2-Dibromoethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2-Dichlorobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2-Dichloroethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2-Dichloropropane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,3,5-Trimethylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,3-Dichlorobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,3-Dichloropropane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,4-Dichlorobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
2,2-Dichloropropane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
2-Butanone (MEK)	ND	0 / 18	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U
2-Chloroethyl vinyl ether	ND	0 / 18	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	UJ	<	5.00E+01	U
2-Chlorotoluene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
4-Chlorotoluene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
4-Methyl-2-pentanone (MIBK)	ND	0 / 18	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U
Acetone	ND	0 / 18	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U
Acrolein	ND	0 / 18	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U
Acrylonitrile	ND	0 / 18	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U
Benzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Bromobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Bromodichloromethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Bromoform	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Bromomethane	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
Carbon tetrachloride	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Chlorobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U

SUMMARY OF ANALYSIS
2014 BIENNIAL SAMPLING EVENT
CANNON AIR FORCE BASE, NEW MEXICO

FIELD ID			MWA-7-14			MWB-7-14			MWC-7-14			MWD-7-14			MWE-7-14			MWF-7-14			MWG-7-14		
DATE COLLECTED			July 17, 2014			7/16/2014			7/15/2014			7/15/2014			7/21/2014			7/21/2014			7/20/2014		
	Maximum	Frequency	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual
Chlorodibromomethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Chloroethane	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
Chloroform	4.00E+00	3 / 18	<	5.00E+00	U	<	5.00E+00	U	4.00E+00	5.00E+00	J	3.90E-01	5.00E+00	J	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
Chloromethane	ND	0 / 18	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U
cis-1,2-Dichloroethene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
cis-1,3-Dichloropropene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Dibromomethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Dichlorodifluoromethane	1.10E+00	2 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
Di-isopropyl ether	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Ethylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Hexachloro-1,3-butadiene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Isopropylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Methyl tert-butyl ether	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Methylene Chloride	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
Naphthalene	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
n-Butylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
n-Propylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
p-Isopropyltoluene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
sec-Butylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Styrene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
tert-Butylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Tetrachloroethene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Toluene	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
trans-1,2-Dichloroethene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
trans-1,3-Dichloropropene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Trichloroethene	6.50E-01	1 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Trichlorofluoromethane	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
Vinyl chloride	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Xylenes, Total	ND	0 / 18	<	3.00E+00	U	<	3.00E+00	U	<	3.00E+00	U	<	3.00E+00	U	<	3.00E+00	U	<	3.00E+00	U	<	3.00E+00	U
METALS (µg/L)																							
Aluminum	1.60E+02	15 / 18	1.30E+02	1.00E+02		5.30E+01	1.00E+02	J	7.80E+01	1.00E+02	J	7.10E+01	1.00E+02	J	5.50E+01	1.00E+02	J	1.60E+02	1.00E+02		7.20E+01	1.00E+02	J
Antimony	6.20E-01	5 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	3.50E-01	1.00E+00	J
Arsenic	6.00E+00	17 / 18	5.10E+00	1.00E+00		4.90E+00	1.00E+00		5.70E+00	1.00E+00		6.00E+00	1.00E+00		3.50E+00	1.00E+00		4.40E+00	1.00E+00		3.80E+00	1.00E+00	
Barium	9.20E+01	17 / 18	5.50E+01	2.00E+00		5.40E+01	2.00E+00		8.00E+01	2.00E+00		9.20E+01	2.00E+00		3.50E+01	2.00E+00		4.70E+01	2.00E+00		3.00E+01	2.00E+00	
Beryllium	2.70E-01	5 / 18	<	1.00E+00	U	<	1.00E+00	U	2.00E-01	1.00E+00	J	2.10E-01	1.00E+00	J	<	1.00E+00	U	1.80E-01	1.00E+00	J	<	1.00E+00	U
Cadmium	2.50E-01	7 / 18	1.80E-01	5.00E-01	J	<	5.00E-01	U	<	5.00E-01	U	<	5.00E-01	U	<	5.00E-01	U	<	5.00E-01	U	1.80E-01	5.00E-01	J
Calcium	9.30E+04	17 / 18	3.90E+04	1.00E+03		3.80E+04	1.00E+03		3.60E+04	1.00E+03		2.80E+04	1.00E+03		4.40E+04	1.00E+03		4.90E+04	1.00E+03	J	4.70E+04	1.00E+03	
Chromium	5.00E+00	15 / 18	1.80E+00	2.00E+00	J	1.50E+00	2.00E+00	J	8.90E-01	2.00E+00	J	<	2.00E+00	U	<	2.00E+00	U	4.80E+00	2.00E+00		1.80E+00	2.00E+00	J
Chromium, Hexavalent	1.20E+00	16 / 17	9.20E-01	5.00E-01		8.10E-01	5.00E-01	J	2.00E-01	5.00E-01	J	3.20E-01	5.00E-01	J	8.90E-01	5.00E-01		9.00E-01	5.00E-01		1.10E+00	5.00E-01	

SUMMARY OF ANALYSIS
2014 BIENNIAL SAMPLING EVENT
CANNON AIR FORCE BASE, NEW MEXICO

FIELD ID			MWA-7-14			MWB-7-14			MWC-7-14			MWD-7-14			MWE-7-14			MWF-7-14			MWG-7-14		
DATE COLLECTED			July 17, 2014			7/16/2014			7/15/2014			7/15/2014			7/21/2014			7/21/2014			7/20/2014		
	Maximum	Frequency	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual
Cobalt	4.90E-01	4 / 18	4.10E-01	1.00E+00	J	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	4.90E-01	1.00E+00	J	<	1.00E+00	U
Copper	5.30E+00	17 / 18	1.20E+00	2.00E+00	J	1.80E+00	2.00E+00	J	1.20E+00	2.00E+00	J	8.20E-01	2.00E+00	J	1.20E+00	2.00E+00	J	1.90E+00	2.00E+00	J	2.80E+00	2.00E+00	
Iron	5.20E+02	17 / 18	1.40E+02	1.00E+02		3.50E+02	1.00E+02		1.60E+02	1.00E+02		1.00E+02	1.00E+02		7.20E+01	1.00E+02	J	3.70E+02	1.00E+02		3.40E+02	1.00E+02	
Lead	8.40E+00	12 / 18	8.50E-01	1.00E+00	J	1.20E+00	1.00E+00		5.30E-01	1.00E+00	J	2.80E-01	1.00E+00	J	8.40E+00	1.00E+00		1.70E+00	1.00E+00		1.20E+00	1.00E+00	
Magnesium	8.10E+04	17 / 18	3.70E+04	1.00E+03		3.60E+04	1.00E+03		3.50E+04	1.00E+03		2.80E+04	1.00E+03		4.00E+04	1.00E+03		4.50E+04	1.00E+03	J	4.30E+04	1.00E+03	
Manganese	3.70E+01	17 / 18	1.00E+01	2.00E+00		3.70E+01	2.00E+00		1.60E+01	2.00E+00		1.80E+01	2.00E+00		5.10E+00	2.00E+00		1.80E+01	2.00E+00		5.80E+00	2.00E+00	
Mercury	ND	0 / 18	<	2.00E-01	U	<	2.00E-01	U	<	2.00E-01	U	<	2.00E-01	U	<	2.00E-01	U	<	2.00E-01	U	<	2.00E-01	U
Nickel	2.20E+01	17 / 18	1.60E+00	1.00E+00		1.00E+00	1.00E+00		7.80E-01	1.00E+00	J	6.90E-01	1.00E+00	J	1.30E+00	1.00E+00		1.20E+00	1.00E+00		2.80E+00	1.00E+00	
Potassium	1.00E+04	17 / 18	6.40E+03	1.00E+03		6.30E+03	1.00E+03		6.00E+03	1.00E+03		5.20E+03	1.00E+03		6.90E+03	1.00E+03		7.80E+03	1.00E+03		7.60E+03	1.00E+03	
Selenium	2.00E+01	17 / 18	7.70E+00	1.00E+00		6.30E+00	1.00E+00		1.70E+00	1.00E+00		9.70E-01	1.00E+00	J	9.10E+00	1.00E+00		1.00E+01	1.00E+00	O1	1.00E+01	1.00E+00	
Silver	3.60E+00	1 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	3.60E+00	1.00E+00	O1	<	1.00E+00	U
Sodium	1.30E+05	17 / 18	5.00E+04	1.00E+03		5.00E+04	1.00E+03		5.30E+04	1.00E+03		4.40E+04	1.00E+03		5.10E+04	1.00E+03		5.70E+04	1.00E+03		5.30E+04	1.00E+03	
Thallium	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Vanadium	4.00E+01	17 / 18	3.40E+01	2.00E+00		2.70E+01	2.00E+00		3.90E+01	2.00E+00		4.00E+01	2.00E+00		2.10E+01	2.00E+00		2.10E+01	2.00E+00		1.80E+01	2.00E+00	
Zinc	3.10E+02	17 / 18	1.40E+01	1.00E+01		6.60E+00	1.00E+01	J	7.60E+00	1.00E+01	J	4.50E+00	1.00E+01	J	1.50E+01	1.00E+01		1.20E+01	1.00E+01		6.10E+01	1.00E+01	
Other Paramters (mg/L)																							
Ammonia Nitrogen	7.80E-02	10 / 18	7.80E-02	2.50E-01	J	<	2.50E-01	U	<	2.50E-01	U	<	2.50E-01	U	5.40E-02	2.50E-01	J	5.70E-02	2.50E-01	J	7.40E-02	2.50E-01	J
Chloride	2.00E+02	17 / 18	5.00E+01	1.00E+00		4.30E+01	1.00E+00		1.30E+01	1.00E+00		4.50E+00	1.00E+00		4.80E+01	1.00E+00		6.70E+01	1.00E+00		6.60E+01	1.00E+00	
Perchlorate	2.00E+00	13 / 17	1.70E+00	5.00E-01		1.70E+00	5.00E-01		<	5.00E-01	U	<	5.00E-01	U	1.80E+00	5.00E-01		1.80E+00	5.00E-01		2.00E+00	5.00E-01	
Nitrate	1.50E+01	17 / 18	1.90E+00	1.00E-01		1.30E+00	1.00E-01		2.00E+00	1.00E-01		1.30E+00	1.00E-01		1.40E+00	1.00E-01		1.20E+00	1.00E-01		1.40E+00	1.00E-01	
Nitrite	ND	0 / 18	<	1.00E-01	U	<	1.00E-01	U	<	1.00E-01	U	<	1.00E-01	U	<	1.00E-01	U	<	1.00E-01	U	<	1.00E-01	U
Sulfate	3.80E+02	17 / 18	7.20E+01	5.00E+00		9.30E+01	5.00E+00		4.30E+01	5.00E+00		3.00E+01	5.00E+00		1.30E+02	2.50E+01		1.50E+02	2.50E+01		1.30E+02	1.00E+01	
Total Organic Carbon	1.40E+00	16 / 18	3.50E-01	1.00E+00	J	2.40E-01	1.00E+00	J	3.20E-01	1.00E+00	J	2.20E-01	1.00E+00	J	1.20E-01	1.00E+00	J	2.60E-01	1.00E+00	J	2.30E-01	1.00E+00	J

Notes:
µg/L = microgram per liter
J = Estimated
LOQ = Limit of Quantitation
mg/L = milligram per liter
ND = Not Detected
Qual = Qualifier
U = Nondetect
UJ = Estimated Nondetect

SUMMARY OF ANALYSIS
2014 BIENNIAL SAMPLING EVENT
CANNON AIR FORCE BASE, NEW MEXICO

FIELD ID			MWH-7-14			MWNA-7-14			MWOA-7-14			MWPA-7-14			MW RB-7-14			MWS-7-14			MWT-7-14		
DATE COLLECTED			7/20/2014			7/21/2014			7/17/2014			July 17, 2014			7/20/2014			7/16/2014			7/16/2014		
	Maximum	Frequency	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual
VOLATILE ORGANIC COMPOUNDS (µg/L)																							
1,1,1,2-Tetrachloroethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1,1-Trichloroethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1,2,2-Tetrachloroethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1,2-Trichloroethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1,2-Trichlorotrifluoroethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1-Dichloroethane	4.60E-01	2 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	4.60E-01	1.00E+00	J
1,1-Dichloroethene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1-Dichloropropene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2,3-Trichlorobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2,3-Trichloropropane	ND	0 / 18	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U
1,2,3-Trimethylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2,4-Trichlorobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2,4-Trimethylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2-Dibromo-3-Chloropropane	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
1,2-Dibromoethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2-Dichlorobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2-Dichloroethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2-Dichloropropane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,3,5-Trimethylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,3-Dichlorobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,3-Dichloropropane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,4-Dichlorobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
2,2-Dichloropropane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
2-Butanone (MEK)	ND	0 / 18	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U
2-Chloroethyl vinyl ether	ND	0 / 18	<	5.00E+01	U	<	5.00E+01	UJ	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U
2-Chlorotoluene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
4-Chlorotoluene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
4-Methyl-2-pentanone (MIBK)	ND	0 / 18	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U
Acetone	ND	0 / 18	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U
Acrolein	ND	0 / 18	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U
Acrylonitrile	ND	0 / 18	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U
Benzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Bromobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Bromodichloromethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Bromoform	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Bromomethane	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
Carbon tetrachloride	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Chlorobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U

SUMMARY OF ANALYSIS
2014 BIENNIAL SAMPLING EVENT
CANNON AIR FORCE BASE, NEW MEXICO

FIELD ID			MWH-7-14			MWNA-7-14			MWOA-7-14			MWPA-7-14			MW RB-7-14			MWS-7-14			MWT-7-14		
DATE COLLECTED			7/20/2014			7/21/2014			7/17/2014			July 17, 2014			7/20/2014			7/16/2014			7/16/2014		
	Maximum	Frequency	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual
Chlorodibromomethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Chloroethane	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
Chloroform	4.00E+00	3 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	3.50E-01	5.00E+00	J
Chloromethane	ND	0 / 18	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U
cis-1,2-Dichloroethene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
cis-1,3-Dichloropropene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Dibromomethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Dichlorodifluoromethane	1.10E+00	2 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	6.70E-01	5.00E+00	J
Di-isopropyl ether	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Ethylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Hexachloro-1,3-butadiene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Isopropylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Methyl tert-butyl ether	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Methylene Chloride	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
Naphthalene	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
n-Butylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
n-Propylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
p-Isopropyltoluene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00		<	1.00E+00	U	<	1.00E+00	U
sec-Butylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Styrene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
tert-Butylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Tetrachloroethene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Toluene	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
trans-1,2-Dichloroethene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
trans-1,3-Dichloropropene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Trichloroethene	6.50E-01	1 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Trichlorofluoromethane	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
Vinyl chloride	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Xylenes, Total	ND	0 / 18	<	3.00E+00	U	<	3.00E+00	U	<	3.00E+00	U	<	3.00E+00	U	<	3.00E+00	U	<	3.00E+00	U	<	3.00E+00	U
METALS (µg/L)																							
Aluminum	1.60E+02	15 / 18	7.20E+01	1.00E+02	J	4.80E+01	1.00E+02	J	7.00E+01	1.00E+02	J	1.40E+02	1.00E+02		5.50E+01	1.00E+02	J	<	1.00E+02	U	4.80E+01	1.00E+02	J
Antimony	6.20E-01	5 / 18	6.20E-01	1.00E+00	J	3.50E-01	1.00E+00	J	<	1.00E+00	U	<	1.00E+00	U	4.30E-01	1.00E+00	J	<	1.00E+00	U	<	1.00E+00	U
Arsenic	6.00E+00	17 / 18	3.40E+00	1.00E+00		5.00E+00	1.00E+00		2.60E+00	1.00E+00		3.60E+00	1.00E+00		1.40E+00	1.00E+00		4.40E+00	1.00E+00		3.80E+00	1.00E+00	
Barium	9.20E+01	17 / 18	4.70E+01	2.00E+00		4.40E+01	2.00E+00		6.10E+01	2.00E+00		4.40E+01	2.00E+00		2.80E+01	2.00E+00		3.40E+01	2.00E+00		3.80E+01	2.00E+00	
Beryllium	2.70E-01	5 / 18	<	1.00E+00	U	1.80E-01	1.00E+00	J	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Cadmium	2.50E-01	7 / 18	2.30E-01	5.00E-01	J	<	5.00E-01	U	1.80E-01	5.00E-01	J	1.80E-01	5.00E-01	J	1.90E-01	5.00E-01	J	<	5.00E-01	U	<	5.00E-01	U
Calcium	9.30E+04	17 / 18	5.00E+04	1.00E+03		3.40E+04	1.00E+03		8.70E+04	1.00E+03		5.30E+04	1.00E+03		4.00E+04	1.00E+03		4.90E+04	1.00E+03		4.90E+04	1.00E+03	
Chromium	5.00E+00	15 / 18	1.20E+00	2.00E+00	J	1.90E+00	2.00E+00	J	8.90E-01	2.00E+00	J	1.40E+00	2.00E+00	J	8.00E-01	2.00E+00	J	1.70E+00	2.00E+00	J	3.00E+00	2.00E+00	
Chromium, Hexavalent	1.20E+00	16 / 17	2.10E-01	5.00E-01	J	1.10E+00	5.00E-01		6.80E-01	5.00E-01		1.10E+00	5.00E-01		5.90E-01	5.00E-01		9.90E-01	5.00E-01	J	1.20E+00	5.00E-01	J

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CANNON AIR FORCE BASE, NEW MEXICO

FIELD ID			MWH-7-14			MWNA-7-14			MWOA-7-14			MWPA-7-14			MW RB-7-14			MWS-7-14			MWT-7-14		
DATE COLLECTED			7/20/2014			7/21/2014			7/17/2014			July 17, 2014			7/20/2014			7/16/2014			7/16/2014		
	Maximum	Frequency	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual
Cobalt	4.90E-01	4 / 18	<	1.00E+00	U	<	1.00E+00	U	4.20E-01	1.00E+00	J	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Copper	5.30E+00	17 / 18	4.60E+00	2.00E+00		5.30E+00	2.00E+00		1.40E+00	2.00E+00	J	1.60E+00	2.00E+00	J	1.60E+00	2.00E+00	J	2.10E+00	2.00E+00		2.30E+00	2.00E+00	
Iron	5.20E+02	17 / 18	2.50E+02	1.00E+02		2.50E+01	1.00E+02	J	6.70E+01	1.00E+02	J	1.00E+02	1.00E+02		5.00E+01	1.00E+02	J	2.80E+01	1.00E+02	J	5.20E+02	1.00E+02	
Lead	8.40E+00	12 / 18	9.60E-01	1.00E+00	J	<	1.00E+00	U	<	1.00E+00	U	5.30E-01	1.00E+00	J	<	1.00E+00	U	3.40E-01	1.00E+00	J	<	1.00E+00	U
Magnesium	8.10E+04	17 / 18	3.50E+04	1.00E+03		3.10E+04	1.00E+03		7.90E+04	1.00E+03		4.80E+04	1.00E+03		3.80E+04	1.00E+03		4.60E+04	1.00E+03		3.80E+04	1.00E+03	
Manganese	3.70E+01	17 / 18	1.80E+01	2.00E+00		3.30E+00	2.00E+00		3.60E+00	2.00E+00		5.90E+00	2.00E+00		2.00E+00	2.00E+00		3.10E+00	2.00E+00		1.50E+01	2.00E+00	
Mercury	ND	0 / 18	<	2.00E-01	U	<	2.00E-01	U	<	2.00E-01	U	<	2.00E-01	U	<	2.00E-01	U	<	2.00E-01	U	<	2.00E-01	U
Nickel	2.20E+01	17 / 18	2.20E+01	1.00E+00		4.70E-01	1.00E+00	J	3.00E+00	1.00E+00		1.40E+00	1.00E+00		2.40E+00	1.00E+00		1.30E+00	1.00E+00		7.30E+00	1.00E+00	
Potassium	1.00E+04	17 / 18	6.60E+03	1.00E+03		7.40E+03	1.00E+03		9.90E+03	1.00E+03		7.50E+03	1.00E+03		7.00E+03	1.00E+03		6.60E+03	1.00E+03		6.60E+03	1.00E+03	
Selenium	2.00E+01	17 / 18	9.40E+00	1.00E+00		8.10E+00	1.00E+00		9.00E+00	1.00E+00		1.10E+01	1.00E+00		1.00E+01	1.00E+00		7.00E+00	1.00E+00		1.80E+00	1.00E+00	
Silver	3.60E+00	1 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Sodium	1.30E+05	17 / 18	4.90E+04	1.00E+03		4.40E+04	1.00E+03		1.30E+05	1.00E+03		3.70E+04	1.00E+03		4.20E+04	1.00E+03		4.60E+04	1.00E+03		5.10E+04	1.00E+03	
Thallium	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Vanadium	4.00E+01	17 / 18	1.60E+01	2.00E+00		2.40E+01	2.00E+00		1.60E+01	2.00E+00		1.90E+01	2.00E+00		2.00E+01	2.00E+00		2.80E+01	2.00E+00		2.30E+01	2.00E+00	
Zinc	3.10E+02	17 / 18	3.10E+02	1.00E+01		3.70E+00	1.00E+01	J	6.00E+00	1.00E+01	J	1.30E+01	1.00E+01		7.10E+00	1.00E+01	J	7.80E+01	1.00E+01		9.80E+01	1.00E+01	
Other Paramters (mg/L)																							
Ammonia Nitrogen	7.80E-02	10 / 18	7.00E-02	2.50E-01	J	4.90E-02	2.50E-01	J	7.00E-02	2.50E-01	J	6.40E-02	2.50E-01	J	5.70E-02	2.50E-01	J	<	2.50E-01	U	<	2.50E-01	U
Chloride	2.00E+02	17 / 18	5.00E+01	1.00E+00		3.90E+01	1.00E+00		1.90E+02	5.00E+00		6.80E+01	1.00E+00		5.80E+01	1.00E+00		5.90E+01	1.00E+00		4.90E+01	1.00E+00	
Perchlorate	2.00E+00	13 / 17	1.70E+00	5.00E-01		1.50E+00	5.00E-01		<	5.00E-01	U	1.50E+00	5.00E-01		1.80E+00	5.00E-01		1.30E+00	5.00E-01		1.30E+00	5.00E-01	
Nitrate	1.50E+01	17 / 18	2.30E+00	1.00E-01		1.40E+00	1.00E-01		1.50E+01	5.00E-01		1.60E+00	1.00E-01		1.10E+00	1.00E-01		1.60E+00	1.00E-01		1.10E+00	1.00E-01	
Nitrite	ND	0 / 18	<	1.00E-01	U	<	1.00E-01	U	<	1.00E-01	U	<	1.00E-01	U	<	1.00E-01	U	<	1.00E-01	U	<	1.00E-01	U
Sulfate	3.80E+02	17 / 18	1.20E+02	1.00E+01		7.80E+01	5.00E+00		1.60E+02	2.50E+01		1.20E+02	1.00E+01		1.20E+02	2.50E+01		1.00E+02	1.00E+01		1.00E+02	1.00E+01	
Total Organic Carbon	1.40E+00	16 / 18	3.60E-01	1.00E+00	J	1.20E+00	1.00E+00		9.00E-01	1.00E+00	J	2.30E-01	1.00E+00	J	<	1.00E+00	U	7.40E-01	1.00E+00	J	4.40E-01	1.00E+00	J

Notes:
µg/L = microgram per liter
J = Estimated
LOQ = Limit of Quantitation
mg/L = milligram per liter
ND = Not Detected
Qual = Qualifier
U = Nondetect
UJ = Estimated Nondetect

SUMMARY OF ANALYSIS
2014 BIENNIAL SAMPLING EVENT
CANNON AIR FORCE BASE, NEW MEXICO

FIELD ID			MWU-7-14			MWV-7-14			MWW-7-14			MWX-7-14		
DATE COLLECTED			7/16/2014			7/14/2014			7/20/2014			7/15/2014		
	Maximum	Frequency	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	6	LOQ	Qual
VOLATILE ORGANIC COMPOUNDS (µg/L)														
1,1,1,2-Tetrachloroethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1,1-Trichloroethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1,2,2-Tetrachloroethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1,2-Trichloroethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1,2-Trichlorotrifluoroethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1-Dichloroethane	4.60E-01	2 / 18	3.60E-01	1.00E+00	J	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1-Dichloroethene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,1-Dichloropropene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2,3-Trichlorobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2,3-Trichloropropane	ND	0 / 18	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U
1,2,3-Trimethylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2,4-Trichlorobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2,4-Trimethylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2-Dibromo-3-Chloropropane	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
1,2-Dibromoethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2-Dichlorobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2-Dichloroethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,2-Dichloropropane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,3,5-Trimethylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,3-Dichlorobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,3-Dichloropropane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
1,4-Dichlorobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
2,2-Dichloropropane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
2-Butanone (MEK)	ND	0 / 18	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U
2-Chloroethyl vinyl ether	ND	0 / 18	<	5.00E+01	U	<	5.00E+01	UJ	<	5.00E+01	U	<	5.00E+01	U
2-Chlorotoluene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
4-Chlorotoluene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
4-Methyl-2-pentanone (MIBK)	ND	0 / 18	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U
Acetone	ND	0 / 18	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U
Acrolein	ND	0 / 18	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U	<	5.00E+01	U
Acrylonitrile	ND	0 / 18	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U	<	1.00E+01	U
Benzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Bromobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Bromodichloromethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Bromoform	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Bromomethane	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
Carbon tetrachloride	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Chlorobenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U

SUMMARY OF ANALYSIS
2014 BIENNIAL SAMPLING EVENT
CANNON AIR FORCE BASE, NEW MEXICO

FIELD ID			MWU-7-14			MWV-7-14			MWW-7-14			MWX-7-14		
DATE COLLECTED			7/16/2014			7/14/2014			7/20/2014			7/15/2014		
	Maximum	Frequency	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	6	LOQ	Qual
Chlorodibromomethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Chloroethane	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
Chloroform	4.00E+00	3 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	3.80E-01	5.00E+00	J
Chloromethane	ND	0 / 18	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U	<	2.50E+00	U
cis-1,2-Dichloroethene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
cis-1,3-Dichloropropene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Dibromomethane	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Dichlorodifluoromethane	1.10E+00	2 / 18	1.10E+00	5.00E+00	J	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
Di-isopropyl ether	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Ethylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Hexachloro-1,3-butadiene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Isopropylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Methyl tert-butyl ether	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Methylene Chloride	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	1.40E+00	5.00E+00	J
Naphthalene	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
n-Butylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
n-Propylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
p-Isopropyltoluene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
sec-Butylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Styrene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
tert-Butylbenzene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Tetrachloroethene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Toluene	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
trans-1,2-Dichloroethene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
trans-1,3-Dichloropropene	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Trichloroethene	6.50E-01	1 / 18	6.50E-01	1.00E+00	J	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Trichlorofluoromethane	ND	0 / 18	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U	<	5.00E+00	U
Vinyl chloride	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Xylenes, Total	ND	0 / 18	<	3.00E+00	U	<	3.00E+00	U	<	3.00E+00	U	<	3.00E+00	U
METALS (µg/L)														
Aluminum	1.60E+02	15 / 18	<	1.00E+02	U	1.40E+02	1.00E+02		1.40E+02	1.00E+02		3.00E+02	1.00E+02	
Antimony	6.20E-01	5 / 18	<	1.00E+00	U	<	1.00E+00	U	4.20E-01	1.00E+00	J	<	1.00E+00	U
Arsenic	6.00E+00	17 / 18	4.30E+00	1.00E+00		4.60E+00	1.00E+00		2.20E+00	1.00E+00		7.80E+00	1.00E+00	
Barium	9.20E+01	17 / 18	6.10E+01	2.00E+00		2.80E+01	2.00E+00		1.40E+01	2.00E+00		8.50E+01	2.00E+00	
Beryllium	2.70E-01	5 / 18	<	1.00E+00	U	2.70E-01	1.00E+00	J	<	1.00E+00	U	2.60E-01	1.00E+00	J
Cadmium	2.50E-01	7 / 18	<	5.00E-01	U	<	5.00E-01	U	2.50E-01	5.00E-01	J	<	5.00E-01	U
Calcium	9.30E+04	17 / 18	8.10E+04	1.00E+03		9.30E+04	1.00E+03		5.90E+04	1.00E+03		3.00E+04	1.00E+03	
Chromium	5.00E+00	15 / 18	5.00E+00	2.00E+00		5.70E-01	2.00E+00	J	5.50E-01	2.00E+00	J	1.70E+00	2.00E+00	J
Chromium, Hexavalent	1.20E+00	16 / 17	1.00E+00	5.00E-01	J			R	7.50E-01	5.00E-01		6.60E-01	5.00E-01	

SUMMARY OF ANALYSIS
2014 BIENNIAL SAMPLING EVENT
CANNON AIR FORCE BASE, NEW MEXICO

FIELD ID			MWU-7-14			MWV-7-14			MWW-7-14			MWX-7-14		
DATE COLLECTED			7/16/2014			7/14/2014			7/20/2014			7/15/2014		
	Maximum	Frequency	Result	LOQ	Qual	Result	LOQ	Qual	Result	LOQ	Qual	6	LOQ	Qual
Cobalt	4.90E-01	4 / 18	<	1.00E+00	U	3.20E-01	1.00E+00	J	<	1.00E+00	U	2.90E-01	1.00E+00	J
Copper	5.30E+00	17 / 18	2.00E+00	2.00E+00	J	2.00E+00	2.00E+00	J	2.90E+00	2.00E+00		5.70E+00	2.00E+00	
Iron	5.20E+02	17 / 18	2.30E+01	1.00E+02	J	6.90E+01	1.00E+02	J	1.20E+02	1.00E+02		2.20E+02	1.00E+02	
Lead	8.40E+00	12 / 18	<	1.00E+00	U	4.20E-01	1.00E+00	J	3.20E-01	1.00E+00	J	8.10E-01	1.00E+00	J
Magnesium	8.10E+04	17 / 18	5.60E+04	1.00E+03		8.10E+04	1.00E+03		4.60E+04	1.00E+03		2.70E+04	1.00E+03	
Manganese	3.70E+01	17 / 18	6.40E+00	2.00E+00		3.60E+01	2.00E+00		2.00E+00	2.00E+00	J	1.30E+01	2.00E+00	
Mercury	ND	0 / 18	<	2.00E-01	U	<	2.00E-01	U	<	2.00E-01	U	<	2.00E-01	U
Nickel	2.20E+01	17 / 18	4.50E+00	1.00E+00		1.40E+00	1.00E+00		2.40E+00	1.00E+00		6.80E-01	1.00E+00	J
Potassium	1.00E+04	17 / 18	7.30E+03	1.00E+03		8.40E+03	1.00E+03		1.00E+04	1.00E+03		5.80E+03	1.00E+03	
Selenium	2.00E+01	17 / 18	7.40E+00	1.00E+00		2.00E+01	1.00E+00		6.70E+00	1.00E+00		4.80E+00	1.00E+00	
Silver	3.60E+00	1 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Sodium	1.30E+05	17 / 18	5.60E+04	1.00E+03		6.70E+04	1.00E+03		1.30E+05	1.00E+03		4.70E+04	1.00E+03	
Thallium	ND	0 / 18	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U	<	1.00E+00	U
Vanadium	4.00E+01	17 / 18	2.30E+01	2.00E+00		2.10E+01	2.00E+00		6.40E+00	2.00E+00		4.90E+01	2.00E+00	
Zinc	3.10E+02	17 / 18	9.20E+01	1.00E+01		4.70E+01	1.00E+01		2.00E+01	1.00E+01		5.90E+01	1.00E+01	
Other Paramters (mg/L)														
Ammonia Nitrogen	7.80E-02	10 / 18	<	2.50E-01	U	<	2.50E-01	U	7.50E-02	2.50E-01	J	<	2.50E-01	U
Chloride	2.00E+02	17 / 18	6.90E+01	1.00E+00		2.00E+02	5.00E+00		1.20E+02	5.00E+00		3.00E+01	1.00E+00	
Perchlorate	2.00E+00	13 / 17	1.30E+00	5.00E-01		<	5.00E-01	U	<	5.00E-01	U	<	5.00E-01	U
Nitrate	1.50E+01	17 / 18	1.30E+00	1.00E-01		7.20E+00	1.00E-01		5.70E-01	1.00E-01		1.70E+00	1.00E-01	
Nitrite	ND	0 / 18	<	1.00E-01	U	<	1.00E-01	U	<	1.00E-01	U	<	1.00E-01	U
Sulfate	3.80E+02	17 / 18	1.10E+02	1.00E+01		2.30E+02	2.50E+01		3.80E+02	2.50E+01		4.70E+01	5.00E+00	
Total Organic Carbon	1.40E+00	16 / 18	3.70E-01	1.00E+00	J	1.40E+00	1.00E+00		2.00E-01	1.00E+00	J	2.20E-01	1.00E+00	J

Notes:
µg/L = microgram per liter
J = Estimated
LOQ = Limit of Quantitation
mg/L = milligram per liter
ND = Not Detected
Qual = Qualifier
U = Nondetect
UJ = Estimated Nondetect

E.2 Laboratory Sample Delivery Groups

The raw data packages were submitted to AFCEC, including Cannon AFB. Electronic copies are available upon request.

E.3 URS Data Verifications

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L709935 **URS Chemist: Steve Gragert**
Date Verified: 8/22/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Sample Identification #	Date Collected	Date Received	Matrix	Analysis
MWV-7-14	7/14/2014	7/15/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C
TRIP BLANK 7-14-14	7/14/2014	7/15/2014	Aq	8260C

1.0 Laboratory Case Narrative \ Cooler Receipt Form

Verification Criteria	Yes	No	N/A
Were any DoD-QSM deviations noted in the laboratory case narrative?	X		
Were DoD-QSM corrective actions followed if deviations were noted?	X		
Were any issues noted in the cooler receipt form?		X	

The laboratory case narrative indicated 2-chloroethyl vinyl ether MS/MSD recoveries were outside evaluation criteria. This issue is discussed further in Section 12.0.

Although it was not indicated in the laboratory case narrative, the laboratory analyzed perchlorate via USEPA Method 314.0 rather than SW-846 6850 as requested by URS in the contract, bottle order, and CoC. All perchlorate data were rejected. This issue is discussed further in Section 19.0. No other issues were noted in the laboratory case narrative or cooler receipt form.

2.0 Sample Documentation

Verification Criteria	Yes	No
Were all samples documented correctly on the chain-of-custody (COC) and samples labels?	X	
Were all sample identifications (IDs) documented correctly on sample labels?	X	
Did samples listed on COCs match the sample labels?	X	
Were sample relinquished properly on the COC?	X	

3.0 Holding Time

Verification Criteria	Yes	No
Were all samples extracted and/or analyzed within the appropriate holding time?		X
Were all samples preserved appropriately?		X

Hexavalent chromium was not correctly preserved with ammonium sulfate and was analyzed 3 days outside the 1 day holding time criteria. Qualifications of data due to holding time exceedance are listed in the table below.

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Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Field ID	Parameter	Analyte	Qualification
MWV-7-14	Hexavalent chromium	Hexavalent chromium	**R**

4.0 Instrument Performance Check (Tuning)

Method 6020A Instrument Tuning Criteria			
Instrument:	**ICPMS4**		
Date of Tuning:	**7/17/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Was the mass calibration ≤ 0.1amu from the true value?	X		
Was the resolution < 0.9 amu full width at 10% peak height?	X		
For stability, was the RSD ≤ 5% for at least 4 replicate analyses?	X		

Method 8260C Instrument Tuning Criteria			
Instrument:	**VOCMS23**		
Date of Tuning:	**7/16/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Were all samples analyzed under an acceptable 12 hour clock tune?	X		
Were ion relative abundance for each target mass within the required intensities limits listed in Table 3 of SW-846 Method 8260C?	X		

Method 8260C Instrument Tuning Criteria			
Instrument:	**VOCMS23**		
Date of Tuning:	**7/17/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Were all samples analyzed under an acceptable 12 hour clock tune?	X		
Were ion relative abundance for each target mass within the required intensities limits listed in Table 3 of SW-846 Method 8260C?	X		

5.0 Initial Calibration

Method 7199 Initial Calibration Criteria			
Instrument:	**IC-13**		
Date of Calibration:	**7/18/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

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Date Verified: 8/22/2014 **URS ITR: Jeff Aust 9/3/2014**
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Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 9056A Initial Calibration Criteria			
Instrument:	**IC-8**		
Date of Calibration:	**7/14/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 350.1 Initial Calibration Criteria			
Instrument:	**FS3100-1**		
Date of Calibration:	**7/17/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 9060A Initial Calibration Criteria			
Instrument:	**TOC3**		
Date of Calibration:	**7/16/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 7470A Initial Calibration Criteria			
Instrument:	**CVAA3**		
Date of Calibration:	**7/16/2014**		
	Yes	**No**	**N/A**
CVAA – Was a minimum of 5 standards and a calibration blank used for ICAL?	X		
CVAA – Was $r^2 \geq 0.99$?	X		

Method 6010B Initial Calibration Criteria			
Instrument:	**ICP11**		
Date of Calibration:	**7/17/2014**		
	Yes	**No**	**N/A**
ICP-AES– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-AES– If more than one standard was used, was $r^2 \geq 0.99$?	X		

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Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 6020A Initial Calibration Criteria			
Instrument:	**ICPMS4**		
Date of Calibration:	**7/17/2014**		
	Yes	**No**	**N/A**
ICP-MS– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-MS– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 8260C Initial Calibration Criteria			
Instrument:	**VOCMS23**		
Date of Calibration:	**7/16/2014**		
	Yes	**No**	**N/A**
Are the average response factors (RFs) for SPCCs above the minimum DoD-QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Are the RSDs for CCCs (1,1-Dichloroethene; Chloroform; 1,2-Dichloropropane; Toluene; Ethylbenzene and Vinyl Chloride) for VOCs ≤ 30%? and one option below?	X		
Option 1: RSD for each analyte ≤ 15%?	X		
Option 2: If linear least squares regression was used was the r ≥ 0.995?	X		
Option 3: If non-linear regression was used was the coefficient of determination $r^2 \geq 0.99$?			X
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X

6.0 Initial Calibration Verification [(ICV) Second Source]

7199 Verification Criteria for ICV 7/18/2014 at 09:08, Instrument: IC-13	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

9056A Verification Criteria for ICV: 7/15/2014 at 08:16, Instrument: IC-8	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

350.1 Verification Criteria for ICV on 7/17/2014 at 13:50, Instrument: FS3100-1	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

9060A Verification Criteria for ICV on 7/16/2014 at 07:41, Instrument: TOC3	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L709935 **URS Chemist: Steve Gragert**
Date Verified: 8/22/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

7470A Verification Criteria for ICV on 7/16/2014 16:10, Instrument: CVAA3	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

6010B Verification Criteria for ICV on 7/17/2014 07:42, Instrument: ICP11	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

6020A Verification Criteria for ICV on 7/17/2014 12:08, Instrument: ICPMS4	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

Method 8260C ICV Criteria			
Instrument:	VOCMS23		
Date of Initial Calibration Verification:	7/16/2014 18:40		
	Yes	No	N/A
Was the ICV analyzed after each calibration?	X		
Was the ICV %difference (%D) for all analytes within ± 20% of the expected value (initial source)?	X		

7.0 Continuing Calibration Verification (CCV)

7199 Verification Criteria for CCV: 7/18/2014 at 12:52, Instrument: IC-13	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9056A Verification Criteria for CCV on 7/15/2014 at 18:25, Instrument: IC-8	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9056A Verification Criteria for CCV on 7/15/2014 at 19:29, Instrument: IC-8	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L709935 **URS Chemist: Steve Gragert**
Date Verified: 8/22/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

350.1 Verification Criteria for CCV on 7/17/2014 at 14:35, Instrument: FS3100-1	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

350.1 Verification Criteria for CCV on 7/17/2014 at 15:10, Instrument: FS3100-1	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9060A Verification Criteria for CCV: 7/16/2014 12:19, Instrument: TOC3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

7470A Verification Criteria for CCV: 7/16/2014 11:49, Instrument: CVAA3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 80-120%?	X	

7470A Verification Criteria for CCV: 7/16/2014 12:41, Instrument: CVAA3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 80-120%?	X	

6010B Verification Criteria for CCV: 7/17/2014 16:08, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/17/2014 17:29, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/23/2014 17:23, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/23/2014 18:05, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

Cannon AFB PBR Data Verification

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Date Verified: 8/22/2014 **URS ITR: Jeff Aust 9/3/2014**
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Method 8260C CCV Criteria			
Instrument:	**VOCMS23**		
Date of Calibration Verification:	**7/17/2014 19:04**		
	Yes	**No**	**N/A**
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 12 hours of analysis time?	X		
Are the average response factors (RFs) for SPCCs above the minimum DoD QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Was the CCV %difference (%D) or %drift for all target compounds ≤ 20%?	X		

8.0 Blank Samples

Blank Criteria	**Yes**	**No**	**N/A**
Was a method blank analyzed with every preparatory batch?	X		
Were analytes detected > ½ the LOQ and > 1/10 the amount measured in any sample or 1/10 the regulatory limit?		X	
Were target analytes detected in method, trip or calibration blanks?		X	

9.0 Laboratory Control Sample (LCS)

LCS Criteria	**Yes**	**No**	**N/A**
Was an LCS analyzed with every preparatory batch?	X		
Were LCS recoveries within acceptance criteria listed in the UFP-QAPP?	X		

10.0 Surrogate Recoveries

Methods 8260C Surrogate Criteria	**Yes**	**No**	**N/A**
Were surrogate spikes added to all field and QC samples?	X		
Were surrogate recoveries within acceptance criteria listed in the UFP-QAPP?	X		

11.0 Internal Standard (IS) Recoveries

Methods 8260C IS Criteria	**Yes**	**No**	**N/A**
Were internal standards spiked for all samples and standards?	X		
Were internal standard areas within -50% to + 100% of the ICAL midpoint standard area?	X		
Were retention time ± 30 seconds from the retention time of the midpoint standard of the ICAL?	X		

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Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

12.0 Matrix Spike/Matrix Spike Duplicate Recoveries/RPDs

MS/MSD Criteria	Yes	No	N/A
Were MS/MSD samples analyzed with every preparatory batch?	X		
Were MS/MSD samples collected for this SDG?	X		
Were MS/MSD recoveries/RPDs within acceptance criteria listed in the UFP-QAPP?		X	

MS/MSD ID	Parameter	Analyte	MS/MSD Recovery	RPD	MS/MSD/ RPD Criteria
MWV-7-14	VOCs	2-Chloroethyl vinyl ether	**12.4/2.73**	**127.7**	10-155/20

Analytical data that required qualification based on MS/MSD data are included in the table below.

Field ID	Parameter	Analyte	Qualification
MWV-7-14	VOCs	2-Chloroethyl vinyl ether	**UJ**

13.0 Dilution Test

Method 6010B/6020A Dilution Test Criteria	Yes	No	N/A
Was a dilution test sample analyzed with every preparatory batch?	X		
Were metals concentrations > 50x the LOQ?			X
Did the five-fold dilution agree within ± 10% of the original measurement?			X
If the five-fold dilution did not agree within ± 10% of the original measurement, was a post digestion spike sample analyzed?	X		

The serial dilution was completed on a sample from another SDG.

14.0 Post Digestion Spike (PDS) Recoveries

Method 6010B PDS Criteria	Yes	No	N/A
Was a PDS sample analyzed if the dilution test failed or metals concentrations were > 50 x the LOD?			X
Were the PDS recoveries within 75-125%?			X

The serial dilution was completed on a sample from another SDG.

Cannon AFB PBR Data Verification

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Date Verified: 8/22/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

15.0 Interference Check Solutions (ICS)

Method 6010B/6020A ICS Criteria	Yes	No	N/A
Were ICS-A and ICSAB samples analyzed at the beginning of the analytical run and every 12 hours?	X		
Was the ICS-A absolute value concentration for all non-spiked metals < LOD (unless they are a verified trace impurity form one of the spiked metals)	X		
Was the ICS-AB recoveries within ± 20%?	X		

16.0 Laboratory Duplicate Samples

Laboratory Duplicate Criteria	Yes	No	N/A
Were laboratory duplicate samples analyzed for this SDG? (if yes, list below)	X		
Were parent sample / laboratory duplicate RPDs ≤ 20% for analytes that had concentrations > 5x the LOQ.	X		
Were the differences between the parent sample / laboratory duplicate > 2x the LOQ for analytes that had concentrations < 5x the LOQ	X		

Parent Sample ID	Analysis
MWV-7-14	Hexavalent Chromium

17.0 Field Duplicate Samples

Field Duplicate Criteria	Yes	No	N/A
Were field duplicate samples collected for this SDG? (if yes, list below)		X	
Were parent sample / field duplicate RPDs ≤ 30% for water samples and ≤ 50% for soils for analytes that had concentrations > 5x the LOQ.			X
Were the differences between the parent sample / field duplicate > 2x the LOQ for analytes that had concentrations < 5x the LOQ			X

18.0 Sensitivity

Sensitivity Criteria	Yes	No	N/A
Was the laboratory sensitivity consistent with project (QAPP) requirements?	X		
Did all analytes meet sensitivity requirements?	X		

19.0 Additional Qualifications

Additional Qualification Criteria	Yes	No	N/A
Were common laboratory contaminants detected?		X	
Were common laboratory contaminant concentrations < 2x the LOQ			X
Was professional judgment used to qualify data (if yes, list below)	X		

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Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

The laboratory analyzed perchlorate via USEPA Method 314.0 rather than SW-846 6850 as requested by URS in the contract, bottle order, and CoC. Per the DoD Perchlorate Handbook (2007 Aug), *"Methods employing IC/EC (e.g. Methods 314.0 and 314.1) are not appropriate for sampling and testing associated with environmental restoration/cleanup or range assessment projects. Only methods employing MS are to be used for environmental restoration/cleanup or range assessment projects."* All perchlorate data were rejected and listed in the table below.

Field ID	Analysis	Analyte	New LOQ	Qualification
MWV-7-14	Perchlorate	Perchlorate	--	**R**

20.0 Completeness

Completeness Criteria	Yes	No	N/A
Were any data rejected during the verification process?	X		
Were any samples lost, broken, or in any other manner in not verified?		X	
Were samples analyses requested performed, the correct analyte lists used and correct sample preparation and analyses methods and units utilized?		X	

As indicated in Section 3.0, hexavalent chromium was not correctly preserved with ammonium sulfate and was analyzed 3 days outside the 1 day holding time criteria. The result for sample MWV-7-14 was rejected. Hexavalent chromium is not a compound of concern at Cannon AFB.

As indicated in Section 19.0, the laboratory analyzed perchlorate via USEPA method 314.0 rather than SW-846 6850 as requested by URS. Two perchlorate samples were rejected as indicated in Section 19.0. Perchlorate is not a compound of concern at Cannon AFB.

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710204 **URS Chemist: Steve Gragert**
Date Verified: 8/23/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Sample Identification #	Date Collected	Date Received	Matrix	Analysis
Trip Blank 7-15-14	7/15/2014	7/16/2014	Aq	8260C
MWX-7-14	7/15/2014	7/16/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C
MWD-7-14	7/15/2014	7/16/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C
MWC-7-14	7/15/2014	7/16/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C

1.0 Laboratory Case Narrative \ Cooler Receipt Form

Verification Criteria	Yes	No	N/A
Were any DoD-QSM deviations noted in the laboratory case narrative?	X		
Were DoD-QSM corrective actions followed if deviations were noted?	X		
Were any issues noted in the cooler receipt form?		X	

The laboratory case narrative the MS recoveries for hexavalent chromium and perchlorate in sample MWD-7-14 were below evaluation criteria. This issue is discussed further in Section 12.0.

Although it was not indicated in the laboratory case narrative, the laboratory analyzed perchlorate via USEPA Method 314.0 rather than SW-846 6850 as requested by URS in the contract, bottle order, and CoC. All perchlorate data were rejected. This issue is discussed further in Section 19.0. No other issues pertaining to the samples in this SDG were noted in the laboratory case narrative or cooler receipt form.

2.0 Sample Documentation

Verification Criteria	Yes	No
Were all samples documented correctly on the chain-of-custody (COC) and samples labels?	X	
Were all sample identifications (IDs) documented correctly on sample labels?	X	
Did samples listed on COCs match the sample labels?	X	
Were sample relinquished properly on the COC?	X	

3.0 Holding Time

Verification Criteria	Yes	No
Were all samples extracted and/or analyzed within the appropriate holding time?	X	
Were all samples preserved appropriately?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710204 **URS Chemist: Steve Gragert**
Date Verified: 8/23/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

4.0 Instrument Performance Check (Tuning)

Method 6020A Instrument Tuning Criteria			
Instrument:	**ICPMS4**		
Date of Tuning:	**7/23/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Was the mass calibration ≤ 0.1amu from the true value?	X		
Was the resolution < 0.9 amu full width at 10% peak height?	X		
For stability, was the RSD ≤ 5% for at least 4 replicate analyses?	X		

Method 8260C Instrument Tuning Criteria			
Instrument:	**VOCMS23**		
Date of Tuning:	**7/16/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Were all samples analyzed under an acceptable 12 hour clock tune?	X		
Were ion relative abundance for each target mass within the required intensities limits listed in Table 3 of SW-846 Method 8260C?	X		

Method 8260C Instrument Tuning Criteria			
Instrument:	**VOCMS23**		
Date of Tuning:	**7/17/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Were all samples analyzed under an acceptable 12 hour clock tune?	X		
Were ion relative abundance for each target mass within the required intensities limits listed in Table 3 of SW-846 Method 8260C?	X		

5.0 Initial Calibration

Method 7199 Initial Calibration Criteria			
Instrument:	**IC-13**		
Date of Calibration:	**7/17/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710204 **URS Chemist: Steve Gragert**
Date Verified: 8/23/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 9056A Initial Calibration Criteria			
Instrument:	**IC-8**		
Date of Calibration:	**7/14/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 350.1 Initial Calibration Criteria			
Instrument:	**FS3100-1**		
Date of Calibration:	**7/19/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 9060A Initial Calibration Criteria			
Instrument:	**TOC3**		
Date of Calibration:	**7/19/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 7470A Initial Calibration Criteria			
Instrument:	**CVAA1**		
Date of Calibration:	**7/18/2014**		
	Yes	**No**	**N/A**
CVAA – Was a minimum of 5 standards and a calibration blank used for ICAL?	X		
CVAA – Was $r^2 \geq 0.99$?	X		

Method 6010B Initial Calibration Criteria			
Instrument:	**ICP11**		
Date of Calibration:	**7/17/2014**		
	Yes	**No**	**N/A**
ICP-AES– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-AES– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 6020A Initial Calibration Criteria			
Instrument:	**ICPMS4**		
Date of Calibration:	**7/23/2014**		
	Yes	**No**	**N/A**
ICP-MS– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-MS– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710204 **URS Chemist: Steve Gragert**
Date Verified: 8/23/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 8260C Initial Calibration Criteria			
Instrument:	**VOCMS23**		
Date of Calibration:	**7/16/2014**		
	Yes	**No**	**N/A**
Are the average response factors (RFs) for SPCCs above the minimum DoD-QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Are the RSDs for CCCs (1,1-Dichloroethene; Chloroform; 1,2-Dichloropropane; Toluene; Ethylbenzene and Vinyl Chloride) for VOCs ≤ 30%? and one option below?	X		
Option 1: RSD for each analyte ≤ 15%?	X		
Option 2: If linear least squares regression was used was the r ≥ 0.995?	X		
Option 3: If non-linear regression was used was the coefficient of determination r^2 ≥ 0.99?			X
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X

6.0 Initial Calibration Verification [(ICV) Second Source]

7199 Verification Criteria for ICV 7/18/2014 at 9:08, Instrument: IC-13	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

9056A Verification Criteria for ICV: 7/16/2014 at 08:01, Instrument: IC-8	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

350.1 Verification Criteria for ICV on 7/19/2014 at 14:17, Instrument: FS3100-1	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

9060A Verification Criteria for ICV on 7/19/2014 at 06:40, Instrument: TOC3	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

7470A Verification Criteria for ICV on 7/18/2014 16:42, Instrument: CVAA1	**Yes**	**No**
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710204 **URS Chemist: Steve Gragert**
Date Verified: 8/23/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

6010B Verification Criteria for ICV on 7/17/2014 07:42, Instrument: ICP11	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

6020A Verification Criteria for ICV on 7/23/2014 12:08, Instrument: ICPMS4	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

Method 8260C ICV Criteria			
Instrument:	VOCMS23		
Date of Initial Calibration Verification:	7/16/2014 18:40		
	Yes	No	N/A
Was the ICV analyzed after each calibration?	X		
Was the ICV %difference (%D) for all analytes within ± 20% of the expected value (initial source)?	X		

7.0 Continuing Calibration Verification (CCV)

7199 Verification Criteria for CCV: 7/18/2014 at 12:52, Instrument: IC-13	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9056A Verification Criteria for CCV on 7/16/2014 at 15:05, Instrument: IC-8	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

350.1 Verification Criteria for CCV on 7/19/2014 at 15:02, Instrument: FS3100-1	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9060A Verification Criteria for CCV: 7/19/2014 10:37, Instrument: TOC3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

7470A Verification Criteria for CCV: 7/18/2014 17:39, Instrument: CVAA1	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 80-120%?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710204 **URS Chemist: Steve Gragert**
Date Verified: 8/23/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

6010B Verification Criteria for CCV: 7/17/2014 16:08, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/17/2014 17:29, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/23/2014 17:23, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/23/2014 18:05, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

Method 8260C CCV Criteria			
Instrument:	VOCMS23		
Date of Calibration Verification:	7/17/2014 19:04		
	Yes	No	N/A
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 12 hours of analysis time?	X		
Are the average response factors (RFs) for SPCCs above the minimum DoD QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Was the CCV %difference (%D) or %drift for all target compounds ≤ 20%?	X		

8.0 Blank Samples

Blank Criteria	Yes	No	N/A
Was a method blank analyzed with every preparatory batch?	X		
Were analytes detected > ½ the LOQ and > 1/10 the amount measured in any sample or 1/10 the regulatory limit?		X	
Were target analytes detected in method, trip or calibration blanks?		X	

9.0 Laboratory Control Sample (LCS)

LCS Criteria	Yes	No	N/A
Was an LCS analyzed with every preparatory batch?	X		
Were LCS recoveries within acceptance criteria listed in the UFP-QAPP?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710204 **URS Chemist: Steve Gragert**
Date Verified: 8/23/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

10.0 Surrogate Recoveries

Methods 8260C Surrogate Criteria	Yes	No	N/A
Were surrogate spikes added to all field and QC samples?	X		
Were surrogate recoveries within acceptance criteria listed in the UFP-QAPP?	X		

11.0 Internal Standard (IS) Recoveries

Methods 8260C IS Criteria	Yes	No	N/A
Were internal standards spiked for all samples and standards?	X		
Were internal standard areas within -50% to + 100% of the ICAL midpoint standard area?	X		
Were retention time ± 30 seconds from the retention time of the midpoint standard of the ICAL?	X		

12.0 Matrix Spike/Matrix Spike Duplicate Recoveries/RPDs

MS/MSD Criteria	Yes	No	N/A
Were MS/MSD samples analyzed with every preparatory batch?	X		
Were MS/MSD samples collected for this SDG?	X		
Were MS/MSD recoveries/RPDs within acceptance criteria listed in the UFP-QAPP?		X	

MS/MSD ID	Parameter	Analyte	MS/MSD Recovery	RPD	MS/MSD/RPD Criteria
MWD-7-14	Hexavalent chromium	Hexavalent chromium	**86.4**/91.4	4.93	90-110/20
MWD-7-14	Perchlorate	Perchlorate	**79.9**/81.1	1.49	80-120/15

Analytical data that required qualification based on MS/MSD data are included in the table below.

Field ID	Parameter	Analyte	Qualification
MWD-7-14	Hexavalent Chromium	Hexavalent Chromium	**J**
MWD-7-14	Perchlorate	Perchlorate	**UJ**

13.0 Dilution Test

Method 6010B/6020A Dilution Test Criteria	Yes	No	N/A
Was a dilution test sample analyzed with every preparatory batch?	X		
Were metals concentrations > 50x the LOQ?			X
Did the five-fold dilution agree within ± 10% of the original measurement?			X

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710204 **URS Chemist: Steve Gragert**
Date Verified: 8/23/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 6010B/6020A Dilution Test Criteria	Yes	No	N/A
If the five-fold dilution did not agree within ± 10% of the original measurement, was a post digestion spike sample analyzed?	X		

The serial dilution was completed on a sample from another SDG.

14.0 Post Digestion Spike (PDS) Recoveries

Method 6010B PDS Criteria	Yes	No	N/A
Was a PDS sample analyzed if the dilution test failed or metals concentrations were > 50 x the LOD?			X
Were the PDS recoveries within 75-125%?			X

The serial dilution was completed on a sample from another SDG.

15.0 Interference Check Solutions (ICS)

Method 6010B/6020A ICS Criteria	Yes	No	N/A
Were ICS-A and ICSAB samples analyzed at the beginning of the analytical run and every 12 hours?	X		
Was the ICS-A absolute value concentration for all non-spiked metals < LOD (unless they are a verified trace impurity form one of the spiked metals)	X		
Was the ICS-AB recoveries within ± 20%?	X		

16.0 Laboratory Duplicate Samples

Laboratory Duplicate Criteria	Yes	No	N/A
Were laboratory duplicate samples analyzed for this SDG? (if yes, list below)	X		
Were parent sample / laboratory duplicate RPDs ≤ 20% for analytes that had concentrations > 5x the LOQ.	X		
Were the differences between the parent sample / laboratory duplicate > 2x the LOQ for analytes that had concentrations < 5x the LOQ	X		

Parent Sample ID	Analysis
MWX-7-14	Chloride, Nitrate, Nitrite, and Sulfate
MWD-7-14	Perchlorate
MWD-7-14	TOC

17.0 Field Duplicate Samples

Field Duplicate Criteria	Yes	No	N/A
Were field duplicate samples collected for this SDG? (if yes, list below)		X	
Were parent sample / field duplicate RPDs ≤ 30% for water samples and ≤ 50% for			X

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710204 **URS Chemist: Steve Gragert**
Date Verified: 8/23/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Field Duplicate Criteria	Yes	No	N/A
soils for analytes that had concentrations > 5x the LOQ.			
Were the differences between the parent sample / field duplicate > 2x the LOQ for analytes that had concentrations < 5x the LOQ			X

18.0 Sensitivity

Sensitivity Criteria	Yes	No	N/A
Was the laboratory sensitivity consistent with project (QAPP) requirements?	X		
Did all analytes meet sensitivity requirements?	X		

19.0 Additional Qualifications

Additional Qualification Criteria	Yes	No	N/A
Were common laboratory contaminants detected?	X		
Were common laboratory contaminant concentrations < 2x the LOQ	X		
Was professional judgment used to qualify data (if yes, list below)	X		

Professional judgment was used to qualify the common laboratory contaminant acetone reported at concentrations less than two times (2X) the LOQ. See table below for qualification of data.

The laboratory analyzed perchlorate via USEPA method 314.0 rather than SW-846 6850 as requested by URS in the contract, bottle order, and CoC. Per the DoD Perchlorate Handbook (2007 Aug), *"Methods employing IC/EC (e.g. Methods 314.0 and 314.1) are not appropriate for sampling and testing associated with environmental restoration/cleanup or range assessment projects. Only methods employing MS are to be used for environmental restoration/cleanup or range assessment projects."* All perchlorate data were rejected and listed in the table below.

Field ID	Analysis	Analyte	New LOQ	Qualification
MWX-7-14	VOCs	Methylene chloride	--	**U**
MWD-7-14	VOCs	Methylene chloride	--	**U**
MWC-7-14	VOCs	Methylene chloride	--	**U**
MWX-7-14	Perchlorate	Perchlorate	--	**R**
MWD-7-14	Perchlorate	Perchlorate	--	**R**
MWC-7-14	Perchlorate	Perchlorate	--	**R**

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710204 **URS Chemist: Steve Gragert**
Date Verified: 8/23/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

20.0 Completeness

Completeness Criteria	Yes	No	N/A
Were any data rejected during the verification process?	X		
Were any samples lost, broken, or in any other manner in not verified?		X	
Were samples analyses requested performed, the correct analyte lists used and correct sample preparation and analyses methods and units utilized?		X	

As indicated in Section 19.0, the laboratory analyzed perchlorate via USEPA method 314.0 rather than SW-846 6850 as requested by URS. Three perchlorate samples were rejected as indicated in Section 19.0. Perchlorate is not a compound of concern at Cannon AFB.

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710491 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Sample Identification #	Date Collected	Date Received	Matrix	Analysis
Trip Blank	7/16/2014	7/17/2014	Aq	8260C
MWS-7-14	7/16/2014	7/17/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C
MWT-7-14	7/16/2014	7/17/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C
MWB-7-14	7/16/2014	7/17/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C
MWU-7-14	7/16/2014	7/17/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C

1.0 Laboratory Case Narrative \ Cooler Receipt Form

Verification Criteria	Yes	No	N/A
Were any DoD-QSM deviations noted in the laboratory case narrative?		X	
Were DoD-QSM corrective actions followed if deviations were noted?			X
Were any issues noted in the cooler receipt form?	X		

The cooler receipt form indicated hexavalent chromium was received outside the 24 hour holding time criteria. This issue is discussed further in Section 3.0.

Although it was not indicated in the laboratory case narrative, the laboratory analyzed perchlorate via USEPA Method 314.0 rather than SW-846 6850 as requested by URS in the contract, bottle order, and CoC. All perchlorate data were rejected. This issue is discussed further in Section 19.0. No other issues pertaining to the samples in this SDG were noted in the laboratory case narrative or cooler receipt form.

2.0 Sample Documentation

Verification Criteria	Yes	No
Were all samples documented correctly on the chain-of-custody (COC) and samples labels?	X	
Were all sample identifications (IDs) documented correctly on sample labels?	X	
Did samples listed on COCs match the sample labels?	X	
Were sample relinquished properly on the COC?	X	

3.0 Holding Time

Verification Criteria	Yes	No
Were all samples extracted and/or analyzed within the appropriate holding time?		X
Were all samples preserved appropriately?		X

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710491 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Hexavalent chromium samples MWS-7-14, MWT-7-14, MWB-7-14, and MWU-7-14 were not properly preserved with ammonium sulfate. The samples were analyzed 1 day outside the 24 hour holding time, but were within 2X the holding time criteria.. Qualifications of data due to holding time exceedances are listed in the table below.

Field ID	Parameter	Analyte	Qualification
MWS-7-14	Hexavalent Chromium	Hexavalent Chromium	**J**
MWT-7-14	Hexavalent Chromium	Hexavalent Chromium	**J**
MWB-7-14	Hexavalent Chromium	Hexavalent Chromium	**J**
MWU-7-14	Hexavalent Chromium	Hexavalent Chromium	**J**

4.0 Instrument Performance Check (Tuning)

Method 6020A Instrument Tuning Criteria			
Instrument:	**ICPMS4**		
Date of Tuning:	**7/29/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Was the mass calibration ≤ 0.1amu from the true value?	X		
Was the resolution < 0.9 amu full width at 10% peak height?	X		
For stability, was the RSD ≤ 5% for at least 4 replicate analyses?	X		

Method 8260C Instrument Tuning Criteria			
Instrument:	**VOCMS23**		
Date of Tuning:	**7/19/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Were all samples analyzed under an acceptable 12 hour clock tune?	X		
Were ion relative abundance for each target mass within the required intensities limits listed in Table 3 of SW-846 Method 8260C?	X		

Method 8260C Instrument Tuning Criteria			
Instrument:	**VOCMS23**		
Date of Tuning:	**7/22/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Were all samples analyzed under an acceptable 12 hour clock tune?	X		
Were ion relative abundance for each target mass within the required intensities limits listed in Table 3 of SW-846 Method 8260C?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710491 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

5.0 Initial Calibration

Method 7199 Initial Calibration Criteria			
Instrument:	**IC-13**		
Date of Calibration:	**7/18/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 9056A Initial Calibration Criteria			
Instrument:	**IC-10**		
Date of Calibration:	**7/17/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 350.1 Initial Calibration Criteria			
Instrument:	**FS3100-1**		
Date of Calibration:	**7/19/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 9060A Initial Calibration Criteria			
Instrument:	**TOC3**		
Date of Calibration:	**7/19/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 7470A Initial Calibration Criteria			
Instrument:	**CVAA3**		
Date of Calibration:	**7/18/2014**		
	Yes	**No**	**N/A**
CVAA – Was a minimum of 5 standards and a calibration blank used for ICAL?	X		
CVAA – Was $r^2 \geq 0.99$?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710491 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 6010B Initial Calibration Criteria			
Instrument:	**ICP11**		
Date of Calibration:	**7/20/2014**		
	Yes	**No**	**N/A**
ICP-AES– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-AES– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 6010B Initial Calibration Criteria			
Instrument:	**ICP11**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
ICP-AES– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-AES– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 6010B Initial Calibration Criteria			
Instrument:	**ICP11**		
Date of Calibration:	**7/25/2014**		
	Yes	**No**	**N/A**
ICP-AES– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-AES– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 6010B Initial Calibration Criteria			
Instrument:	**ICP11**		
Date of Calibration:	**7/28/2014**		
	Yes	**No**	**N/A**
ICP-AES– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-AES– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 6020A Initial Calibration Criteria			
Instrument:	**ICPMS4**		
Date of Calibration:	**7/29/2014**		
	Yes	**No**	**N/A**
ICP-MS– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-MS– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 8260C Initial Calibration Criteria			
Instrument:	**VOCMS23**		
Date of Calibration:	**7/19/2014**		
	Yes	**No**	**N/A**
Are the average response factors (RFs) for SPCCs above the minimum DoD-QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710491 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 8260C Initial Calibration Criteria			
Instrument:	**VOCMS23**		
Date of Calibration:	**7/19/2014**		
	Yes	**No**	**N/A**
for chloromethane, bromoform, and 1,1-dichloroethane.)			
Are the RSDs for CCCs (1,1-Dichloroethene; Chloroform; 1,2-Dichloropropane; Toluene; Ethylbenzene and Vinyl Chloride) for VOCs ≤ 30%? and one option below?	X		
Option 1: RSD for each analyte ≤ 15%?	X		
Option 2: If linear least squares regression was used was the r ≥ 0.995?	X		
Option 3: If non-linear regression was used was the coefficient of determination $r^2 \geq 0.99$?			X
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X

6.0 Initial Calibration Verification [(ICV) Second Source]

7199 Verification Criteria for ICV 7/18/2014 at 09:08, Instrument: IC-13	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%	X	

9056A Verification Criteria for ICV: 7/17/2014 at 07:55, Instrument: IC-10	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%	X	

350.1 Verification Criteria for ICV on 7/19/2014 at 14:17, Instrument: FS3100-1	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%	X	

9060A Verification Criteria for ICV on 7/19/2014 at 06:40, Instrument: TOC3	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%	X	

7470A Verification Criteria for ICV on 7/18/2014 16:42, Instrument: CVAA3	**Yes**	**No**
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%	X	

6010B Verification Criteria for ICV on 7/20/2014 23:26, Instrument: ICP11	**Yes**	**No**
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710491 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

6010B Verification Criteria for ICV on 7/24/2014 08:22, Instrument: ICP11	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%	X	

6010B Verification Criteria for ICV on 7/25/2014 09:24, Instrument: ICP11	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%	X	

6010B Verification Criteria for ICV on 7/28/2014 08:14, Instrument: ICP11	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%	X	

6020A Verification Criteria for ICV on 7/29/2014 23:14, Instrument: ICPMS4	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%	X	

Method 8260C ICV Criteria			
Instrument:	**VOCMS23**		
Date of Initial Calibration Verification:	**7/19/2014 09:58**		
	Yes	**No**	**N/A**
Was the ICV analyzed after each calibration?	X		
Was the ICV %difference (%D) for all analytes within ± 20% of the expected value (initial source)?		X	

The ICV %D for chloromethane was +21.4%. All data were nondetect and associated with an ICV above evaluation criteria, indicating a possible high bias. Therefore, no qualification of data was required.

7.0 Continuing Calibration Verification (CCV)

7199 Verification Criteria for CCV: 7/18/2014 at 12:52, Instrument: IC-13	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710491 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

9056A Verification Criteria for CCV on 7/17/2014 at 14:28, Instrument: IC-10	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

350.1 Verification Criteria for CCV on 7/19/2014 at 16:42, Instrument: FS3100-1	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9060A Verification Criteria for CCV: 7/19/2014 10:37, Instrument: TOC3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

7470A Verification Criteria for CCV: 7/18/2014 17:00, Instrument: CVAA3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 80-120%?	X	

6010B Verification Criteria for CCV: 7/21/2014 15:34, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/21/2014 16:42, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/24/2014 01:05, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/24/2014 02:06, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/25/2014 03:07, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/25/2014 04:08, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710491 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

6010B Verification Criteria for CCV: 7/25/2014 05:09, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/28/2014 15:30, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/28/2014 15:50, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/30/2014 18:26, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/30/2014 19:11, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

Method 8260C CCV Criteria			
Instrument:	VOCMS23		
Date of Calibration Verification:	7/22/2014 19:44		
	Yes	No	N/A
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 12 hours of analysis time?	X		
Are the average response factors (RFs) for SPCCs above the minimum DoD QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Was the CCV %difference (%D) or %drift for all target compounds ≤ 20%?	X		

8.0 Blank Samples

Blank Criteria	Yes	No	N/A
Was a method blank analyzed with every preparatory batch?	X		
Were analytes detected > ½ the LOQ and > 1/10 the amount measured in any sample or 1/10 the regulatory limit?		X	
Were target analytes detected in method, trip or calibration blanks?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710491 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Blank ID	Parameter	Analyte	Concentration	LOQ	Units
CCB 7/30/2014 6:29 PM	6020A	Silver	0.002	1	µg/L
CCB 7/30/2014 6:29 PM	6020A	Chromium	0.011	2	µg/L
CCB 7/30/2014 6:29 PM	6020A	Vanadium	0.003	2	µg/L
CCB 7/30/2014 6:55 PM	6020A	Chromium	0.004	2	µg/L

All associated silver results were nondetect. All associated chromium and vanadium results were >5X the CCB contamination; therefore, no qualification of data was required.

9.0 Laboratory Control Sample (LCS)

LCS Criteria	Yes	No	N/A
Was an LCS analyzed with every preparatory batch?	X		
Were LCS recoveries within acceptance criteria listed in the UFP-QAPP?	X		

10.0 Surrogate Recoveries

Methods 8260C Surrogate Criteria	Yes	No	N/A
Were surrogate spikes added to all field and QC samples?	X		
Were surrogate recoveries within acceptance criteria listed in the UFP-QAPP?	X		

11.0 Internal Standard (IS) Recoveries

Methods 8260C IS Criteria	Yes	No	N/A
Were internal standards spiked for all samples and standards?	X		
Were internal standard areas within -50% to + 100% of the ICAL midpoint standard area?	X		
Were retention time ± 30 seconds from the retention time of the midpoint standard of the ICAL?	X		

12.0 Matrix Spike/Matrix Spike Duplicate Recoveries/RPDs

MS/MSD Criteria	Yes	No	N/A
Were MS/MSD samples analyzed with every preparatory batch?	X		
Were MS/MSD samples collected for this SDG?	X		
Were MS/MSD recoveries/RPDs within acceptance criteria listed in the UFP-QAPP?	X		

Sample MWD-7-14 was spiked and analyzed for perchlorate.

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710491 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

13.0 Dilution Test

Method 6010B/6020A Dilution Test Criteria	Yes	No	N/A
Was a dilution test sample analyzed with every preparatory batch?	X		
Were metals concentrations > 50x the LOQ?			X
Did the five-fold dilution agree within ± 10% of the original measurement?			X
If the five-fold dilution did not agree within ± 10% of the original measurement, was a post digestion spike sample analyzed?	X		

The serial dilution was completed on a sample from another SDG.

14.0 Post Digestion Spike (PDS) Recoveries

Method 6010B/6020A PDS Criteria	Yes	No	N/A
Was a PDS sample analyzed if the dilution test failed or metals concentrations were > 50 x the LOD?			X
Were the PDS recoveries within 75-125%?			X

The serial dilution was completed on a sample from another SDG.

15.0 Interference Check Solutions (ICS)

Method 6010B/6020A ICS Criteria	Yes	No	N/A
Were ICS-A and ICSAB samples analyzed at the beginning of the analytical run and every 12 hours?	X		
Was the ICS-A absolute value concentration for all non-spiked metals < LOD (unless they are a verified trace impurity form one of the spiked metals)	X		
Were the ICS-AB recoveries within ± 20%?	X		

16.0 Laboratory Duplicate Samples

Laboratory Duplicate Criteria	Yes	No	N/A
Were laboratory duplicate samples analyzed for this SDG? (if yes, list below)	X		
Were parent sample / laboratory duplicate RPDs ≤ 20% for analytes that had concentrations > 5x the LOQ.	X		
Were the differences between the parent sample / laboratory duplicate > 2x the LOQ for analytes that had concentrations < 5x the LOQ	X		

Parent Sample ID	Analysis
MWU-7-14	TOC

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710491 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

17.0 Field Duplicate Samples

Field Duplicate Criteria	Yes	No	N/A
Were field duplicate samples collected for this SDG? (if yes, list below)		X	
Were parent sample / field duplicate RPDs ≤ 30% for water samples and ≤ 50% for soils for analytes that had concentrations > 5x the LOQ.			X
Were the differences between the parent sample / field duplicate > 2x the LOQ for analytes that had concentrations < 5x the LOQ			X

18.0 Sensitivity

Sensitivity Criteria	Yes	No	N/A
Was the laboratory sensitivity consistent with project (QAPP) requirements?	X		
Did all analytes meet sensitivity requirements?	X		

19.0 Additional Qualifications

Additional Qualification Criteria	Yes	No	N/A
Were common laboratory contaminants detected?		X	
Were common laboratory contaminant concentrations < 2x the LOQ			X
Was professional judgment used to qualify data (if yes, list below)	X		

The laboratory analyzed perchlorate via USEPA Method 314.0 rather than SW-846 6850 as requested by URS in the contract, bottle order, and CoC. Per the DoD Perchlorate Handbook (2007 Aug), "*Methods employing IC/EC (e.g. Methods 314.0 and 314.1) are not appropriate for sampling and testing associated with environmental restoration/cleanup or range assessment projects. Only methods employing MS are to be used for environmental restoration/cleanup or range assessment projects.*" All perchlorate data were rejected and listed in the table below.

Field ID	Analysis	Analyte	New LOQ	Qualification
MWS-7-14	Perchlorate	Perchlorate	--	**R**
MWT-7-14	Perchlorate	Perchlorate	--	**R**
MWB-7-14	Perchlorate	Perchlorate	--	**R**
MWU-7-14	Perchlorate	Perchlorate	--	**R**

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L710491 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

20.0 Completeness

Completeness Criteria	Yes	No	N/A
Were any data rejected during the verification process?	X		
Were any samples lost, broken, or in any other manner in not verified?		X	
Were samples analyses requested performed, the correct analyte lists used and correct sample preparation and analyses methods and units utilized?		X	

As indicated in Section 19.0, the laboratory analyzed perchlorate via USEPA method 314.0 rather than SW-846 6850 as requested by URS. Four perchlorate samples were rejected as indicated in Section 19.0. Perchlorate is not a compound of concern at Cannon AFB.

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711018 **URS Chemist: Steve Gragert**
Date Verified: 8/27/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Sample Identification #	Date Collected	Date Received	Matrix	Analysis
MWA-7-14	7/17/2014	7/18/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C
MWOA-7-14	7/17/2014	7/18/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C
MWOA-7-14-A	7/17/2014	7/18/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C
MWPA-7-14	7/17/2014	7/18/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C
Trip Blank	7/17/2014	7/18/2014	Aq	8260C

1.0 Laboratory Case Narrative \ Cooler Receipt Form

Verification Criteria	Yes	No	N/A
Were any DoD-QSM deviations noted in the laboratory case narrative?	X		
Were DoD-QSM corrective actions followed if deviations were noted?	X		
Were any issues noted in the cooler receipt form?		X	

The laboratory case narrative indicated a bromobenzene LCS recovery was outside evaluation criteria. This issue is discussed further in Section 9.0.

Although it was not indicated in the laboratory case narrative, the laboratory analyzed perchlorate via USEPA Method 314.0 rather than SW-846 6850 as requested by URS in the contract, bottle order, and CoC. All perchlorate data were rejected. This issue is discussed further in Section 19.0. No other issues pertaining to the samples in this SDG were noted in the laboratory case narrative or cooler receipt form.

2.0 Sample Documentation

Verification Criteria	Yes	No
Were all samples documented correctly on the chain-of-custody (COC) and samples labels?	X	
Were all sample identifications (IDs) documented correctly on sample labels?	X	
Did samples listed on COCs match the sample labels?	X	
Were sample relinquished properly on the COC?	X	

3.0 Holding Time

Verification Criteria	Yes	No
Were all samples extracted and/or analyzed within the appropriate holding time?	X	
Were all samples preserved appropriately?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711018 **URS Chemist: Steve Gragert**
Date Verified: 8/27/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

4.0 Instrument Performance Check (Tuning)

Method 6020A Instrument Tuning Criteria			
Instrument:	**ICPMS4**		
Date of Tuning:	**7/23/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Was the mass calibration ≤ 0.1amu from the true value?	X		
Was the resolution < 0.9 amu full width at 10% peak height?	X		
For stability, was the RSD ≤ 5% for at least 4 replicate analyses?	X		

Method 6020A Instrument Tuning Criteria			
Instrument:	**ICPMS4**		
Date of Tuning:	**7/29/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Was the mass calibration ≤ 0.1amu from the true value?	X		
Was the resolution < 0.9 amu full width at 10% peak height?	X		
For stability, was the RSD ≤ 5% for at least 4 replicate analyses?	X		

Method 8260C Instrument Tuning Criteria			
Instrument:	**VOCMS23**		
Date of Tuning:	**7/21/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Were all samples analyzed under an acceptable 12 hour clock tune?	X		
Were ion relative abundance for each target mass within the required intensities limits listed in Table 3 of SW-846 Method 8260C?	X		

Method 8260C Instrument Tuning Criteria			
Instrument:	**VOCMS23**		
Date of Tuning:	**7/23/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Were all samples analyzed under an acceptable 12 hour clock tune?	X		
Were ion relative abundance for each target mass within the required intensities limits listed in Table 3 of SW-846 Method 8260C?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711018 **URS Chemist: Steve Gragert**
Date Verified: 8/27/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 8260C Instrument Tuning Criteria			
Instrument:	**VOCMS23**		
Date of Tuning:	**7/24/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Were all samples analyzed under an acceptable 12 hour clock tune?	X		
Were ion relative abundance for each target mass within the required intensities limits listed in Table 3 of SW-846 Method 8260C?	X		

5.0 Initial Calibration

Method 7199 Initial Calibration Criteria			
Instrument:	**IC-13**		
Date of Calibration:	**7/25/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 9056A Initial Calibration Criteria			
Instrument:	**IC-10**		
Date of Calibration:	**7/19/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 350.1 Initial Calibration Criteria			
Instrument:	**FS3100-1**		
Date of Calibration:	**7/22/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 9060A Initial Calibration Criteria			
Instrument:	**TOC3**		
Date of Calibration:	**7/22/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711018 **URS Chemist: Steve Gragert**
Date Verified: 8/27/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 7470A Initial Calibration Criteria			
Instrument:	**CVAA3**		
Date of Calibration:	**7/22/2014**		
	Yes	**No**	**N/A**
CVAA – Was a minimum of 5 standards and a calibration blank used for ICAL?	X		
CVAA – Was $r^2 \geq 0.99$?	X		

Method 6010B Initial Calibration Criteria			
Instrument:	**ICP10**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
ICP-AES– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-AES– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 6010B Initial Calibration Criteria			
Instrument:	**ICP11**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
ICP-AES– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-AES– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 6020A Initial Calibration Criteria			
Instrument:	**ICPMS4**		
Date of Calibration:	**7/23/2014**		
	Yes	**No**	**N/A**
ICP-MS– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-MS– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 6020A Initial Calibration Criteria			
Instrument:	**ICPMS4**		
Date of Calibration:	**7/29/2014**		
	Yes	**No**	**N/A**
ICP-MS– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-MS– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 8260C Initial Calibration Criteria			
Instrument:	**VOCMS23**		
Date of Calibration:	**7/21/2014**		
	Yes	**No**	**N/A**
Are the average response factors (RFs) for SPCCs above the minimum DoD-QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711018 **URS Chemist: Steve Gragert**
Date Verified: 8/27/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 8260C Initial Calibration Criteria			
Instrument:	**VOCMS23**		
Date of Calibration:	**7/21/2014**		
	Yes	**No**	**N/A**
Are the RSDs for CCCs (1,1-Dichloroethene; Chloroform; 1,2-Dichloropropane; Toluene; Ethylbenzene and Vinyl Chloride) for VOCs ≤ 30%? and one option below?	X		
Option 1: RSD for each analyte ≤ 15%?	X		
Option 2: If linear least squares regression was used was the r ≥ 0.995?	X		
Option 3: If non-linear regression was used was the coefficient of determination $r^2 \geq$ 0.99?			X
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X

6.0 Initial Calibration Verification [(ICV) Second Source]

7199 Verification Criteria for ICV 7/25/2014 at 09:06, Instrument: IC-13	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

9056A Verification Criteria for ICV: 7/19/2014 at 06:16, Instrument: IC-10	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

350.1 Verification Criteria for ICV on 7/22/2014 at 17:29, Instrument: FS3100-1	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

9060A Verification Criteria for ICV on 7/22/2014 15:45, Instrument: TOC3	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

7470A Verification Criteria for ICV on 7/22/2014 13:57, Instrument: CVAA3	**Yes**	**No**
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

6010B Verification Criteria for ICV on 7/24/2014 23:26, Instrument: ICP10	**Yes**	**No**
Was the second source % recovery between 90-110%?	X	
Was the value of second source for all analyte(s) within ± 10% of true value?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711018 **URS Chemist: Steve Gragert**
Date Verified: 8/27/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

6010B Verification Criteria for ICV on 7/25/2014 08:14, Instrument: ICP11	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

6020A Verification Criteria for ICV on 7/23/2014 11:02, Instrument: ICPMS4	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

6020A Verification Criteria for ICV on 7/29/2014 17:54, Instrument: ICPMS4	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

Method 8260C ICV Criteria			
Instrument:	VOCMS23		
Date of Initial Calibration Verification:	7/21/2014 09:09		
	Yes	No	N/A
Was the ICV analyzed after each calibration?	X		
Was the ICV %difference (%D) for all analytes within ± 20% of the expected value (initial source)?	X		

7.0 Continuing Calibration Verification (CCV)

7199 Verification Criteria for CCV: 7/25/2014 at 12:03, Instrument: IC-13	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9056A Verification Criteria for CCV on 7/19/2014 at 13:14, Instrument: IC-10	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

350.1 Verification Criteria for CCV on 7/22/2014 at 18:11, Instrument: FS3100-1	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

350.1 Verification Criteria for CCV on 7/22/2014 at 18:46, Instrument: FS3100-1	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711018 **URS Chemist: Steve Gragert**
Date Verified: 8/27/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

9060A Verification Criteria for CCV: 7/22/2014 20:21, Instrument: TOC3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9060A Verification Criteria for CCV: 7/22/2014 23:53, Instrument: TOC3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

7470A Verification Criteria for CCV: 7/22/2014 14:53, Instrument: CVAA3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 80-120%?	X	

7470A Verification Criteria for CCV: 7/22/2014 15:55, Instrument: CVAA3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 80-120%?	X	

6010B Verification Criteria for CCV: 7/25/2014 15:12, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/25/2014 16:36, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/25/2014 01:05, Instrument ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/25/2014 02:06, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/28/2014 13:34, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/28/2014 14:10, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711018 **URS Chemist: Steve Gragert**
Date Verified: 8/27/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

6020A Verification Criteria for CCV: 7/31/2014 16:11, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/31/2014 16:48, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

Method 8260C CCV Criteria			
Instrument:	VOCMS23		
Date of Calibration Verification:	7/24/2014 08:00		
	Yes	No	N/A
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 12 hours of analysis time?	X		
Are the average response factors (RFs) for SPCCs above the minimum DoD QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Was the CCV %difference (%D) or %drift for all target compounds ≤ 20%?	X		

Method 8260C CCV Criteria			
Instrument:	VOCMS23		
Date of Calibration Verification:	7/24/2014 19:31		
	Yes	No	N/A
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 12 hours of analysis time?	X		
Are the average response factors (RFs) for SPCCs above the minimum DoD QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Was the CCV %difference (%D) or %drift for all target compounds ≤ 20%?	X		

8.0 Blank Samples

Blank Criteria	Yes	No	N/A
Was a method blank analyzed with every preparatory batch?	X		
Were analytes detected > ½ the LOQ and > 1/10 the amount measured in any sample or 1/10 the regulatory limit?		X	
Were target analytes detected in method, trip or calibration blanks?		X	

9.0 Laboratory Control Sample (LCS)

LCS Criteria	Yes	No	N/A
Was an LCS analyzed with every preparatory batch?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711018 **URS Chemist: Steve Gragert**
Date Verified: 8/27/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

LCS Criteria	Yes	No	N/A
Were LCS recoveries within acceptance criteria listed in the UFP-QAPP?		X	

LCS ID	Parameter	Analyte	LCS/LCSD Recovery	RPD	LCS/LCSD Criteria
WG733125	VOCs	Bromobenzene	109/**118**	8.2	78-116/20

All bromobenzene results were reported as nondetect and associated with an LCS recovery above evaluation criteria, indicating a possible high bias. Therefore, no qualification of data was required.

10.0 Surrogate Recoveries

Methods 8260C Surrogate Criteria	Yes	No	N/A
Were surrogate spikes added to all field and QC samples?	X		
Were surrogate recoveries within acceptance criteria listed in the UFP-QAPP?	X		

11.0 Internal Standard (IS) Recoveries

Methods 8260C IS Criteria	Yes	No	N/A
Were internal standards spiked for all samples and standards?	X		
Were internal standard areas within -50% to + 100% of the ICAL midpoint standard area?	X		
Were retention time ± 30 seconds from the retention time of the midpoint standard of the ICAL?	X		

12.0 Matrix Spike/Matrix Spike Duplicate Recoveries/RPDs

MS/MSD Criteria	Yes	No	N/A
Were MS/MSD samples analyzed with every preparatory batch?	X		
Were MS/MSD samples collected for this SDG?		X	
Were MS/MSD recoveries/RPDs within acceptance criteria listed in the UFP-QAPP?			X

13.0 Dilution Test

Method 6010B/6020A Dilution Test Criteria	Yes	No	N/A
Was a dilution test sample analyzed with every preparatory batch?	X		
Were metals concentrations > 50x the LOQ?			X
Did the five-fold dilution agree within ± 10% of the original measurement?			X
If the five-fold dilution did not agree within ± 10% of the original measurement, was a post digestion spike sample analyzed?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711018 **URS Chemist: Steve Gragert**
Date Verified: 8/27/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

The serial dilution was completed on a sample from another SDG.

14.0 Post Digestion Spike (PDS) Recoveries

Method 6010B/6020A PDS Criteria	Yes	No	N/A
Was a PDS sample analyzed if the dilution test failed or metals concentrations were > 50 x the LOD?			X
Were the PDS recoveries within 75-125%?			X

The serial dilution was completed on a sample from another SDG.

15.0 Interference Check Solutions (ICS)

Method 6010B/6020A ICS Criteria	Yes	No	N/A
Were ICS-A and ICSAB samples analyzed at the beginning of the analytical run and every 12 hours?	X		
Was the ICS-A absolute value concentration for all non-spiked metals < LOD (unless they are a verified trace impurity form one of the spiked metals)	X		
Were the ICS-AB recoveries within ± 20%?	X		

16.0 Laboratory Duplicate Samples

Laboratory Duplicate Criteria	Yes	No	N/A
Were laboratory duplicate samples analyzed for this SDG? (if yes, list below)		X	
Were parent sample / laboratory duplicate RPDs ≤ 20% for analytes that had concentrations > 5x the LOQ.			X
Were the differences between the parent sample / laboratory duplicate > 2x the LOQ for analytes that had concentrations < 5x the LOQ			X

17.0 Field Duplicate Samples

Field Duplicate Criteria	Yes	No	N/A
Were field duplicate samples collected for this SDG? (if yes, list below)	X		
Were parent sample / field duplicate RPDs ≤ 30% for water samples and ≤ 50% for soils for analytes that had concentrations > 5x the LOQ.		X	
Were the differences between the parent sample / field duplicate > 2x the LOQ for analytes that had concentrations < 5x the LOQ	X		

Parent Sample ID	Field Duplicate Sample ID
MWOA-7-14	MWOA-7-14-A

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711018 **URS Chemist: Steve Gragert**
Date Verified: 8/27/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Analytical data that required qualification based on parent sample / field duplicate RPDs and/or differences are included in the table below.

Parent Sample ID	Field Duplicate Sample ID	Parameter	Analyte	RPD or difference	Qualification
MWOA-7-14	MWOA-7-14-A	TOC	TOC	**32**	**J/J**

18.0 Sensitivity

Sensitivity Criteria	Yes	No	N/A
Was the laboratory sensitivity consistent with project (QAPP) requirements?	X		
Did all analytes meet sensitivity requirements?	X		

19.0 Additional Qualifications

Additional Qualification Criteria	Yes	No	N/A
Were common laboratory contaminants detected?		X	
Were common laboratory contaminant concentrations < 2x the LOQ			X
Was professional judgment used to qualify data (if yes, list below)	X		

The laboratory analyzed perchlorate via USEPA Method 314.0 rather than SW-846 6850 as requested by URS in the contract, bottle order, and CoC. Per the DoD Perchlorate Handbook (2007 Aug), *"Methods employing IC/EC (e.g. Methods 314.0 and 314.1) are not appropriate for sampling and testing associated with environmental restoration/cleanup or range assessment projects. Only methods employing MS are to be used for environmental restoration/cleanup or range assessment projects."* All perchlorate data were rejected and listed in the table below.

Field ID	Analysis	Analyte	New LOQ	Qualification
MWA-7-14	Perchlorate	Perchlorate	--	**R**
MWOA-7-14	Perchlorate	Perchlorate	--	**R**
MWOA-7-14-A	Perchlorate	Perchlorate	--	**R**
MWPA-7-14	Perchlorate	Perchlorate	--	**R**

20.0 Completeness

Completeness Criteria	Yes	No	N/A
Were any data rejected during the verification process?	X		
Were any samples lost, broken, or in any other manner in not verified?		X	
Were samples analyses requested performed, the correct analyte lists used and correct sample preparation and analyses methods and units utilized?		X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711018 **URS Chemist: Steve Gragert**
Date Verified: 8/27/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

As indicated in Section 19.0, the laboratory analyzed perchlorate via USEPA method 314.0 rather than SW-846 6850 as requested by URS. Four perchlorate samples were rejected as indicated in Section 19.0. Perchlorate is not a compound of concern at Cannon AFB.

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711295 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Sample Identification #	Date Collected	Date Received	Matrix	Analysis
MWNA-7-14	7/21/2014	7/22/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C
TRIP BLANK	7/21/2014	7/22/2014	Aq	8260C

1.0 Laboratory Case Narrative \ Cooler Receipt Form

Verification Criteria	Yes	No	N/A
Were any DoD-QSM deviations noted in the laboratory case narrative?	X		
Were DoD-QSM corrective actions followed if deviations were noted?	X		
Were any issues noted in the cooler receipt form?		X	

The laboratory case narrative indicated 2-chloroethyl vinyl ether MS/MSD recoveries and RPDs were outside evaluation criteria. These issues are discussed further in Section 12.0.

Although it was not indicated in the laboratory case narrative, the laboratory analyzed perchlorate via USEPA Method 314.0 rather than SW-846 6850 as requested by URS in the contract, bottle order, and CoC. All perchlorate data were rejected. This issue is discussed further in Section 19.0. No other issues were noted in the laboratory case narrative or cooler receipt form.

2.0 Sample Documentation

Verification Criteria	Yes	No
Were all samples documented correctly on the chain-of-custody (COC) and samples labels?	X	
Were all sample identifications (IDs) documented correctly on sample labels?	X	
Did samples listed on COCs match the sample labels?	X	
Were sample relinquished properly on the COC?	X	

3.0 Holding Time

Verification Criteria	Yes	No
Were all samples extracted and/or analyzed within the appropriate holding time?	X	
Were all samples preserved appropriately?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711295 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

4.0 Instrument Performance Check (Tuning)

Method 6020A Instrument Tuning Criteria			
Instrument:	**ICPMS4**		
Date of Tuning:	**7/23/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Was the mass calibration ≤ 0.1amu from the true value?	X		
Was the resolution < 0.9 amu full width at 10% peak height?	X		
For stability, was the RSD ≤ 5% for at least 4 replicate analyses?	X		

Method 8260C Instrument Tuning Criteria			
Instrument:	**VOCMS23**		
Date of Tuning:	**7/22/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Were all samples analyzed under an acceptable 12 hour clock tune?	X		
Were ion relative abundance for each target mass within the required intensities limits listed in Table 3 of SW-846 Method 8260C?	X		

5.0 Initial Calibration

Method 7199 Initial Calibration Criteria			
Instrument:	**IC-13**		
Date of Calibration:	**7/22/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 9056A Initial Calibration Criteria			
Instrument:	**IC-9**		
Date of Calibration:	**7/22/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 350.1 Initial Calibration Criteria			
Instrument:	**FS3100-1**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711295 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 350.1 Initial Calibration Criteria			
Instrument:	**FS3100-1**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
Was r ≥ 0.995?	X		

Method 9060A Initial Calibration Criteria			
Instrument:	**TOC3**		
Date of Calibration:	**7/23/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 7470A Initial Calibration Criteria			
Instrument:	**CVAA3**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
CVAA – Was a minimum of 5 standards and a calibration blank used for ICAL?	X		
CVAA – Was $r^2 \geq 0.99$?	X		

Method 6010B Initial Calibration Criteria			
Instrument:	**ICP11**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
ICP-AES– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-AES– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 6010B Initial Calibration Criteria			
Instrument:	**ICP11**		
Date of Calibration:	**7/25/2014**		
	Yes	**No**	**N/A**
ICP-AES– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-AES– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 6020A Initial Calibration Criteria			
Instrument:	**ICPMS4**		
Date of Calibration:	**7/23/2014**		
	Yes	**No**	**N/A**
ICP-MS– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-MS– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711295 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 8260C Initial Calibration Criteria			
Instrument:	**VOCMS23**		
Date of Calibration:	**7/22/2014**		
	Yes	**No**	**N/A**
Are the average response factors (RFs) for SPCCs above the minimum DoD-QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Are the RSDs for CCCs (1,1-Dichloroethene; Chloroform; 1,2-Dichloropropane; Toluene; Ethylbenzene and Vinyl Chloride) for VOCs ≤ 30%? and one option below?	X		
Option 1: RSD for each analyte ≤ 15%?	X		
Option 2: If linear least squares regression was used was the r ≥ 0.995?	X		
Option 3: If non-linear regression was used was the coefficient of determination r^2 ≥ 0.99?			X
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X

6.0 Initial Calibration Verification [(ICV) Second Source]

7199 Verification Criteria for ICV: 7/22/2014 09:45, Instrument: IC-13	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

9056A Verification Criteria for ICV: 7/22/2014 08:44, Instrument: IC-9	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

350.1 Verification Criteria for ICV on 7/24/2014 17:23, Instrument: FS3100-1	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

9060A Verification Criteria for ICV on 7/23/2014 12:42, Instrument: TOC3	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

7470A Verification Criteria for ICV on 7/24/2014 09:02, Instrument: CVAA3	**Yes**	**No**
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711295 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

6010B Verification Criteria for ICV on 7/24/2014 08:14, Instrument: ICP11	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

6010B Verification Criteria for ICV on 7/25/2014 08:55, Instrument: ICP11	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

6020A Verification Criteria for ICV on 7/23/2014 11:02, Instrument: ICPMS4	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

Method 8260C ICV Criteria			
Instrument:	VOCMS23		
Date of Initial Calibration Verification:	7/22/2014 09:21		
	Yes	No	N/A
Was the ICV analyzed after each calibration?	X		
Was the ICV %difference (%D) for all analytes within ± 20% of the expected value (initial source)?	X		

7.0 Continuing Calibration Verification (CCV)

7199 Verification Criteria for CCV: 7/22/2014 11:57, Instrument: IC-13	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9056A Verification Criteria for CCV on 7/22/2014 at 15:18, Instrument: IC-9	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9056A Verification Criteria for CCV on 7/22/2014 at 18:18, Instrument: IC-9	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

350.1 Verification Criteria for CCV on 7/24/2014 at 16:55, Instrument: FS3100-1	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711295 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

9060A Verification Criteria for CCV: 7/23/2014 16:40, Instrument: TOC3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

7470A Verification Criteria for CCV: 7/24/2014 11:49, Instrument: CVAA3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 80-120%?	X	

7470A Verification Criteria for CCV: 7/24/2014 12:41, Instrument: CVAA3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 80-120%?	X	

6010B Verification Criteria for CCV: 7/25/2014 19:11, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/25/2014 20:18, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/29/2014 14:41, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/29/2014 15:43, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/23/2014 21:30, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/23/2014 22:40, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711295 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 8260C CCV Criteria			
Instrument:	**VOCMS23**		
Date of Calibration Verification:	**7/22/2014 09:21 ICV**		
	Yes	**No**	**N/A**
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 12 hours of analysis time?	X		
Are the average response factors (RFs) for SPCCs above the minimum DoD QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Was the CCV %difference (%D) or %drift for all target compounds ≤ 20%?	X		

8.0 Blank Samples

Blank Criteria	**Yes**	**No**	**N/A**
Was a method blank analyzed with every preparatory batch?	X		
Were analytes detected > ½ the LOQ and > 1/10 the amount measured in any sample or 1/10 the regulatory limit?		X	
Were target analytes detected in method, trip or calibration blanks?		X	

9.0 Laboratory Control Sample (LCS)

LCS Criteria	**Yes**	**No**	**N/A**
Was an LCS analyzed with every preparatory batch?	X		
Were LCS recoveries within acceptance criteria listed in the UFP-QAPP?	X		

10.0 Surrogate Recoveries

Methods 8260C Surrogate Criteria	**Yes**	**No**	**N/A**
Were surrogate spikes added to all field and QC samples?	X		
Were surrogate recoveries within acceptance criteria listed in the UFP-QAPP?	X		

11.0 Internal Standard (IS) Recoveries

Methods 8260C IS Criteria	**Yes**	**No**	**N/A**
Were internal standards spiked for all samples and standards?	X		
Were internal standard areas within -50% to + 100% of the ICAL midpoint standard area?	X		
Were retention time ± 30 seconds from the retention time of the midpoint standard of the ICAL?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711295 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

12.0 Matrix Spike/Matrix Spike Duplicate Recoveries/RPDs

MS/MSD Criteria	Yes	No	N/A
Were MS/MSD samples analyzed with every preparatory batch?	X		
Were MS/MSD samples collected for this SDG?	X		
Were MS/MSD recoveries/RPDs within acceptance criteria listed in the UFP-QAPP?		X	

Sample MWNA-7-14 was spiked and analyzed for perchlorate and VOCs.

MS/MSD ID	Parameter	Analyte	MS/MSD Recovery	RPD	MS/MSD/RPD Criteria
MWNA-7-14	VOCs	2-Chloroethyl vinyl ether	**0.8/0.3**	**91.3**	10-155/20

Analytical data that required qualification based on MS/MSD data are included in the table below.

Field ID	Parameter	Analyte	Qualification
MWNA-7-14	Perchlorate	Perchlorate	**J**
MWNA-7-14	VOCs	2-Chloroethyl vinyl ether	**UJ**

13.0 Dilution Test

Method 6010B/6020A Dilution Test Criteria	Yes	No	N/A
Was a dilution test sample analyzed with every preparatory batch?	X		
Were metals concentrations > 50x the LOQ?			X
Did the five-fold dilution agree within ± 10% of the original measurement?			X
If the five-fold dilution did not agree within ± 10% of the original measurement, was a post digestion spike sample analyzed?	X		

The serial dilution was completed on a sample from another SDG.

14.0 Post Digestion Spike (PDS) Recoveries

Method 6010B PDS Criteria	Yes	No	N/A
Was a PDS sample analyzed if the dilution test failed or metals concentrations were > 50 x the LOD?			X
Were the PDS recoveries within 75-125%?			X

The serial dilution was completed on a sample from another SDG.

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711295 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

15.0 Interference Check Solutions (ICS)

Method 6010B/6020A ICS Criteria	Yes	No	N/A
Were ICS-A and ICSAB samples analyzed at the beginning of the analytical run and every 12 hours?	X		
Was the ICS-A absolute value concentration for all non-spiked metals < LOD (unless they are a verified trace impurity form one of the spiked metals)	X		
Was the ICS-AB recoveries within ± 20%?	X		

16.0 Laboratory Duplicate Samples

Field Duplicate Criteria	Yes	No	N/A
Were laboratory duplicate samples analyzed for this SDG? (if yes, list below)	X		
Were parent sample / laboratory duplicate RPDs ≤ 20% for analytes that had concentrations > 5x the LOQ.	X		
Were the differences between the parent sample / laboratory duplicate > 2x the LOQ for analytes that had concentrations < 5x the LOQ	X		

Parent Sample ID	Analysis
MWNA-7-14	Chloride, Nitrate, Nitrite, and Sulfate
MWNA-7-14	Hexavalent chromium

17.0 Field Duplicate Samples

Field Duplicate Criteria	Yes	No	N/A
Were field duplicate samples collected for this SDG? (if yes, list below)		X	
Were parent sample / field duplicate RPDs ≤ 30% for water samples and ≤ 50% for soils for analytes that had concentrations > 5x the LOQ.			X
Were the differences between the parent sample / field duplicate > 2x the LOQ for analytes that had concentrations < 5x the LOQ			X

18.0 Sensitivity

Sensitivity Criteria	Yes	No	N/A
Was the laboratory sensitivity consistent with project (QAPP) requirements?	X		
Did all analytes meet sensitivity requirements?	X		

19.0 Additional Qualifications

Additional Qualification Criteria	Yes	No	N/A
Were common laboratory contaminants detected?		X	
Were common laboratory contaminant concentrations < 2x the LOQ			X
Was professional judgment used to qualify data (if yes, list below)	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711295 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

The laboratory analyzed perchlorate via USEPA Method 314.0 rather than SW-846 6850 as requested by URS in the contract, bottle order, and CoC. Per the DoD Perchlorate Handbook (2007 Aug), *"Methods employing IC/EC (e.g. Methods 314.0 and 314.1) are not appropriate for sampling and testing associated with environmental restoration/cleanup or range assessment projects. Only methods employing MS are to be used for environmental restoration/cleanup or range assessment projects."* All perchlorate data were rejected and listed in the table below.

Field ID	Analysis	Analyte	New LOQ	Qualification
MWNA-7-14	Perchlorate	Perchlorate	--	**R**

20.0 Completeness

Completeness Criteria	Yes	No	N/A
Were any data rejected during the verification process?	X		
Were any samples lost, broken, or in any other manner in not verified?		X	
Were samples analyses requested performed, the correct analyte lists used and correct sample preparation and analyses methods and units utilized?		X	

As indicated in Section 19.0, the laboratory analyzed perchlorate via USEPA method 314.0 rather than SW-846 6850 as requested by URS. One perchlorate sample was rejected as indicated in Section 19.0. Perchlorate is not a compound of concern at Cannon AFB.

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711300 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Sample Identification #	Date Collected	Date Received	Matrix	Analysis
MWF-7-14	7/21/2014	7/22/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C
TRIP BLANK-7-21-14	7/21/2014	7/22/2014	Aq	8260C

1.0 Laboratory Case Narrative \ Cooler Receipt Form

Verification Criteria	Yes	No	N/A
Were any DoD-QSM deviations noted in the laboratory case narrative?	X		
Were DoD-QSM corrective actions followed if deviations were noted?	X		
Were any issues noted in the cooler receipt form?		X	

The laboratory case narrative indicated calcium, magnesium, and 2-chloroethyl vinyl ether MS/MSD recoveries were outside evaluation criteria. These issues are discussed further in Section 12.0. Antimony, selenium, and silver post digestion spike recoveries were outside evaluation criteria. This issue is discussed further in Section 14.0.

Although it was not indicated in the laboratory case narrative, the laboratory analyzed perchlorate via USEPA Method 314.0 rather than SW-846 6850 as requested by URS in the contract, bottle order, and CoC. All perchlorate data were rejected. This issue is discussed further in Section 19.0. No other issues were noted in the laboratory case narrative or cooler receipt form.

2.0 Sample Documentation

Verification Criteria	Yes	No
Were all samples documented correctly on the chain-of-custody (COC) and samples labels?	X	
Were all sample identifications (IDs) documented correctly on sample labels?	X	
Did samples listed on COCs match the sample labels?	X	
Were sample relinquished properly on the COC?	X	

3.0 Holding Time

Verification Criteria	Yes	No
Were all samples extracted and/or analyzed within the appropriate holding time?	X	
Were all samples preserved appropriately?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711300 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

4.0 Instrument Performance Check (Tuning)

Method 6020A Instrument Tuning Criteria			
Instrument:	**ICPMS4**		
Date of Tuning:	**7/23/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Was the mass calibration ≤ 0.1amu from the true value?	X		
Was the resolution < 0.9 amu full width at 10% peak height?	X		
For stability, was the RSD ≤ 5% for at least 4 replicate analyses?	X		

Method 8260C Instrument Tuning Criteria			
Instrument:	**VOCMS23**		
Date of Tuning:	**7/24/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Were all samples analyzed under an acceptable 12 hour clock tune?	X		
Were ion relative abundance for each target mass within the required intensities limits listed in Table 3 of SW-846 Method 8260C?	X		

Method 8260C Instrument Tuning Criteria			
Instrument:	**VOCMS18**		
Date of Tuning:	**7/29/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Were all samples analyzed under an acceptable 12 hour clock tune?	X		
Were ion relative abundance for each target mass within the required intensities limits listed in Table 3 of SW-846 Method 8260C?	X		

5.0 Initial Calibration

Method 7199 Initial Calibration Criteria			
Instrument:	**IC-13**		
Date of Calibration:	**7/22/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711300 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 9056A Initial Calibration Criteria			
Instrument:	**IC-9**		
Date of Calibration:	**7/22/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 350.1 Initial Calibration Criteria			
Instrument:	**FS3100-1**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 9060A Initial Calibration Criteria			
Instrument:	**TOC3**		
Date of Calibration:	**7/23/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 7470A Initial Calibration Criteria			
Instrument:	**CVAA3**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
CVAA – Was a minimum of 5 standards and a calibration blank used for ICAL?	X		
CVAA – Was $r^2 \geq 0.99$?	X		

Method 6010B Initial Calibration Criteria			
Instrument:	**ICP11**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
ICP-AES– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-AES– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 6010B Initial Calibration Criteria			
Instrument:	**ICP11**		
Date of Calibration:	**7/25/2014**		
	Yes	**No**	**N/A**
ICP-AES– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-AES– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711300 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 6020A Initial Calibration Criteria			
Instrument:	**ICPMS4**		
Date of Calibration:	**7/23/2014**		
	Yes	**No**	**N/A**
ICP-MS– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-MS– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 8260C Initial Calibration Criteria			
Instrument:	**VOCMS23**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
Are the average response factors (RFs) for SPCCs above the minimum DoD-QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Are the RSDs for CCCs (1,1-Dichloroethene; Chloroform; 1,2-Dichloropropane; Toluene; Ethylbenzene and Vinyl Chloride) for VOCs ≤ 30%? and one option below?	X		
Option 1: RSD for each analyte ≤ 15%?	X		
Option 2: If linear least squares regression was used was the r ≥ 0.995?	X		
Option 3: If non-linear regression was used was the coefficient of determination $r^2 \geq 0.99$?			X
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X

Method 8260C Initial Calibration Criteria			
Instrument:	**VOCMS18**		
Date of Calibration:	**7/29/2014**		
	Yes	**No**	**N/A**
Are the average response factors (RFs) for SPCCs above the minimum DoD-QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Are the RSDs for CCCs (1,1-Dichloroethene; Chloroform; 1,2-Dichloropropane; Toluene; Ethylbenzene and Vinyl Chloride) for VOCs ≤ 30%? and one option below?	X		
Option 1: RSD for each analyte ≤ 15%?	X		
Option 2: If linear least squares regression was used was the r ≥ 0.995?	X		
Option 3: If non-linear regression was used was the coefficient of determination $r^2 \geq 0.99$?			X
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711300 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

6.0 Initial Calibration Verification [(ICV) Second Source]

7199 Verification Criteria for ICV: 7/22/2014 09:45, Instrument: IC-13	Yes	No
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%	X	

9056A Verification Criteria for ICV: 7/22/2014 08:44, Instrument: IC-9	Yes	No
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%	X	

350.1 Verification Criteria for ICV on 7/24/2014 17:23, Instrument: FS3100-1	Yes	No
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%	X	

9060A Verification Criteria for ICV on 7/23/2014 12:42, Instrument: TOC3	Yes	No
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%	X	

7470A Verification Criteria for ICV on 7/24/2014 09:02, Instrument: CVAA3	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%	X	

6010B Verification Criteria for ICV on 7/23/2014 12:08, Instrument: ICP11	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%	X	

6010B Verification Criteria for ICV on 7/25/2014 11:08, Instrument: ICP11	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%	X	

6020A Verification Criteria for ICV on 7/23/2014 11:02, Instrument: ICPMS4	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711300 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 8260C ICV Criteria			
Instrument:	**VOCMS23**		
Date of Initial Calibration Verification:	**7/24/2014 08:00**		
	Yes	**No**	**N/A**
Was the ICV analyzed after each calibration?	X		
Was the ICV %difference (%D) for all analytes within ± 20% of the expected value (initial source)?	X		

Method 8260C ICV Criteria			
Instrument:	**VOCMS18**		
Date of Initial Calibration Verification:	**7/29/2014 09:47**		
	Yes	**No**	**N/A**
Was the ICV analyzed after each calibration?	X		
Was the ICV %difference (%D) for all analytes within ± 20% of the expected value (initial source)?	X		

7.0 Continuing Calibration Verification (CCV)

7199 Verification Criteria for CCV: 7/22/2014 11:57, Instrument: IC-13	**Yes**	**No**
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9056A Verification Criteria for CCV on 7/22/2014 at 15:18, Instrument: IC-9	**Yes**	**No**
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9056A Verification Criteria for CCV on 7/22/2014 at 18:18, Instrument: IC-9	**Yes**	**No**
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

350.1 Verification Criteria for CCV on 7/24/2014 at 16:55, Instrument: FS3100-1	**Yes**	**No**
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9060A Verification Criteria for CCV: 7/23/2014 16:40, Instrument: TOC3	**Yes**	**No**
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711300 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

7470A Verification Criteria for CCV: 7/24/2014 11:49, Instrument: CVAA3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 80-120%?	X	

7470A Verification Criteria for CCV: 7/24/2014 12:41, Instrument: CVAA3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 80-120%?	X	

6010B Verification Criteria for CCV: 7/23/2014 18:05, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/23/2014 19:32, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/25/2014 15:37, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/25/2014 16:38, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/23/2014 18:05, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/23/2014 19:32, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

Method 8260C CCV Criteria			
Instrument:	VOCMS23		
Date of Calibration Verification:	7/24/2014 08:00 ICV		
	Yes	No	N/A
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 12 hours of analysis time?	X		
Are the average response factors (RFs) for SPCCs above the minimum DoD QSM	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711300 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 8260C CCV Criteria			
Instrument:	**VOCMS23**		
Date of Calibration Verification:	**7/24/2014 08:00 ICV**		
	Yes	**No**	**N/A**
response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)			
Was the CCV %difference (%D) or %drift for all target compounds ≤ 20%?	X		

Method 8260C CCV Criteria			
Instrument:	**VOCMS18**		
Date of Calibration Verification:	**7/29/2014 09:47 ICV**		
	Yes	**No**	**N/A**
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 12 hours of analysis time?	X		
Are the average response factors (RFs) for SPCCs above the minimum DoD QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Was the CCV %difference (%D) or %drift for all target compounds ≤ 20%?	X		

8.0 Blank Samples

Blank Criteria	**Yes**	**No**	**N/A**
Was a method blank analyzed with every preparatory batch?	X		
Were analytes detected > ½ the LOQ and > 1/10 the amount measured in any sample or 1/10 the regulatory limit?		X	
Were target analytes detected in method, trip or calibration blanks?	X		

Blank ID	**Parameter**	**Analyte**	**Concentration**	**LOQ**	**Units**
CCB 7/30/2014 6:29 PM	6020A	Silver	0.002	1	µg/L

All associated silver results were nondetect. All associated chromium and vanadium results were >5X the CCB contamination; therefore, no qualification of data was required.

9.0 Laboratory Control Sample (LCS)

LCS Criteria	**Yes**	**No**	**N/A**
Was an LCS analyzed with every preparatory batch?	X		
Were LCS recoveries within acceptance criteria listed in the UFP-QAPP?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711300 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

10.0 Surrogate Recoveries

Methods 8260C Surrogate Criteria	Yes	No	N/A
Were surrogate spikes added to all field and QC samples?	X		
Were surrogate recoveries within acceptance criteria listed in the UFP-QAPP?	X		

11.0 Internal Standard (IS) Recoveries

Methods 8260C IS Criteria	Yes	No	N/A
Were internal standards spiked for all samples and standards?	X		
Were internal standard areas within -50% to + 100% of the ICAL midpoint standard area?	X		
Were retention time ± 30 seconds from the retention time of the midpoint standard of the ICAL?	X		

12.0 Matrix Spike/Matrix Spike Duplicate Recoveries/RPDs

MS/MSD Criteria	Yes	No	N/A
Were MS/MSD samples analyzed with every preparatory batch?	X		
Were MS/MSD samples collected for this SDG?	X		
Were MS/MSD recoveries/RPDs within acceptance criteria listed in the UFP-QAPP?		X	

Sample MWF-7-14 was spiked and analyzed for hexavalent chromium, perchlorate, TOC, ammonia, mercury, and ICP-AES/MS metals.

MS/MSD ID	Parameter	Analyte	MS/MSD Recovery	RPD	MS/MSD/RPD Criteria
MWF-7-14	Metals	Calcium	**53/40**	2	75-125/20
MWF-7-14	Metals	Magnesium	**72/35**	7	75-125/20
MWF-7-14	VOCs	2-Chloroethyl vinyl ether	**4.79/1.27**	**116.2**	10-155/20

Analytical data that required qualification based on MS/MSD data are included in the table below.

Field ID	Parameter	Analyte	Qualification
MWF-7-14	Metals	Calcium	**J**
MWF-7-14	Metals	Magnesium	**J**
MWF-7-14	VOCs	2-Chloroethyl vinyl ether	**UJ**

Cannon AFB PBR Data Verification

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Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

13.0 Dilution Test

Method 6010B/6020A Dilution Test Criteria	Yes	No	N/A
Was a dilution test sample analyzed with every preparatory batch?	X		
Were metals concentrations > 50x the LOQ?		X	
Did the five-fold dilution agree within ± 10% of the original measurement?		X	
If the five-fold dilution did not agree within ± 10% of the original measurement, was a post digestion spike sample analyzed?	X		

The serial dilution was performed on sample MWF-7-14. Analytes with RPDs outside evaluation criteria are listed in the table below.

Field ID	Parameter	Analyte	RPD
MWNA-7-14	6010B	Aluminum	**36%**
MWNA-7-14	6020A	Arsenic	**20%**
MWNA-7-14	6020A	Beryllium	**311%**
MWNA-7-14	6020A	Chromium	**20%**
MWNA-7-14	6020A	Cobalt	**116**
MWNA-7-14	6020A	Copper	**62%**
MWNA-7-14	6020A	Lead	**33%**
MWNA-7-14	6020A	Nickel	**146%**
MWNA-7-14	6020A	Silver	**27%**
MWNA-7-14	6020A	Zinc	**203%**

14.0 Post Digestion Spike (PDS) Recoveries

Method 6010B/6020A PDS Criteria	Yes	No	N/A
Was a PDS sample analyzed if the dilution test failed or metals concentrations were > 50 x the LOD?	X		
Were the PDS recoveries within 75-125%?		X	

The serial dilution was performed on sample MWF-7-14. Antimony (117%), selenium (117%), and silver (75%) had recoveries outside evaluation criteria.

15.0 Interference Check Solutions (ICS)

Method 6010B/6020A ICS Criteria	Yes	No	N/A
Were ICS-A and ICSAB samples analyzed at the beginning of the analytical run and every 12 hours?	X		
Was the ICS-A absolute value concentration for all non-spiked metals < LOD (unless they are a verified trace impurity form one of the spiked metals)	X		
Was the ICS-AB recoveries within ± 20%?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711300 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

16.0 Laboratory Duplicate Samples

Field Duplicate Criteria	Yes	No	N/A
Were laboratory duplicate samples analyzed for this SDG? (if yes, list below)	X		
Were parent sample / laboratory duplicate RPDs ≤ 20% for analytes that had concentrations > 5x the LOQ.	X		
Were the differences between the parent sample / laboratory duplicate > 2x the LOQ for analytes that had concentrations < 5x the LOQ	X		

Parent Sample ID	Analysis
MWF-7-14	Chloride, Nitrate, Nitrite, and Sulfate
MWF-7-14	Mercury

17.0 Field Duplicate Samples

Field Duplicate Criteria	Yes	No	N/A
Were field duplicate samples collected for this SDG? (if yes, list below)		X	
Were parent sample / field duplicate RPDs ≤ 30% for water samples and ≤ 50% for soils for analytes that had concentrations > 5x the LOQ.			X
Were the differences between the parent sample / field duplicate > 2x the LOQ for analytes that had concentrations < 5x the LOQ			X

18.0 Sensitivity

Sensitivity Criteria	Yes	No	N/A
Was the laboratory sensitivity consistent with project (QAPP) requirements?	X		
Did all analytes meet sensitivity requirements?	X		

19.0 Additional Qualifications

Additional Qualification Criteria	Yes	No	N/A
Were common laboratory contaminants detected?		X	
Were common laboratory contaminant concentrations < 2x the LOQ			X
Was professional judgment used to qualify data (if yes, list below)	X		

The laboratory analyzed perchlorate via USEPA Method 314.0 rather than SW-846 6850 as requested by URS in the contract, bottle order, and CoC. Per the DoD Perchlorate Handbook (2007 Aug), *"Methods employing IC/EC (e.g. Methods 314.0 and 314.1) are not appropriate for sampling and testing associated with environmental restoration/cleanup or range assessment projects. Only methods employing MS are to be used for environmental restoration/cleanup or range assessment projects."* All perchlorate data were rejected and listed in the table below.

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711300 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Field ID	Analysis	Analyte	New LOQ	Qualification
MWF-7-14	Perchlorate	Perchlorate	--	**R**

20.0 Completeness

Completeness Criteria	Yes	No	N/A
Were any data rejected during the verification process?	X		
Were any samples lost, broken, or in any other manner in not verified?		X	
Were samples analyses requested performed, the correct analyte lists used and correct sample preparation and analyses methods and units utilized?		X	

As indicated in Section 19.0, the laboratory analyzed perchlorate via USEPA method 314.0 rather than SW-846 6850 as requested by URS. One perchlorate sample was rejected as indicated in Section 19.0. Perchlorate is not a compound of concern at Cannon AFB.

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711329 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Sample Identification #	Date Collected	Date Received	Matrix	Analysis
MWE-7-14	7/21/2014	7/22/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C
MWF-7-14	7/21/2014	7/22/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C
TRIP BLANK	7/21/2014	7/22/2014	Aq	8260C

1.0 Laboratory Case Narrative \ Cooler Receipt Form

Verification Criteria	Yes	No	N/A
Were any DoD-QSM deviations noted in the laboratory case narrative?		X	
Were DoD-QSM corrective actions followed if deviations were noted?			X
Were any issues noted in the cooler receipt form?		X	

Although it was not indicated in the laboratory case narrative, the laboratory analyzed perchlorate via USEPA Method 314.0 rather than SW-846 6850 as requested by URS in the contract, bottle order, and CoC. All perchlorate data were rejected. This issue is discussed further in Section 19.0. No issues pertaining to the samples in this SDG were noted in the laboratory case narrative or cooler receipt form.

2.0 Sample Documentation

Verification Criteria	Yes	No
Were all samples documented correctly on the chain-of-custody (COC) and samples labels?	X	
Were all sample identifications (IDs) documented correctly on sample labels?	X	
Did samples listed on COCs match the sample labels?	X	
Were sample relinquished properly on the COC?	X	

3.0 Holding Time

Verification Criteria	Yes	No
Were all samples extracted and/or analyzed within the appropriate holding time?	X	
Were all samples preserved appropriately?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711329 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

4.0 Instrument Performance Check (Tuning)

Method 6020A Instrument Tuning Criteria			
Instrument:	**ICPMS4**		
Date of Tuning:	**7/23/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Was the mass calibration ≤ 0.1amu from the true value?	X		
Was the resolution < 0.9 amu full width at 10% peak height?	X		
For stability, was the RSD ≤ 5% for at least 4 replicate analyses?	X		

Method 8260C Instrument Tuning Criteria			
Instrument:	**VOCMS23**		
Date of Tuning:	**7/24/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Were all samples analyzed under an acceptable 12 hour clock tune?	X		
Were ion relative abundance for each target mass within the required intensities limits listed in Table 3 of SW-846 Method 8260C?	X		

Method 8260C Instrument Tuning Criteria			
Instrument:	**VOCMS18**		
Date of Tuning:	**7/29/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Were all samples analyzed under an acceptable 12 hour clock tune?	X		
Were ion relative abundance for each target mass within the required intensities limits listed in Table 3 of SW-846 Method 8260C?	X		

5.0 Initial Calibration

Method 7199 Initial Calibration Criteria			
Instrument:	**IC-13**		
Date of Calibration:	**7/22/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711329 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 9056A Initial Calibration Criteria			
Instrument:	**IC-9**		
Date of Calibration:	**7/22/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 350.1 Initial Calibration Criteria			
Instrument:	**FS3100-1**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 9060A Initial Calibration Criteria			
Instrument:	**TOC3**		
Date of Calibration:	**7/23/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 7470A Initial Calibration Criteria			
Instrument:	**CVAA3**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
CVAA – Was a minimum of 5 standards and a calibration blank used for ICAL?	X		
CVAA – Was $r^2 \geq 0.99$?	X		

Method 6010B Initial Calibration Criteria			
Instrument:	**ICP11**		
Date of Calibration:	**7/25/2014**		
	Yes	**No**	**N/A**
ICP-AES– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-AES– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 6020A Initial Calibration Criteria			
Instrument:	**ICPMS4**		
Date of Calibration:	**7/23/2014**		
	Yes	**No**	**N/A**
ICP-MS– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-MS– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711329 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 8260C Initial Calibration Criteria			
Instrument:	**VOCMS23**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
Are the average response factors (RFs) for SPCCs above the minimum DoD-QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Are the RSDs for CCCs (1,1-Dichloroethene; Chloroform; 1,2-Dichloropropane; Toluene; Ethylbenzene and Vinyl Chloride) for VOCs ≤ 30%? and one option below?	X		
Option 1: RSD for each analyte ≤ 15%?	X		
Option 2: If linear least squares regression was used was the r ≥ 0.995?	X		
Option 3: If non-linear regression was used was the coefficient of determination r^2 ≥ 0.99?			X
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X

Method 8260C Initial Calibration Criteria			
Instrument:	**VOCMS18**		
Date of Calibration:	**7/29/2014**		
	Yes	**No**	**N/A**
Are the average response factors (RFs) for SPCCs above the minimum DoD-QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Are the RSDs for CCCs (1,1-Dichloroethene; Chloroform; 1,2-Dichloropropane; Toluene; Ethylbenzene and Vinyl Chloride) for VOCs ≤ 30%? and one option below?	X		
Option 1: RSD for each analyte ≤ 15%?	X		
Option 2: If linear least squares regression was used was the r ≥ 0.995?	X		
Option 3: If non-linear regression was used was the coefficient of determination r^2 ≥ 0.99?			X
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X

6.0 Initial Calibration Verification [(ICV) Second Source]

7199 Verification Criteria for ICV: 7/22/2014 09:45, Instrument: IC-13	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%	X	

9056A Verification Criteria for ICV: 7/22/2014 08:44, Instrument: IC-9	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711329 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

350.1 Verification Criteria for ICV on 7/24/2014 17:23, Instrument: FS3100-1	Yes	No
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%	X	

9060A Verification Criteria for ICV on 7/23/2014 12:42, Instrument: TOC3	Yes	No
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%	X	

7470A Verification Criteria for ICV on 7/24/2014 09:02, Instrument: CVAA3	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%	X	

6010B Verification Criteria for ICV on 7/25/2014 11:08, Instrument: ICP11	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%	X	

6020A Verification Criteria for ICV on 7/23/2014 11:02, Instrument: ICPMS4	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%	X	

Method 8260C ICV Criteria			
Instrument:	**VOCMS23**		
Date of Initial Calibration Verification:	**7/24/2014 08:00**		
	Yes	**No**	**N/A**
Was the ICV analyzed after each calibration?	X		
Was the ICV %difference (%D) for all analytes within ± 20% of the expected value (initial source)?	X		

Method 8260C ICV Criteria			
Instrument:	**VOCMS18**		
Date of Initial Calibration Verification:	**7/29/2014 09:47**		
	Yes	**No**	**N/A**
Was the ICV analyzed after each calibration?	X		
Was the ICV %difference (%D) for all analytes within ± 20% of the expected value (initial source)?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711329 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

7.0 Continuing Calibration Verification (CCV)

7199 Verification Criteria for CCV: 7/22/2014 11:57, Instrument: IC-13	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9056A Verification Criteria for CCV on 7/22/2014 at 15:18, Instrument: IC-9	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9056A Verification Criteria for CCV on 7/22/2014 at 18:18, Instrument: IC-9	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

350.1 Verification Criteria for CCV on 7/24/2014 at 16:55, Instrument: FS3100-1	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9060A Verification Criteria for CCV: 7/23/2014 16:40, Instrument: TOC3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

7470A Verification Criteria for CCV: 7/24/2014 11:49, Instrument: CVAA3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 800-120%?	X	

7470A Verification Criteria for CCV: 7/24/2014 12:41, Instrument: CVAA3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 800-120%?	X	

6010B Verification Criteria for CCV: 7/25/2014 12:16, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/25/2014 13:17, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711329 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

6020A Verification Criteria for CCV: 7/23/2014 13:59, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/23/2014 14:17, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/23/2014 15:30, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/23/2014 16:43, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

Method 8260C CCV Criteria			
Instrument:	VOCMS23		
Date of Calibration Verification:	7/24/2014 08:00 ICV		
	Yes	No	N/A
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 12 hours of analysis time?	X		
Are the average response factors (RFs) for SPCCs above the minimum DoD QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Was the CCV %difference (%D) or %drift for all target compounds ≤ 20%?	X		

Method 8260C CCV Criteria			
Instrument:	VOCMS18		
Date of Calibration Verification:	7/29/2014 09:47 ICV		
	Yes	No	N/A
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 12 hours of analysis time?	X		
Are the average response factors (RFs) for SPCCs above the minimum DoD QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Was the CCV %difference (%D) or %drift for all target compounds ≤ 20%?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711329 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

8.0 Blank Samples

Blank Criteria	Yes	No	N/A
Was a method blank analyzed with every preparatory batch?	X		
Were analytes detected > ½ the LOQ and > 1/10 the amount measured in any sample or 1/10 the regulatory limit?		X	
Were target analytes detected in method, trip or calibration blanks?		X	

9.0 Laboratory Control Sample (LCS)

LCS Criteria	Yes	No	N/A
Was an LCS analyzed with every preparatory batch?	X		
Were LCS recoveries within acceptance criteria listed in the UFP-QAPP?	X		

10.0 Surrogate Recoveries

Methods 8260C Surrogate Criteria	Yes	No	N/A
Were surrogate spikes added to all field and QC samples?	X		
Were surrogate recoveries within acceptance criteria listed in the UFP-QAPP?	X		

11.0 Internal Standard (IS) Recoveries

Methods 8260C IS Criteria	Yes	No	N/A
Were internal standards spiked for all samples and standards?	X		
Were internal standard areas within -50% to + 100% of the ICAL midpoint standard area?	X		
Were retention time ± 30 seconds from the retention time of the midpoint standard of the ICAL?	X		

12.0 Matrix Spike/Matrix Spike Duplicate Recoveries/RPDs

MS/MSD Criteria	Yes	No	N/A
Were MS/MSD samples analyzed with every preparatory batch?	X		
Were MS/MSD samples collected for this SDG?	X		
Were MS/MSD recoveries/RPDs within acceptance criteria listed in the UFP-QAPP?	X		

Sample MWF-7-14 was spiked and analyzed for ICP-AES metals.

13.0 Dilution Test

Method 6010B/6020A Dilution Test Criteria	Yes	No	N/A
Was a dilution test sample analyzed with every preparatory batch?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711329 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 6010B/6020A Dilution Test Criteria	Yes	No	N/A
Were metals concentrations > 50x the LOQ?	X		
Did the five-fold dilution agree within ± 10% of the original measurement?	X		
If the five-fold dilution did not agree within ± 10% of the original measurement, was a post digestion spike sample analyzed?			X

The serial dilution was performed on a sample from another SDG.

14.0 Post Digestion Spike (PDS) Recoveries

Method 6010B/6020A PDS Criteria	Yes	No	N/A
Was a PDS sample analyzed if the dilution test failed or metals concentrations were > 50 x the LOD?	X		
Were the PDS recoveries within 75-125%?	X		

The serial dilution was performed on a sample from another SDG.

15.0 Interference Check Solutions (ICS)

Method 6010B/6020A ICS Criteria	Yes	No	N/A
Were ICS-A and ICSAB samples analyzed at the beginning of the analytical run and every 12 hours?	X		
Was the ICS-A absolute value concentration for all non-spiked metals < LOD (unless they are a verified trace impurity form one of the spiked metals)	X		
Was the ICS-AB recoveries within ± 20%?	X		

16.0 Laboratory Duplicate Samples

Field Duplicate Criteria	Yes	No	N/A
Were laboratory duplicate samples analyzed for this SDG? (if yes, list below)		X	
Were parent sample / laboratory duplicate RPDs ≤ 20% for analytes that had concentrations > 5x the LOQ.			X
Were the differences between the parent sample / laboratory duplicate > 2x the LOQ for analytes that had concentrations < 5x the LOQ			X

17.0 Field Duplicate Samples

Field Duplicate Criteria	Yes	No	N/A
Were field duplicate samples collected for this SDG? (if yes, list below)		X	
Were parent sample / field duplicate RPDs ≤ 30% for water samples and ≤ 50% for soils for analytes that had concentrations > 5x the LOQ.			X
Were the differences between the parent sample / field duplicate > 2x the LOQ for analytes that had concentrations < 5x the LOQ			X

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711329 **URS Chemist: Steve Gragert**
Date Verified: 8/26/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

18.0 Sensitivity

Sensitivity Criteria	Yes	No	N/A
Was the laboratory sensitivity consistent with project (QAPP) requirements?	X		
Did all analytes meet sensitivity requirements?	X		

19.0 Additional Qualifications

Additional Qualification Criteria	Yes	No	N/A
Were common laboratory contaminants detected?		X	
Were common laboratory contaminant concentrations < 2x the LOQ			X
Was professional judgment used to qualify data (if yes, list below)	X		

The laboratory analyzed perchlorate via USEPA Method 314.0 rather than SW-846 6850 as requested by URS in the contract, bottle order, and CoC. Per the DoD Perchlorate Handbook (2007 Aug), *"Methods employing IC/EC (e.g. Methods 314.0 and 314.1) are not appropriate for sampling and testing associated with environmental restoration/cleanup or range assessment projects. Only methods employing MS are to be used for environmental restoration/cleanup or range assessment projects."* All perchlorate data were rejected and listed in the table below.

Field ID	Analysis	Analyte	New LOQ	Qualification
MWE-7-14	Perchlorate	Perchlorate	--	**R**
MWF-7-14	Perchlorate	Perchlorate	--	**R**

20.0 Completeness

Completeness Criteria	Yes	No	N/A
Were any data rejected during the verification process?	X		
Were any samples lost, broken, or in any other manner in not verified?		X	
Were samples analyses requested performed, the correct analyte lists used and correct sample preparation and analyses methods and units utilized?		X	

As indicated in Section 19.0, the laboratory analyzed perchlorate via USEPA method 314.0 rather than SW-846 6850 as requested by URS. Two perchlorate samples were rejected as indicated in Section 19.0. Perchlorate is not a compound of concern at Cannon AFB.

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711384 **URS Chemist: Steve Gragert**
Date Verified: 8/21/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Sample Identification #	Date Collected	Date Received	Matrix	Analysis
Trip Blank 7-20-14	7/20/2014	7/21/2014	Aq	8260C
MWRb-7-14	7/20/2014	7/21/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C
MWW-7-14	7/20/2014	7/21/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C

1.0 Laboratory Case Narrative \ Cooler Receipt Form

Verification Criteria	Yes	No	N/A
Were any DoD-QSM deviations noted in the laboratory case narrative?	X		
Were DoD-QSM corrective actions followed if deviations were noted?	X		
Were any issues noted in the cooler receipt form?		X	

Although it was not indicated in the laboratory case narrative, the laboratory analyzed perchlorate via USEPA Method 314.0 rather than SW-846 6850 as requested by URS in the contract, bottle order, and CoC. All perchlorate data were rejected. This issue is discussed further in Section 19.0. No issues pertaining to the samples in this SDG were noted in the laboratory case narrative or cooler receipt form.

2.0 Sample Documentation

Verification Criteria	Yes	No
Were all samples documented correctly on the chain-of-custody (COC) and samples labels?	X	
Were all sample identifications (IDs) documented correctly on sample labels?	X	
Did samples listed on COCs match the sample labels?	X	
Were sample relinquished properly on the COC?	X	

3.0 Holding Time

Verification Criteria	Yes	No
Were all samples extracted and/or analyzed within the appropriate holding time?	X	
Were all samples preserved appropriately?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711384 **URS Chemist: Steve Gragert**
Date Verified: 8/21/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

4.0 Instrument Performance Check (Tuning)

Method 6020A Instrument Tuning Criteria			
Instrument:	**ICPMS4**		
Date of Tuning:	**7/23/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Was the mass calibration ≤ 0.1amu from the true value?	X		
Was the resolution < 0.9 amu full width at 10% peak height?	X		
For stability, was the RSD ≤ 5% for at least 4 replicate analyses?	X		

Method 8260C Instrument Tuning Criteria			
Instrument:	**VOCMS23**		
Date of Tuning:	**7/24/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Were all samples analyzed under an acceptable 12 hour clock tune?	X		
Were ion relative abundance for each target mass within the required intensities limits listed in Table 3 of SW-846 Method 8260C?	X		

Method 8260C Instrument Tuning Criteria			
Instrument:	**VOCMS16**		
Date of Tuning:	**7/29/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Were all samples analyzed under an acceptable 12 hour clock tune?	X		
Were ion relative abundance for each target mass within the required intensities limits listed in Table 3 of SW-846 Method 8260C?	X		

5.0 Initial Calibration

Method 7199 Initial Calibration Criteria			
Instrument:	**IC-13**		
Date of Calibration:	**7/25/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711384 **URS Chemist: Steve Gragert**
Date Verified: 8/21/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 9056A Initial Calibration Criteria			
Instrument:	**IC-9**		
Date of Calibration:	**7/22/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was $r \geq 0.995$?	X		

Method 350.1 Initial Calibration Criteria			
Instrument:	**FS3100-1**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was $r \geq 0.995$?	X		

Method 9060A Initial Calibration Criteria			
Instrument:	**TOC3**		
Date of Calibration:	**7/23/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was $r \geq 0.995$?	X		

Method 7470A Initial Calibration Criteria			
Instrument:	**CVAA3**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
CVAA – Was a minimum of 5 standards and a calibration blank used for ICAL?	X		
CVAA – Was $r^2 \geq 0.99$?	X		

Method 6010B Initial Calibration Criteria			
Instrument:	**ICP11**		
Date of Calibration:	**7/25/2014**		
	Yes	**No**	**N/A**
ICP-AES– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-AES– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 6010B Initial Calibration Criteria			
Instrument:	**ICP11**		
Date of Calibration:	**7/29/2014**		
	Yes	**No**	**N/A**
ICP-AES– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-AES– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711384 **URS Chemist: Steve Gragert**
Date Verified: 8/21/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 6020A Initial Calibration Criteria			
Instrument:	**ICPMS4**		
Date of Calibration:	**7/23/2014**		
	Yes	**No**	**N/A**
ICP-MS– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-MS– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 8260C Initial Calibration Criteria			
Instrument:	**VOCMS23**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
Are the average response factors (RFs) for SPCCs above the minimum DoD-QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Are the RSDs for CCCs (1,1-Dichloroethene; Chloroform; 1,2-Dichloropropane; Toluene; Ethylbenzene and Vinyl Chloride) for VOCs ≤ 30%? and one option below?	X		
Option 1: RSD for each analyte ≤ 15%?	X		
Option 2: If linear least squares regression was used was the r ≥ 0.995?	X		
Option 3: If non-linear regression was used was the coefficient of determination $r^2 \geq 0.99$?			X
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X

Method 8260C Initial Calibration Criteria			
Instrument:	**VOCMS16**		
Date of Calibration:	**7/29/2014**		
	Yes	**No**	**N/A**
Are the average response factors (RFs) for SPCCs above the minimum DoD-QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Are the RSDs for CCCs (1,1-Dichloroethene; Chloroform; 1,2-Dichloropropane; Toluene; Ethylbenzene and Vinyl Chloride) for VOCs ≤ 30%? and one option below?	X		
Option 1: RSD for each analyte ≤ 15%?	X		
Option 2: If linear least squares regression was used was the r ≥ 0.995?	X		
Option 3: If non-linear regression was used was the coefficient of determination $r^2 \geq 0.99$?			X
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711384 **URS Chemist: Steve Gragert**
Date Verified: 8/21/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

6.0 Initial Calibration Verification [(ICV) Second Source]

7199 Verification Criteria for ICV: 7/25/2014 09:06 , Instrument: IC-13	Yes	No
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

9056A Verification Criteria for ICV: 7/22/2014 08:44, Instrument: IC-9	Yes	No
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

350.1 Verification Criteria for ICV on 7/24/2014 17:23, Instrument: FS3100-1	Yes	No
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

9060A Verification Criteria for ICV on 7/23/2014 12:42, Instrument: TOC3	Yes	No
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

7470A Verification Criteria for ICV on 7/24/2014 09:02, Instrument: CVAA3	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

6010B Verification Criteria for ICV on 7/25/2014 08:55, Instrument: ICP11	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

6010B Verification Criteria for ICV on 7/29/2014 08:22, Instrument: ICP11	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

6020A Verification Criteria for ICV on 7/23/2014 11:02, Instrument: ICPMS4	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711384 **URS Chemist: Steve Gragert**
Date Verified: 8/21/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 8260C ICV Criteria			
Instrument:	**VOCMS23**		
Date of Initial Calibration Verification:	**7/24/2014 19:42**		
	Yes	**No**	**N/A**
Was the ICV analyzed after each calibration?	X		
Was the ICV %difference (%D) for all analytes within ± 20% of the expected value (initial source)?	X		

Method 8260C ICV Criteria			
Instrument:	**VOCMS16**		
Date of Initial Calibration Verification:	**7/29/2014 09:31**		
	Yes	**No**	**N/A**
Was the ICV analyzed after each calibration?	X		
Was the ICV %difference (%D) for all analytes within ± 20% of the expected value (initial source)?	X		

7.0 Continuing Calibration Verification (CCV)

7199 Verification Criteria for CCV: 7/25/2014 12:03, Instrument: IC-13	**Yes**	**No**
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

7199 Verification Criteria for CCV: 7/25/2014 14:13, Instrument: IC-13	**Yes**	**No**
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9056A Verification Criteria for CCV on 7/22/2014 at 15:18, Instrument: IC-9	**Yes**	**No**
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9056A Verification Criteria for CCV on 7/22/2014 at 18:18, Instrument: IC-9	**Yes**	**No**
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

350.1 Verification Criteria for CCV on 7/24/2014 at 18:06, Instrument: FS3100-1	**Yes**	**No**
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9060A Verification Criteria for CCV: 7/23/2014 16:40, Instrument: TOC3	**Yes**	**No**
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711384 **URS Chemist: Steve Gragert**
Date Verified: 8/21/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Was the CCV % recovery between 90-110%?	X	

7470A Verification Criteria for CCV: 7/24/2014 11:49, Instrument: CVAA3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 80-120%?	X	

7470A Verification Criteria for CCV: 7/24/2014 12:41, Instrument: CVAA3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 80-120%?	X	

6010B Verification Criteria for CCV: 7/25/2014 12:16, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/25/2014 13:17, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/29/2014 14:41, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/29/2014 15:43, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/23/2014 21:30, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/23/2014 22:40, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711384 **URS Chemist: Steve Gragert**
Date Verified: 8/21/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 8260C CCV Criteria			
Instrument:	**VOCMS23**		
Date of Calibration Verification:	**7/24/2014 19:42**		
	Yes	**No**	**N/A**
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 12 hours of analysis time?	X		
Are the average response factors (RFs) for SPCCs above the minimum DoD QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Was the CCV %difference (%D) or %drift for all target compounds ≤ 20%?	X		

Method 8260C CCV Criteria			
Instrument:	**VOCMS16**		
Date of Calibration Verification:	**7/29/2014 09:31**		
	Yes	**No**	**N/A**
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 12 hours of analysis time?	X		
Are the average response factors (RFs) for SPCCs above the minimum DoD QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Was the CCV %difference (%D) or %drift for all target compounds ≤ 20%?	X		

8.0 Blank Samples

Blank Criteria	**Yes**	**No**	**N/A**
Was a method blank analyzed with every preparatory batch?	X		
Were analytes detected > ½ the LOQ and > 1/10 the amount measured in any sample or 1/10 the regulatory limit?		X	
Were target analytes detected in method, trip or calibration blanks?		X	

9.0 Laboratory Control Sample (LCS)

LCS Criteria	**Yes**	**No**	**N/A**
Was an LCS analyzed with every preparatory batch?	X		
Were LCS recoveries within acceptance criteria listed in the UFP-QAPP?	X		

10.0 Surrogate Recoveries

Methods 8260C Surrogate Criteria	**Yes**	**No**	**N/A**
Were surrogate spikes added to all field and QC samples?	X		
Were surrogate recoveries within acceptance criteria listed in the UFP-QAPP?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711384 **URS Chemist: Steve Gragert**
Date Verified: 8/21/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

11.0 Internal Standard (IS) Recoveries

Methods 8260C IS Criteria	Yes	No	N/A
Were internal standards spiked for all samples and standards?	X		
Were internal standard areas within -50% to + 100% of the ICAL midpoint standard area?	X		
Were retention time ± 30 seconds from the retention time of the midpoint standard of the ICAL?	X		

12.0 Matrix Spike/Matrix Spike Duplicate Recoveries/RPDs

MS/MSD Criteria	Yes	No	N/A
Were MS/MSD samples analyzed with every preparatory batch?	X		
Were MS/MSD samples collected for this SDG?		X	
Were MS/MSD recoveries/RPDs within acceptance criteria listed in the UFP-QAPP?			X

13.0 Dilution Test

Method 6010B/6020A Dilution Test Criteria	Yes	No	N/A
Was a dilution test sample analyzed with every preparatory batch?	X		
Were metals concentrations > 50x the LOQ?			X
Did the five-fold dilution agree within ± 10% of the original measurement?			X
If the five-fold dilution did not agree within ± 10% of the original measurement, was a post digestion spike sample analyzed?	X		

The serial dilution was completed on a sample from another SDG.

14.0 Post Digestion Spike (PDS) Recoveries

Method 6010B PDS Criteria	Yes	No	N/A
Was a PDS sample analyzed if the dilution test failed or metals concentrations were > 50 x the LOD?			X
Were the PDS recoveries within 75-125%?			X

The PDS was completed on a sample from another SDG.

15.0 Interference Check Solutions (ICS)

Method 6010B/6020A ICS Criteria	Yes	No	N/A
Were ICS-A and ICSAB samples analyzed at the beginning of the analytical run and every 12 hours?	X		
Was the ICS-A absolute value concentration for all non-spiked metals < LOD	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711384 **URS Chemist: Steve Gragert**
Date Verified: 8/21/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 6010B/6020A ICS Criteria	Yes	No	N/A
(unless they are a verified trace impurity form one of the spiked metals)			
Was the ICS-AB recoveries within ± 20%?	X		

16.0 Laboratory Duplicate Samples

Laboratory Duplicate Criteria	Yes	No	N/A
Were laboratory duplicate samples analyzed for this SDG? (if yes, list below)		X	
Were parent sample / laboratory duplicate RPDs ≤ 20% for analytes that had concentrations > 5x the LOQ.			X
Were the differences between the parent sample / laboratory duplicate > 2x the LOQ for analytes that had concentrations < 5x the LOQ			X

17.0 Field Duplicate Samples

Field Duplicate Criteria	Yes	No	N/A
Were field duplicate samples collected for this SDG? (if yes, list below)		X	
Were parent sample / field duplicate RPDs ≤ 30% for water samples and ≤ 50% for soils for analytes that had concentrations > 5x the LOQ.			X
Were the differences between the parent sample / field duplicate > 2x the LOQ for analytes that had concentrations < 5x the LOQ			X

18.0 Sensitivity

Sensitivity Criteria	Yes	No	N/A
Was the laboratory sensitivity consistent with project (QAPP) requirements?	X		
Did all analytes meet sensitivity requirements?	X		

19.0 Additional Qualifications

Additional Qualification Criteria	Yes	No	N/A
Were common laboratory contaminants detected?		X	
Were common laboratory contaminant concentrations < 2x the LOQ			X
Was professional judgment used to qualify data (if yes, list below)	X		

The laboratory analyzed perchlorate via USEPA Method 314.0 rather than SW-846 6850 as requested by URS in the contract, bottle order, and CoC. Per the DoD Perchlorate Handbook (2007 Aug), *"Methods employing IC/EC (e.g. Methods 314.0 and 314.1) are not appropriate for sampling and testing associated with environmental restoration/cleanup or range assessment projects. Only methods employing MS are to be used for environmental restoration/cleanup or range assessment projects."* All perchlorate data were rejected and listed in the table below.

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711384 **URS Chemist: Steve Gragert**
Date Verified: 8/21/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Field ID	Analysis	Analyte	New LOQ	Qualification
MWRb-7-14	Perchlorate	Perchlorate	--	**R**
MWW-7-14	Perchlorate	Perchlorate	--	**R**

20.0 Completeness

Completeness Criteria	Yes	No	N/A
Were any data rejected during the verification process?	X		
Were any samples lost, broken, or in any other manner in not verified?		X	
Were samples analyses requested performed, the correct analyte lists used and correct sample preparation and analyses methods and units utilized?		X	

As indicated in Section 19.0, the laboratory analyzed perchlorate via USEPA method 314.0 rather than SW-846 6850 as requested by URS. Two perchlorate samples were rejected as indicated in Section 19.0. Perchlorate is not a compound of concern at Cannon AFB.

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711387 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Sample Identification #	Date Collected	Date Received	Matrix	Analysis
TRIP BLANK 7-20-14	7/20/2014	7/21/2014	Aq	8260C
MWH-7-14	7/20/2014	7/21/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C
MWG-7-14	7/20/2014	7/21/2014	Aq	7199, 9056, 350.1, 9060A, 7470A/6010B/6020A, and 8260C

1.0 Laboratory Case Narrative \ Cooler Receipt Form

Verification Criteria	Yes	No	N/A
Were any DoD-QSM deviations noted in the laboratory case narrative?		X	
Were DoD-QSM corrective actions followed if deviations were noted?			X
Were any issues noted in the cooler receipt form?		X	

Although it was not indicated in the laboratory case narrative, the laboratory analyzed perchlorate via USEPA Method 314.0 rather than SW-846 6850 as requested by URS in the contract, bottle order, and CoC. All perchlorate data were rejected. This issue is discussed further in Section 19.0. No issues pertaining to the samples in this SDG were noted in the laboratory case narrative or cooler receipt form.

2.0 Sample Documentation

Verification Criteria	Yes	No
Were all samples documented correctly on the chain-of-custody (COC) and samples labels?	X	
Were all sample identifications (IDs) documented correctly on sample labels?	X	
Did samples listed on COCs match the sample labels?	X	
Were sample relinquished properly on the COC?	X	

3.0 Holding Time

Verification Criteria	Yes	No
Were all samples extracted and/or analyzed within the appropriate holding time?	X	
Were all samples preserved appropriately?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711387 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

4.0 Instrument Performance Check (Tuning)

Method 6020A Instrument Tuning Criteria			
Instrument:	**ICPMS4**		
Date of Tuning:	**7/25/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Was the mass calibration ≤ 0.1amu from the true value?	X		
Was the resolution < 0.9 amu full width at 10% peak height?	X		
For stability, was the RSD ≤ 5% for at least 4 replicate analyses?	X		

Method 6020A Instrument Tuning Criteria			
Instrument:	**ICPMS4**		
Date of Tuning:	**7/29/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Was the mass calibration ≤ 0.1amu from the true value?	X		
Was the resolution < 0.9 amu full width at 10% peak height?	X		
For stability, was the RSD ≤ 5% for at least 4 replicate analyses?	X		

Method 8260C Instrument Tuning Criteria			
Instrument:	**VOCMS16**		
Date of Tuning:	**7/29/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Were all samples analyzed under an acceptable 12 hour clock tune?	X		
Were ion relative abundance for each target mass within the required intensities limits listed in Table 3 of SW-846 Method 8260C?	X		

Method 8260C Instrument Tuning Criteria			
Instrument:	**VOCMS23**		
Date of Tuning:	**7/24/2014**		
	Yes	**No**	**N/A**
Was instrument tuning completed prior to calibration?	X		
Were all samples analyzed under an acceptable 12 hour clock tune?	X		
Were ion relative abundance for each target mass within the required intensities limits listed in Table 3 of SW-846 Method 8260C?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711387 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

5.0 Initial Calibration

Method 7199 Initial Calibration Criteria			
Instrument:	**IC-13**		
Date of Calibration:	**7/25/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 9056A Initial Calibration Criteria			
Instrument:	**IC-10**		
Date of Calibration:	**7/22/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 350.1 Initial Calibration Criteria			
Instrument:	**FS3100-1**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 9060A Initial Calibration Criteria			
Instrument:	**TOC3**		
Date of Calibration:	**7/23/2014**		
	Yes	**No**	**N/A**
Was a minimum of two standards and a calibration blank used for ICAL?	X		
Was r ≥ 0.995?	X		

Method 7470A Initial Calibration Criteria			
Instrument:	**CVAA3**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
CVAA – Was a minimum of 5 standards and a calibration blank used for ICAL?	X		
CVAA – Was $r^2 \geq 0.99$?	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711387 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 6010B Initial Calibration Criteria			
Instrument:	**ICP11**		
Date of Calibration:	**7/25/2014**		
	Yes	**No**	**N/A**
ICP-AES– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-AES– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 6010B Initial Calibration Criteria			
Instrument:	**ICP11**		
Date of Calibration:	**7/29/2014**		
	Yes	**No**	**N/A**
ICP-AES– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-AES– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 6020A Initial Calibration Criteria			
Instrument:	**ICPMS4**		
Date of Calibration:	**7/25/2014**		
	Yes	**No**	**N/A**
ICP-MS– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-MS– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 6020A Initial Calibration Criteria			
Instrument:	**ICPMS4**		
Date of Calibration:	**7/29/2014**		
	Yes	**No**	**N/A**
ICP-MS– Was a minimum one high standard and a calibration blank used for ICAL?	X		
ICP-MS– If more than one standard was used, was $r^2 \geq 0.99$?	X		

Method 8260C Initial Calibration Criteria			
Instrument:	**VOCMS23**		
Date of Calibration:	**7/24/2014**		
	Yes	**No**	**N/A**
Are the average response factors (RFs) for SPCCs above the minimum DoD-QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Are the RSDs for CCCs (1,1-Dichloroethene; Chloroform; 1,2-Dichloropropane; Toluene; Ethylbenzene and Vinyl Chloride) for VOCs ≤ 30%? and one option below?	X		
Option 1: RSD for each analyte ≤ 15%?	X		
Option 2: If linear least squares regression was used was the r ≥ 0.995?	X		
Option 3: If non-linear regression was used was the coefficient of determination $r^2 \geq 0.99$?			X
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711387 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 8260C Initial Calibration Criteria			
Instrument:	**VOCMS16**		
Date of Calibration:	**7/29/2014**		
	Yes	**No**	**N/A**
Are the average response factors (RFs) for SPCCs above the minimum DoD-QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Are the RSDs for CCCs (1,1-Dichloroethene; Chloroform; 1,2-Dichloropropane; Toluene; Ethylbenzene and Vinyl Chloride) for VOCs ≤ 30%? and one option below?	X		
Option 1: RSD for each analyte ≤ 15%?	X		
Option 2: If linear least squares regression was used was the r ≥ 0.995?	X		
Option 3: If non-linear regression was used was the coefficient of determination r^2 ≥ 0.99?			X
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X

6.0 Initial Calibration Verification [(ICV) Second Source]

7199 Verification Criteria for ICV 7/25/2014 at 09:06, Instrument: IC-13	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

9056A Verification Criteria for ICV: 7/22/2014 at 08:56, Instrument: IC-10	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

350.1 Verification Criteria for ICV on 7/24/2014 at 17:23, Instrument: FS3100-1	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

9060A Verification Criteria for ICV on 7/23/2014 at 12:42, Instrument: TOC3	**Yes**	**No**
Was the second source analyzed after each calibration?	X	
Was the second source % recovery between 90-110%?	X	

7470A Verification Criteria for ICV on 7/24/2014 at 09:58, Instrument: CVAA3	**Yes**	**No**
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711387 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

6010B Verification Criteria for ICV on 7/25/2014 08:55, Instrument: ICP11	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

6010B Verification Criteria for ICV on 7/29/2014 08:22, Instrument: ICP11	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

6020A Verification Criteria for ICV on 7/25/2014 23:14, Instrument: ICPMS4	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

6020A Verification Criteria for ICV on 7/29/2014 21:54, Instrument: ICPMS4	Yes	No
Was the second source analyzed after once after each ICAL, prior to beginning a sample run?	X	
Was the second source % recovery between 90-110%?	X	

Method 8260C ICV Criteria			
Instrument:	**VOCMS23**		
Date of Initial Calibration Verification:	**7/24/2014 0800**		
	Yes	**No**	**N/A**
Was the ICV analyzed after each calibration?	X		
Was the ICV %difference (%D) for all analytes within ± 20% of the expected value (initial source)?	X		

Method 8260C ICV Criteria			
Instrument:	**VOCMS16**		
Date of Initial Calibration Verification:	**7/29/2014 09:31**		
	Yes	**No**	**N/A**
Was the ICV analyzed after each calibration?	X		
Was the ICV %difference (%D) for all analytes within ± 20% of the expected value (initial source)?	X		

7.0 Continuing Calibration Verification (CCV)

7199 Verification Criteria for CCV: 7/25/2014 at 12:03, Instrument: IC-13	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711387 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

7199 Verification Criteria for CCV: 7/25/2014 at 14:13, Instrument: IC-13	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9056A Verification Criteria for CCV on 7/22/2014 at 15:43, Instrument: IC-10	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9056A Verification Criteria for CCV on 7/22/2014 at 23:20, Instrument: IC-10	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

350.1 Verification Criteria for CCV on 7/24/2014 at 18:06, Instrument: FS3100-1	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

9060A Verification Criteria for CCV: 7/23/2014 at 16:40, Instrument: TOC3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

7470A Verification Criteria for CCV: 7/24/2014 11:49, Instrument: CVAA3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 80-120%?	X	

7470A Verification Criteria for CCV: 7/24/2014 12:38, Instrument: CVAA3	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 80-120%?	X	

6010B Verification Criteria for CCV: 7/25/2014 12:16, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/25/2014 13:17, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6010B Verification Criteria for CCV: 7/29/2014 14:41, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711387 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

6010B Verification Criteria for CCV: 7/29/2014 15:43, Instrument: ICP11	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/28/2014 2130, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/28/2014 22:40, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/31/2014 12:13, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

6020A Verification Criteria for CCV: 7/31/2014 13:47, Instrument: ICPMS4	Yes	No
Was the CCV analyzed every 10 samples and at the end of the sequence?	X	
Was the CCV % recovery between 90-110%?	X	

Method 8260C CCV Criteria			
Instrument:	VOCMS23		
Date of Calibration Verification:	7/24/2014 19:42		
	Yes	No	N/A
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 12 hours of analysis time?	X		
Are the average response factors (RFs) for SPCCs above the minimum DoD QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, ≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)	X		
Was the CCV %difference (%D) or %drift for all target compounds ≤ 20%?	X		

Method 8260C CCV Criteria			
Instrument:	VOCMS16		
Date of Calibration Verification:	7/29/2014 09:31		
	Yes	No	N/A
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 12 hours of analysis time?	X		
Are the average response factors (RFs) for SPCCs above the minimum DoD QSM response factor? (VOCs - ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane,	X		

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711387 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Method 8260C CCV Criteria			
Instrument:	**VOCMS16**		
Date of Calibration Verification:	**7/29/2014 09:31**		
	Yes	**No**	**N/A**
≥ 0.1 for chloromethane, bromoform, and 1,1-dichloroethane.)			
Was the CCV %difference (%D) or %drift for all target compounds ≤ 20%?	X		

8.0 Blank Samples

Blank Criteria	**Yes**	**No**	**N/A**
Was a method blank analyzed with every preparatory batch?	X		
Were analytes detected > ½ the LOQ and > 1/10 the amount measured in any sample or 1/10 the regulatory limit?		X	
Were target analytes detected in method, trip or calibration blanks?		X	

9.0 Laboratory Control Sample (LCS)

LCS Criteria	**Yes**	**No**	**N/A**
Was an LCS analyzed with every preparatory batch?	X		
Were LCS recoveries within acceptance criteria listed in the UFP-QAPP?	X		

10.0 Surrogate Recoveries

Methods 8260C Surrogate Criteria	**Yes**	**No**	**N/A**
Were surrogate spikes added to all field and QC samples?	X		
Were surrogate recoveries within acceptance criteria listed in the UFP-QAPP?	X		

11.0 Internal Standard (IS) Recoveries

Methods 8260C IS Criteria	**Yes**	**No**	**N/A**
Were internal standards spiked for all samples and standards?	X		
Were internal standard areas within -50% to + 100% of the ICAL midpoint standard area?	X		
Were retention time ± 30 seconds from the retention time of the midpoint standard of the ICAL?	X		

12.0 Matrix Spike/Matrix Spike Duplicate Recoveries/RPDs

MS/MSD Criteria	**Yes**	**No**	**N/A**
Were MS/MSD samples analyzed with every preparatory batch?	X		
Were MS/MSD samples collected for this SDG?		X	
Were MS/MSD recoveries/RPDs within acceptance criteria listed in the UFP-QAPP?			X

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711387 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

13.0 Dilution Test

Method 6010B/6020A Dilution Test Criteria	Yes	No	N/A
Was a dilution test sample analyzed with every preparatory batch?	X		
Were metals concentrations > 50x the LOQ?			X
Did the five-fold dilution agree within ± 10% of the original measurement?			X
If the five-fold dilution did not agree within ± 10% of the original measurement, was a post digestion spike sample analyzed?	X		

The serial dilution was completed on a sample from another SDG.

14.0 Post Digestion Spike (PDS) Recoveries

Method 6010B PDS Criteria	Yes	No	N/A
Was a PDS sample analyzed if the dilution test failed or metals concentrations were > 50 x the LOD?			X
Were the PDS recoveries within 75-125%?			X

The serial dilution was completed on a sample from another SDG.

15.0 Interference Check Solutions (ICS)

Method 6010B/6020A ICS Criteria	Yes	No	N/A
Were ICS-A and ICSAB samples analyzed at the beginning of the analytical run and every 12 hours?	X		
Was the ICS-A absolute value concentration for all non-spiked metals < LOD (unless they are a verified trace impurity form one of the spiked metals)	X		
Were the ICS-AB recoveries within ± 20%?	X		

16.0 Laboratory Duplicate Samples

Laboratory Duplicate Criteria	Yes	No	N/A
Were laboratory duplicate samples analyzed for this SDG? (if yes, list below)		X	
Were parent sample / laboratory duplicate RPDs ≤ 20% for analytes that had concentrations > 5x the LOQ.			X
Were the differences between the parent sample / laboratory duplicate > 2x the LOQ for analytes that had concentrations < 5x the LOQ			X

17.0 Field Duplicate Samples

Field Duplicate Criteria	Yes	No	N/A
Were field duplicate samples collected for this SDG? (if yes, list below)		X	
Were parent sample / field duplicate RPDs ≤ 30% for water samples and ≤ 50% for			X

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711387 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

Field Duplicate Criteria	Yes	No	N/A
soils for analytes that had concentrations > 5x the LOQ.			
Were the differences between the parent sample / field duplicate > 2x the LOQ for analytes that had concentrations < 5x the LOQ			X

18.0 Sensitivity

Sensitivity Criteria	Yes	No	N/A
Was the laboratory sensitivity consistent with project (QAPP) requirements?	X		
Did all analytes meet sensitivity requirements?	X		

19.0 Additional Qualifications

Additional Qualification Criteria	Yes	No	N/A
Were common laboratory contaminants detected?	X		
Were common laboratory contaminant concentrations < 2x the LOQ	X		
Was professional judgment used to qualify data (if yes, list below)	X		

Professional judgment was used to qualify the common laboratory contaminant acetone reported at concentrations less than two times (2X) the LOQ. See table below for qualification of data.

The laboratory analyzed perchlorate via USEPA Method 314.0 rather than SW-846 6850 as requested by URS in the contract, bottle order, and CoC. Per the DoD Perchlorate Handbook (2007 Aug), *"Methods employing IC/EC (e.g. Methods 314.0 and 314.1) are not appropriate for sampling and testing associated with environmental restoration/cleanup or range assessment projects. Only methods employing MS are to be used for environmental restoration/cleanup or range assessment projects."* All perchlorate data were rejected and listed in the table below.

Field ID	Analysis	Analyte	New LOQ	Qualification
MWG-7-14	VOCs	Acetone	--	**U**
MWH-7-14	Perchlorate	Perchlorate	--	**R**
MWG-7-14	Perchlorate	Perchlorate	--	**R**

Cannon AFB PBR Data Verification

Laboratory and SDG#: ESC L711387 **URS Chemist: Steve Gragert**
Date Verified: 8/25/2014 **URS ITR: Jeff Aust 9/3/2014**
Guidance: DoD-QSM, Version 4.2
Applicable QAPP: Cannon PBR UFP-QAPP (URS, 2014)
Applicable Analytical Methods: 7199, 9056, 350.1, 9060A, 7470A, 6010B, 6020A, and 8260C

20.0 Completeness

Completeness Criteria	Yes	No	N/A
Were any data rejected during the verification process?	X		
Were any samples lost, broken, or in any other manner in not verified?		X	
Were samples analyses requested performed, the correct analyte lists used and correct sample preparation and analyses methods and units utilized?		X	

As indicated in Section 19.0, the laboratory analyzed perchlorate via USEPA method 314.0 rather than SW-846 6850 as requested by URS. Two perchlorate samples were rejected as indicated in Section 19.0. Perchlorate is not a compound of concern at Cannon AFB.

MONITORING WELL IDENTIFICATION REPORT

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS AND RADIOACTIVE MATERIALS BUREAU
525 CAMINO DE LOS MARQUEZ, SUITE 4
SANTA FE, NEW MEXICO 87502

FACILITY NAME	Cannon Air Force Base
USGS SITE ID	342218103182601
COUNTY	Curry
WELL NUMBER	A
WELL LOCATION (LONGITUDE)	103° 18' 31.44"
WELL LOCATION (LATITUDE)	34° 22' 18.91"
AQUIFER NAME	Ogallala
AQUIFER CONFINED	_____ UNCONFINED X
WELL INSTALLATION DATE	01-07-1985
DRILLING METHOD	HYDRT (mud rotary)
INNER CASING DIAMETER	4 inches
BOREHOLE DIAMETER	8 inches
CASING MATERIAL	PVC
METHOD OF DEVELOPMENT	AIRFT
ELEV BOTTOM OF BOREHOLE	3,898.83 feet above NAVD88
ELEV BOTTOM OF WELL CASING	3,920.83 feet above NAVD88
ELEV BOTTOM OF SCREENED INT	3,920.83 feet above NAVD88
ELEV OF TOP OF SCREENED INT	3,935.83 feet above NAVD88
MEASURING POINT CORRECTION	1.97 feet
SURVEYED ELEV OF LAND SURFACE	4,263.83 feet above NAVD88

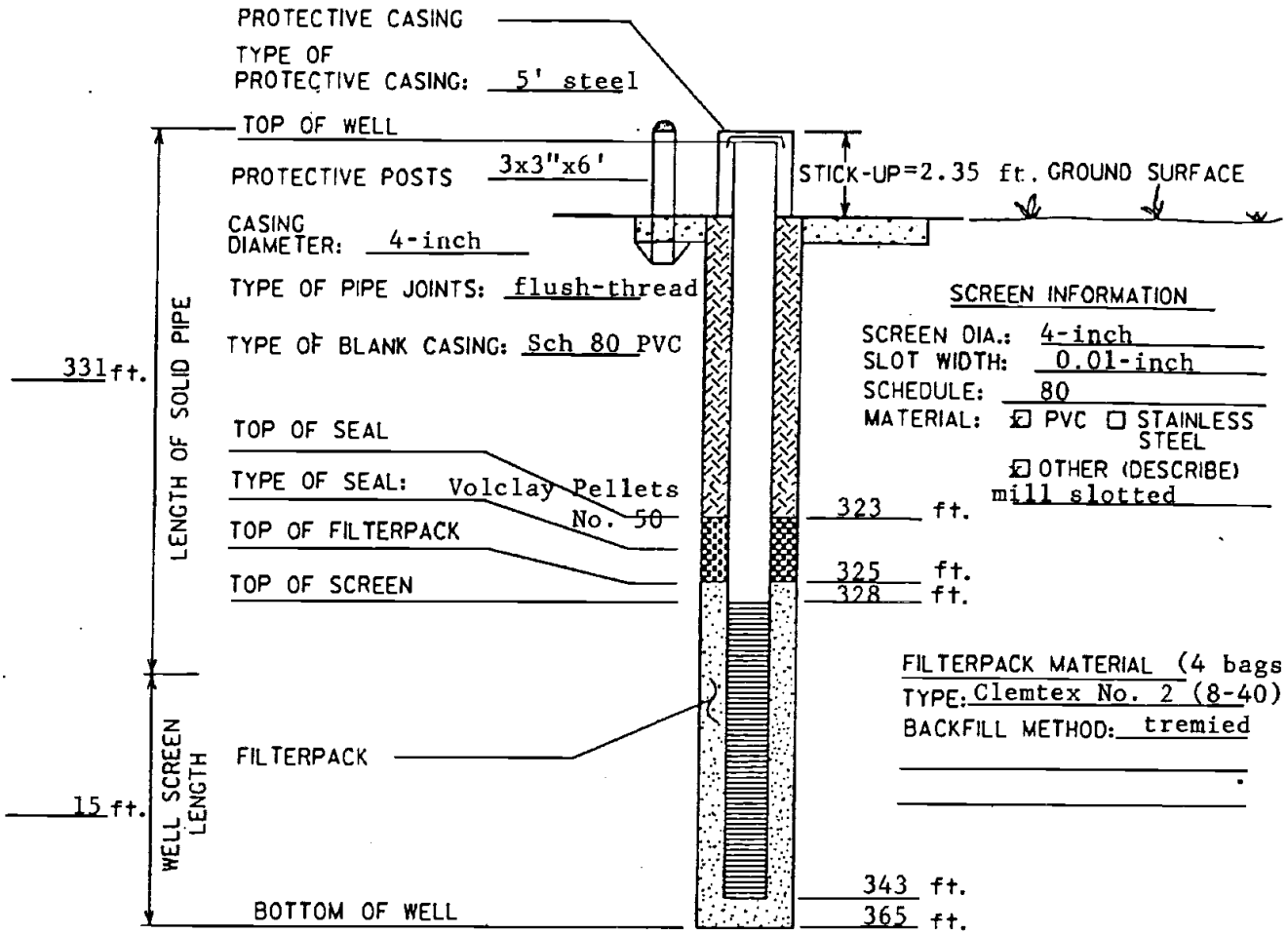
DATE OF REPORT 03-30-05 SIGNATURE Fredrick E. Gebhardt

NAME (TYPED) Fredrick E. Gebhardt

ELEVATION GROUND WATER			PROJECT: CANNON AIR FORCE BASE -- LANDFILL NO. 5
DATE INSTALLED	STARTED: 1-4-85	COMPLETED: 1-7-85	LOCATION (Coordinates or Station)
ELEVATION TOP OF HOLE: 4265.11 ft. MSL			SIGNATURE OF INSPECTOR: T. K. Walters (Radian Corporation)
TOTAL DEPTH OF HOLE: 365 feet			HOLE NO.: Monitoring Well A

MONITORING WELL CONSTRUCTION DIAGRAM

(ALL MEASUREMENTS FROM GROUND SURFACE)



SCREEN INFORMATION

SCREEN DIA.: 4-inch
SLOT WIDTH: 0.01-inch
SCHEDULE: 80
MATERIAL: ☒ PVC ☐ STAINLESS STEEL ☒ OTHER (DESCRIBE) mill slotted

FILTERPACK MATERIAL (4 bags)
TYPE: Clemtex No. 2 (8-40)
BACKFILL METHOD: tremied

WELL DEVELOPMENT

METHOD: Air Lifted
TIME SPENT DEVELOPING: 1 hr. 40 minutes
VOLUME OF WATER REMOVED: 300 gallons
VOLUME OF WATER ADDED: unknown
DESCRIPTION OF PREDEVELOPMENT WATER:

DESCRIPTION OF POST DEVELOPMENT WATER: no fines when surged and backwashed

WATER LEVEL SUMMARY

WATER LEVEL MEASUREMENTS
DATE/TIME/LEVEL

DEPTH FROM TOP CASING AFTER DEVELOPMENT:

DRAFT

RADIAN CORPORATION

Completion Log: Sheet 1 of 2

Well No. Monitor Well A

Location Landfill No. 5

Project Cannon AFB IRP

Log Recorded by T.K. Walters

Construction

Construction Started January 4, 1985

Total Depth Drilled (ft) 365 Completed January 7, 1985

Drilling Method mud rotary Hole Diameter 8-inch

Problems encountered during drilling/completion hole collapsed back to 343 feet, set casing to 343' 625

Water source for drilling and completion procedures base potable water supply well

Sampling

Number, type and disposition of samples collected water samples, collected after well development

Sample interval (ft-ft) 343', top of Ogallala Aquifer

Storage and/or preservation method(s) 4°C, shipped overnight delivery OEHL/RAS

Materials

Casing type Schedule 80 PVC

Top of well casing (ft-AGL/BGL) 3'/343' Diameter 4 inch

Depth of casing (ft) 343' Elevation (ft-msl) 4267.46

Screen type mill slot

Slot size 0.01 inch Diameter 4 inch (internal)

Screen interval (ft-ft) 343-328

Type(s) of glue used to join casing None - threaded flush joint couplings

Type of gravel/sand pack used Clemtex No. 2 (8-40 mesh)

Amount of gravel pack used 4 bags

Grain size distribution of gravel pack Retained #8 (2.0%), #16 (51.2%), #20 (62.8%)[1]

Lithology of gravel pack Mostly silica (94%)

Source (company and quarry/pit) Clemtex, Inc., Houston, Texas

Interval of gravel pack (ft-ft) 343 - 325

Interval of bentonite seal (ft-ft) 325 - 323

Interval of grouting (ft-ft) 323 - Land surface

Comments

Type of bentonite - Pellets (Volclay)

Type of grout - Portland Type I (neat cement)

[1] #30 (78.4%), #40 (91.2%), #50 (98.9%), #100 (100.0%)

Description of Security Measures

N/A

Padlock ID No. N/A Location of key(s) Cannon AFB

RADIAN CORPORATION

Well Completion Log: Sheet 2 of 2 (Development) Well A (continued)

Development started January 7, 1985 Development ended January 7, 1985
Static level of water before _____ (ft) and after _____ (ft) development.
Measuring point (MP) description top of steel casing

MP Height 2.35 (ft) Elevation 4267.46 (ft)
Quantity of water discharged during development 5 well volumes below static level
Type, size/capacity of pump or bailer used for developmnt air line - lift development

Depth of open hole inside well (below ground level on measuring point)
Before development 343 (ft) After development 343 (ft)

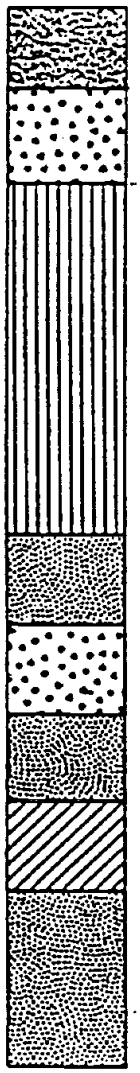
Date/Time	Discharge (GPM/Bail(s)) Note SWL start/End.(1)		Field Measurements Temperature	Conductivity	pH	Remarks
1/25/85	1320 hrs	3 gpm	18.5°	740	7.6	
	1330 hrs		18.5°	750	7.5	
	1410 hrs		18.4°	750	7.4	
	1500 hrs		18.4°	750	7.4	

NOTE: (1) Depth measurements made by Steel Tape (ST); Rope and Bailer (R/B) and Electric Line (EL).
(2) Temperature in degrees celsius.
(3) Conductivity in micromhos/centimeter at field temperature.

Log of Drilling Operations
Monitor Well #A

Location Cannon AFB, Site 5 Landfill No. 5
Log Recorded by T.K. Walters
Type Drill Rig and Operator Failing 1500
Air/mud rotary - Winnek,Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 4 Jan. 1985 and end
7 Jan. 1985 of drilling operation
Sampling Interval (Estimated) 5(ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken	Lithologic Description
0-			G	TOPSOIL; red-brown, fair amount organic matter, caliche contact, 4'.
5-			G	CALICHE; light tan with buff silt.
10-			G	SILT;sandy light brown, with white caliche clasts.
15-			G	SILT; interbedded with caliche, some fine sand 22-25'.
20-			G	SILT; sandy with hard white caliche interbedded.
25-			G	SILT; sandy with hard white caliche interbedded.
30-			G	SAND; silty with caliche buff brown.
35-			G	CALICHE; hard, white, nodular with buff-brown silty sand.
40-			G	SAND; silty, light brown, cemented with calcite, caliche nodules in lower portion.
45-			G	SILT; sandy, unconsolidated, poorly sorted, fine-medium grained with black lithic fragments.
50-			G	SAND; silty, fine-medium grained, unconsolidated, angular, with caliche fragments.
55-			G	SAND; dark brown, poorly cemented, poorly sorted, with clear quartz (angular).
60-				

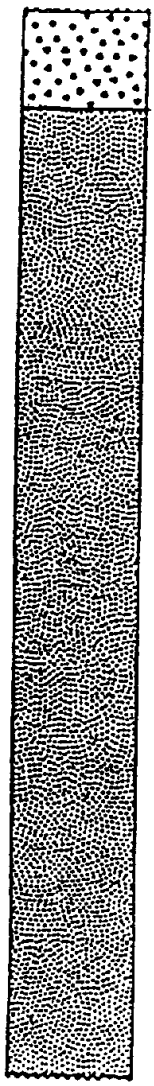
Monitor Well A was grouted from 325 ft to the surface with 8 yds.3 of Portland Type I neat cement.

ST = Shelby tube; SS = split-spoon; G = grab.

Log of Drilling Operations
Monitor Well #A

Location Cannon AFB, Site 5 Landfill No. 5
Log Recorded by T.K. Walters
Type Drill Rig and Operator Failing 1500
Air/mud rotary - Winnek.Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 4 Jan. 1985 and end
7 Jan 1985 of drilling operation
Sampling Interval (Estimated) 5(ft)



Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken	Lithologic Description
60-			G	CALICHE; buff white and silt, extremely hard, 2' sand, cemented, medium grained.
65-			G	SAND; red-brown, unconsolidated, fine-medium grained, poorly sorted.
70-			G	SAND; light brown, unconsolidated, fine-medium, sorted, coarser than above.
75-			G	SAND; tan-brown, unconsolidated, medium grained, quartzose, coarser than above unit, subrounded grains.
80-			G	SAND; fine-medium grained, poorly sorted, unconsolidated with 6' calcite cemented layer.
85-			G	SAND; fine-medium grained, poorly sorted, increase in calcite cement.
90-			G	SAND; fine-medium grained, poorly sorted, coarser than above, calcite cement about 10%.
95-			G	SAND; medium grained, moderately sorted, quartzose, grains sub-rounded, decrease in calcite.
100-			G	SAND; fine-medium poorly sorted, semi-consolidated, calcite cement 50%, coarser than above.
105-			G	SAND; medium-coarse grained, unconsolidated subangular grains.
110-			G	SAND; same as above.
115			G	SAND; same as above.
120-				

Monitor Well A was grouted from 325 ft to the surface with 8 yds.^{3} of Portland Type I neat cement.

ST = Shelby tube; SS = split-spoon; G = grab.

Log of Drilling Operations
Monitor Well #A

Location Cannon AFB, Site 5 Landfill No. 5
Log Recorded by T.K. Walters
Type Drill Rig and Operator Failing 1500
Air/mud rotary - Winnek,Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 4 Jan. 1985 and end
7 Jan. 1985 of drilling operation
Sampling Interval (Estimated) 5(ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken	Lithologic Description
120-			G	SAND; fine-medium grained, unconsolidated, well sorted, subrounded, quartzose.
125-			G	SAND; fine-grained, well sorted, unconsolidated, subrounded, with 5% caliche.
130-			G	SAND; fine-medium grained, well sorted, unconsolidated, subrounded, 5% caliche nodules.
135-			G	SAND; fine grained, very well sorted, unconsolidated, subrounded, 5% lithic fragments.
140-			G	SILT; fine, well sorted, much finer than above unit, unconsolidated.
145-			G	SILT; fine grained, very well sorted, quartzose, with 5% lithic fragments, subrounded.
150-			G	SAND; fine grained, very well sorted, subrounded, quartzose, clear, 5% lithics, drilling slightly slower.
155-			G	SAND; fine grained, silty, with 90% clear quartz, subrounded, 10% lithics.
160-			G	SAND; silty, fine grained, moderately well sorted, subrounded, quartzose.
165-			G	SAND; fine-medium grained, slightly cemented with calcite, caliche nodules 10%.
170-			G	SAND; loosely consolidated, by calcite, fine-medium grained, moderately sorted, caliche 10%.
175-			G	SAND; slightly cemented, by calcite, and caliche nodules (25%), sand is fine-medium, subrounded.
180-				

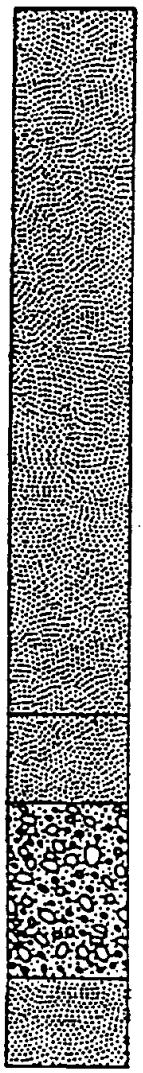
Monitor Well A was grouted from 325 ft to the surface with 8 yds.^{3} of Portland Type I neat cement.

ST = Shelby tube; SS = split-spoon; G = grab.

Log of Drilling Operations
Monitor Well #A

Location Cannon AFB, Site 5 Landfill No. 5
Log Recorded by T.K. Walters
Type Drill Rig and Operator Failing 1500
Air/mud rotary - Winnek, Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 4 Jan. 1985 and end 7 Jan. 1985 of drilling operation
Sampling Interval (Estimated) 5(ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken	Lithologic Description
180-			G	SAND; slightly cemented, fine-medium grained, calcite 50%.
185-			G	SAND; silty, brown, poorly sorted, slightly cemented, fine-medium grained.
190-			G	SAND; unconsolidated, fine-medium grained, subrounded, poorly sorted, 10% lithics.
195-			G	SAND; coarse, and pea gravel, angular, with reworked clay and silt (Cretaceous), unconsolidated, lithics-clay 30%.
200-			G	SAND; tan, fine-medium grained, poorly sorted, angular, with 10% lithic fragments.
205-			G	SAND; tan, fine-medium grained, subangular, with abundant iron staining on quartz grains, lithics 5%, unconsolidated.
210-			G	SAND; tan, medium-coarse, subangular, with reworked shale and silt, poorly sorted, unconsolidated.
215-			G	SAND; olive-brown, 50% green-brown silt and shale, angular quartz, fine-medium grained, poorly sorted.
220-			G	SAND AND SHALE; olive brown, sand medium grained, shale green-brown, with red clay clasts.
225-			G	GRAVEL; unconsolidated, with shale, silt, lithic fragments, unsorted conglomerate.
230-			G	SAND AND GRAVEL; sand cemented, by calcite, gravel angular, loosely consolidated.
235-			G	SAND; with minor gravel, sand fine-medium grained, loosely cemented, poorly sorted.
240-				

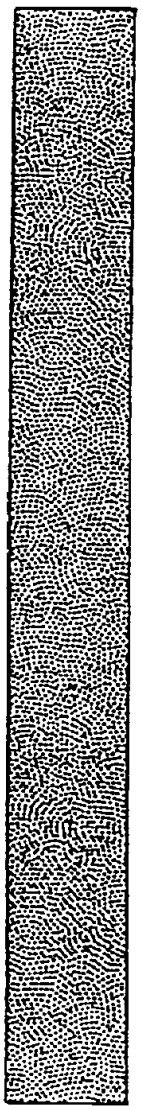
Monitor Well A was grouted from 325 ft to the surface with 8 yds.^{3} of Portland Type I neat cement.

ST = Shelby tube; SS = split-spoon; G = grab.

Log of Drilling Operations
Monitor Well #A

Location Cannon AFB, Site 5 Landfill No. 5
Log Recorded by T.K. Walters
Type Drill Rig and Operator Failing 1500
Air/mud rotary - Winnek,Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 4 Jan. 1985 and end 7 Jan. 1985 of drilling operation
Sampling Interval (Estimated) 5(ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken	Lithologic Description
240-			G	SAND; tan, medium-coarse grained, with 15% gravel, (may be coming in from gravel zone above).
245-			G	SAND; tan, fine-medium grained, poorly sorted, with calcite matrix, slightly silty, 10% lithics.
250-			G	SAND; brown, fine-coarse, unconsolidated, angular, with 15% lithics also angular, clay matrix 20%.
255-			G	SAND; brown, fine grained, with calcite cement, unconsolidated, poorly sorted with coarse sand-size lithic fragments 10%.
260-			G	SAND; brown, fine-medium grained, loosely consolidated with calcite cement, coarse lithics 20%, angular.
265-			G	SAND; brown, 95% quartz, fine-medium grained, absence of coarse lithic fragments, "beach sand" texture.
270-			G	SAND; brown, 95% quartz, rounded, medium grained, well sorted, lithics also rounded and sorted.
275-			G	SAND; brown, medium grained, subrounded, same as above unit with 10% lithics.
280-			G	SAND; brown, medium-coarse, subangular, poorly sorted, unconsolidated, lithics 10-15% subangular, out of "clean sand."
285-			G	SAND; tan, fine-medium grained, moderately well sorted, subrounded, calcite 10%, lithics 10%.
290-			G	SAND; tan, fine-medium, well sorted, subrounded, "clean" with 10% lithics, also fine-medium grained.
295-			G	SAND; tan, fine-medium grained, well sorted, rounded with 10% black lithic fragments, no matrix.
300-				

Monitor Well A was grouted from 325 ft to the surface with 8 yds.^{3} of Portland Type I neat cement.

ST = Shelby tube; SS = split-spoon; G = grab.

Log of Drilling Operations
Monitor Well #A

Location Cannon AFB, Site 5 Landfill No. 5
Log Recorded by T.K. Walters
Type Drill Rig and Operator Failing 1500
Air/mud rotary - Winnek.Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 4 Jan. 1985 and end 7 Jan. 1985 of drilling operation
Sampling Interval (Estimated) 5(ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken	Lithologic Description
300-				
			G	SAND; tan to brown, fine-medium grained, poorly sorted, with 10% coarse sand fragments, subrounded.
305-				
			G	SAND; brown, fine-coarse, poorly sorted, with 15% lithics, also coarse, subrounded, unconsolidated.
310-				
			G	SAND; with gravel, olive brown, sand is fine-medium grained, poorly sorted, subrounded, gravel coarse.
315-				
			G	SAND; fine-coarse, slightly cemented to larger lithic fragments, sand is subrounded.
320-				
			G	SAND; tan, fine-medium grained, loosely cemented, subrounded, calcite 10%.
325-				
			G	SAND; sand and gravel conglomerate, cemented by calcite, coarse texture, w/grey shale and reworked red silt, well indurated.
330-				
			G	SAND; cemented, with 10% gravel, buff-brown, iron stained, conglomerate, calcite matrix, lithics (red plagioclase, volcanics)
335-				
			G	SAND; medium-coarse, loosely consolidated, lithics 25%, coarse grained, out of confining zone at 339'.
340-				
			G	SAND; fine-coarse, unconsolidated, with sub-angular quartz 342-343' sand and gravel conglomerate; 343-345' sand unconsolidated.
345-				
			G	SAND; loosely consolidated, fine-medium grain, moderately sorted, subrounded lithics 5-15%, water changed to dark brown at 350'.
350-				
			G	SAND; fine-medium grained, poorly sorted, subrounded with 10% lithic clasts.
355-				
			G	SAND; medium grained, loosely consolidated subangular, subrounded with 10% lithic fragments.
360-				
			G	SAND; fine-coarse, poorly sorted, angular, with 30% lithic fragments.
365-				

COLLAPSE

Monitor Well A was grouted from 325 ft to the surface with 8 yds.^{3} of Portland Type I neat cement.

ST = Shelby tube; SS = split-spoon; G = grab.

TABLE 3-1. MONITOR WELL CONSTRUCTION SPECIFICATIONS

- Casing: four-inch diameter, flush joint, threaded schedule 80 PVC, plugged at bottom with a permanent plug.
- Screen: four-inch diameter, flush joint, schedule 80 PVC, 0.010-inch mill slot, screen length = 15 feet.
- Sand Pack: 8-40 mesh silica, tremmied from bottom of hole to one foot above top of screen.
- Bentonite Seal: No. 50 Volclay brand bentonite tablets, to two feet above top of sand pack.
- Grout: neat cement (Type I Portland cement) grout tremmied from the top of the bentonite seal to the land surface.
- After each well was installed, it was developed for several hours by air development methods. Water was discharged by this process until the well produced no more fine material when surged and backwashed.
- Cuttings from well drilling activities were contained in 10' x 10' x 8' mud pits and covered. No hazardous or toxic forming materials were disposed of in the mud pits.
- All drill pipe and equipment was steam cleaned (under high pressure) before mobilizing to the next monitor well location.
- Surface Completion: The PVC casing was cut off to provide a two foot stick-up. A protective 5' steel guard pipe 6 inches in diameter with a locking cap was set in a 24" x 24" x 4" concrete pad over the PVC stickup. Each pipe extended about three feet above land surface.
- Guard Posts: Three 3" diameter steel posts 6' in length with a minimum of 2 feet below ground, were emplaced radially 4 feet from the well head, and set in concrete. The guard posts consisted of 2 sections of pipe, fitted together at land surface by keyed-alike locks, for easy removal for well and pump access.
- Pumps: each well was equipped with a submersible pumping apparatus, consisting of a Standard 1/2 HP pump (Model 20X4P 050 - 2.W. Type 20X4P). Each well pump contained a 600-TAX5 motor starter with a P-36-overload and lightning arrestor. Accessory items installed with pumps included a brass check valve, 1" schedule 80 threaded drop pipe, 12 x 2-2 conduction pump wire, 1/8" stainless steel safety cable, 1" stainless steel worm clamps, a three-prong electric plug, 1/4" cable clamps, #10 wire terminals 1 x 3/4" galvanized bushings, and a 3/4" brass hose connector.
- After all wells were in place, each was sampled for the chemical analyses specified in the Scope of Work.

MONITORING WELL IDENTIFICATION REPORT

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS AND RADIOACTIVE MATERIALS BUREAU
525 CAMINO DE LOS MARQUEZ, SUITE 4
SANTA FE, NEW MEXICO 87502

FACILITY NAME Cannon Air Force Base

EPA I.D. NUMBER NM 7572124454

COUNTY Curry

WELL NUMBER B -- Landfill-5

WELL LOCATION (LONGITUDE) 103 ° 18 ' 10 "

WELL LOCATION (LATITUDE) 34 ° 22 ' 03 "

AQUIFER NAME Ogallala

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE 11-30-1984

DRILLING METHOD HYDRT

INNER CASING DIAMETER 4 inches

BOREHOLE DIAMETER 8 inches

CASING MATERIAL PVC

METHOD OF DEVELOPMENT AIRFT

ELEV BOTTOM OF BOREHOLE 3903.11 feet above MSL

ELEV BOTTOM OF WELL CASING 3903.11 feet above MSL

ELEV BOTTOM OF SCREENED INT 3903.11 feet above MSL

ELEV OF TOP OF SCREENED INT 3918.11 feet above MSL

SURVEYED ELEV OF CASING TOP 4265.41 feet above MSL

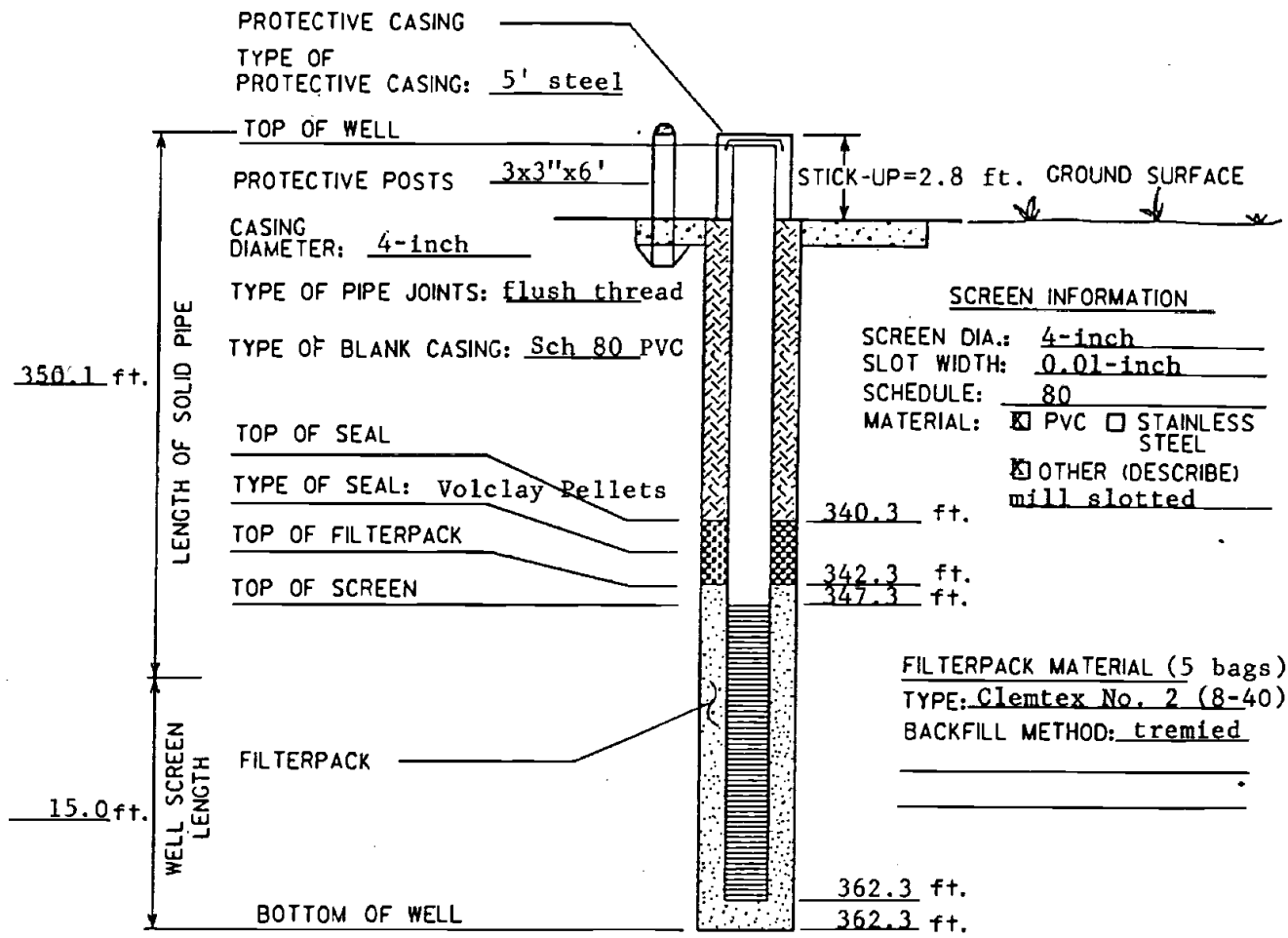
DATE OF REPORT 09-15-2003 SIGNATURE Fredrick E. Gebhardt

NAME (TYPED) Fredrick E. Gebhardt

ELEVATION GROUND WATER			PROJECT CANNON AIR FORCE BASE -- LANDFILL NO. 5
DATE INSTALLED	STARTED 11-25-84	COMPLETED 11-30-84	LOCATION (Coordinates or Station)
ELEVATION TOP OF HOLE 4263.24 ft. MSL			SIGNATURE OF INSPECTOR T. K, Walters (Radian Corporation)
TOTAL DEPTH OF HOLE 362.3 feet			HOLE NO. Monitoring Well B

MONITORING WELL CONSTRUCTION DIAGRAM

(ALL MEASUREMENTS FROM GROUND SURFACE)



SCREEN INFORMATION

SCREEN DIA.: 4-inch
SLOT WIDTH: 0.01-inch
SCHEDULE: 80
MATERIAL: ☒ PVC ☐ STAINLESS STEEL
☒ OTHER (DESCRIBE) mill slotted

FILTERPACK MATERIAL (5 bags)
TYPE: Clemtex No. 2 (8-40)
BACKFILL METHOD: tremied

WELL DEVELOPMENT

METHOD: Air Lifted
TIME SPENT DEVELOPING: 1 hr. 40 minutes
VOLUME OF WATER REMOVED: 300 gallons
VOLUME OF WATER ADDED: unknown
DESCRIPTION OF PREDEVELOPMENT WATER: unknown

DESCRIPTION OF POST DEVELOPMENT WATER: no fines when surged and backwashed

WATER LEVEL SUMMARY

WATER LEVEL MEASUREMENTS
DATE/TIME/LEVEL 11/30/84/0940/245'
11/30/84/1120/265.7'

DEPTH FROM TOP CASING AFTER DEVELOPMENT:
362.3 ft.

RADIAN CORPORATION

Completion Log: Sheet 1 of 2

Well No. Monitor Well B
Location Landfill No. 5

Project Cannon AFB IRP
Log Recorded by T.K. Walters

Construction

Construction Started November 25, 1984 Completed November 30, 1984
Total Depth Drilled (ft) 362.3 Hole Diameter 8-inch
Drilling Method mud rotary
Problems encountered during drilling/completion none

Water source for drilling and completion procedures potable base supply well

Sampling

Number, type and disposition of samples collected water samples collected after well development

Sample interval (ft-ft) 362.3' at top of Ogallala Aquifer

Storage and/or preservation method(s) 4°C, shipped to OEHL/RAS, overnight delivery

Materials

Casing type Schedule 80 PVC Diameter 4 inch (interval)
Top of well casing (ft-AGL/BGL) 2.8/362.3' Elevation (ft-msl) 4266.04
Depth of casing (ft) 362.3
Screen type mill slotted Diameter 4 inch (internal)
Slot size 0.01 inch Screen interval (ft-ft) 362.3-347.3

Type(s) of glue used to join casing None - threaded flush joint couplings
Type of gravel/sand pack used Clemtex No. 2 (8-40 mesh)
Amount of gravel pack used 5 bags
Grain size distribution of gravel pack Retained #8 (2.0%), #16 (51.2%), #20 (62.8%)[1]
Lithology of gravel pack Mostly silica (94%)
Source (company and quarry/pit) Clemtex, Inc., Houston, Texas

Interval of gravel pack (ft-ft) 362.3 - 342.3
Interval of bentonite seal (ft-ft) 342.3 - 340.3
Interval of grouting (ft-ft) 340.3 - Land Surface

Comments

Type of bentonite - Volclay (Pellets)
Type of grout - Portland Type 1 (neat cement)
[1] #30 (78.4%), #40 (91.2%), #50 (98.9%), #100 (100.0%)

Description of Security Measures

N/A

Padlock ID No. N/A Location of key(s) Cannon AFB

RADIAN CORPORATION

Well Completion Log: Sheet 2 of 2 (Development) Well B (continued)

Development started November 30, 1984 Development ended November 30, 1984
atic level of water before 245 (ft) and after 265.7 (ft) development
suring point (MP) description steel casing

MP Height 2.8 (ft) Elevation 4266.04 (ft)
Quantity of water discharged during development 5 well volumes
Type, size/capacity of pump or bailer used for developmnt air lift development

Depth of open hole inside well (below ground level on measuring point)
Before development 362.3 (ft) After development 362.3 (ft)

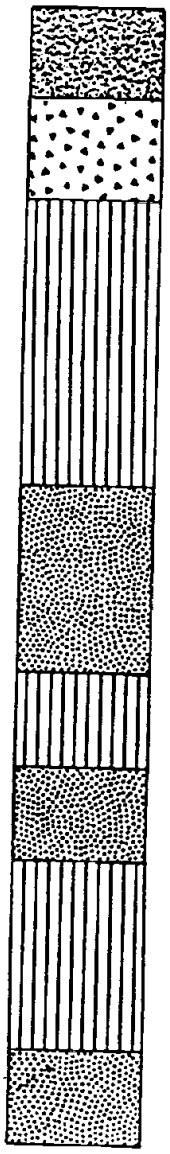
Date/Time	Discharge (GPM/Bail(s)) Note SWL start/End.(1)		Field Measurements Temperature	Conductivity	pH	Remarks
1/24/85	9040	3 gpm	18.1°	760	7.45	
	1000		18.1°	800	7.68	
	1120		18.1°	760	7.5	

NOTE: (1) Depth measurements made by Steel Tape (ST); Rope and Bailer (R/B) and Electric Line (EL).
(2) Temperature in degrees celsius.
(3) Conductivity in micromhos/centimeter at field temperature.

Log of Drilling Operations
Monitor Well #B

ation Site 5B Landfill No. 5.
Log Recorded by T.K. Walters/W. Boettner
Type Drill Rig and Operator Failing 1500
Air/mud Rotary-Winnek, Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 25 November 1984 and end
30 Nov. 1984 of drilling operation
Sampling Interval (Estimated) 5(ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken *	Lithologic Description
0-			G	TOPSOIL; dark brown, loamy fine sand slightly moist caliche at 4.5'.
5-			G	CALICHE; extremely hard, white, sharp upper contact increase in sand 9-10'.
10-			G	SILT; sandy,pink,poorly sorted, slightly moist, calcarceous.
15-			G	SILT; buff cemented by calcite, hard, slightly sandy.
			G	SILT; buff-brown, cemented with calcite.
			G	SAND; red-brown, fine grain, moderately sorted, slightly consolidated.
30-			G	SAND; silty, buff-brown, fine-medium, well sorted, subangular, calcite cement.
35-			G	SILT; very fine with calcite matrix, unconsolidated, well sorted.
40-			G	SAND; fine-medium grained, oxidized with 6" caliche stringers.
45-			G	SILT; sandy buff, well sorted, unconsolidated.
50-			G	SILT; sandy, cemented, with hard 6" layers of caliche.
55-			G	SAND; silty, brown, grading to red oxidized sand, medium grained, moderately sorted.
60-				

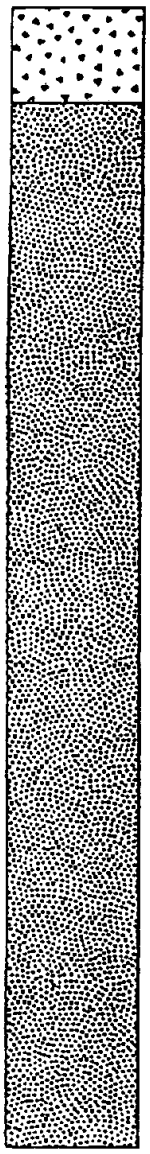
tor Well B was grouted from 344 ft to the surface with 7 yds.3 of Portland I neat cement.

ST = Shelby tube; SS = split-spoon; G = grab.

Log of Drilling Operations
Monitor Well #B

ation Site 5B Landfill No. 5
Log Recorded by T.K. Walters/W. Boettner
Type Drill Rig and Operator Failing 1500
Air/mud Rotary-Winnek, Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 25 November 1985 and end
30 Nov. 1985 of drilling operation
Sampling Interval (Estimated) 5(ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken*	Lithologic Description
60-			G	CALICHE; buff-white, and silt, extremely hard, 2' sand, cemented, medium grained.
65-			G	SAND; red-brown, unconsolidated, fine-medium grained, poorly sorted.
70-			G	SAND: light brown, unconsolidated, moderately sorted, coarser than above.
75-			G	SAND; light brown, unconsolidated, moderately sorted, coarser than above.
80-			G	SAND; tan-brown, unconsolidated, medium grained, quartzose, coarser than above unit, sub-rounded grains.
			G	SAND; fine-medium grained, poorly sorted, unconsolidated with 6" calcite cemented layer.
90-			G	SAND; fine-medium grained, increase in calcite cement.
95-			G	SAND; fine-medium grained, poorly sorted, coarser than above, calcite cement about 10%.
100-			G	SAND; medium grained, moderately sorted, quartzose, grains sub-rounded, decrease in calcite.
105-			G	SAND; fine-medium, poorly sorted, semi-consolidated, calcite cement 50%, coarser than above.
110-			G	SAND; medium-coarse grained, unconsolidated subangular grains.
115-			G	SAND; same as above.
120-			G	SAND; same as above.

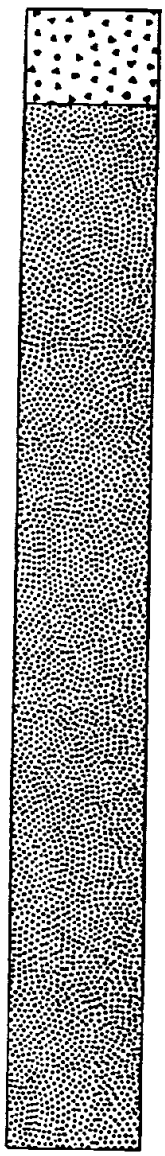
itor Well B was grouted from 344 ft to the surface with 7 yds.3 of Portland I neat cement.

ST = Shelby tube; SS = split-spoon; G = grab.

Log of Drilling Operations
Monitor Well #B

Location Site 5B Landfill No. 5
Log Recorded by T.K. Walters/W. Boettner
Type Drill Rig and Operator Failing 1500 Air/mud Rotary-Winnek, Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 25 November 1984 and end Nov. 30 1984 of drilling operation
Sampling Interval (Estimated) 5(ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken *	Lithologic Description
120-			G	CALICHE; medium-coarse, cemented with calcite moderately sorted, subangular.
125-			G	SAND; same as above.
130-			G	SAND; brown, fine-medium grained, poorly sorted, cemented, 10% lithic fragments.
135			G	SAND; same as above.
0-			G	SAND; slightly cemented, fine-medium grain, calcite 25%.
145-			G	SAND; medium grained, moderately sorted, with 10% lithic fragments.
150-			G	SAND; silty, fine-medium grained with 10% clay.
155-			G	SAND; fine-medium grained, well sorted, decrease in clay.
160-			G	SAND; medium grained, angular, poorly sorted.
165-			G	SAND; brown, fine-medium grained, slightly cemented.
170-			G	SAND; fine-medium grained, moderately sorted, subrounded, lithics 10%.
175-			G	SAND; buff-brown, fine-medium grained, slightly cemented with calcite, calcite nodules 10-15%.
180-				

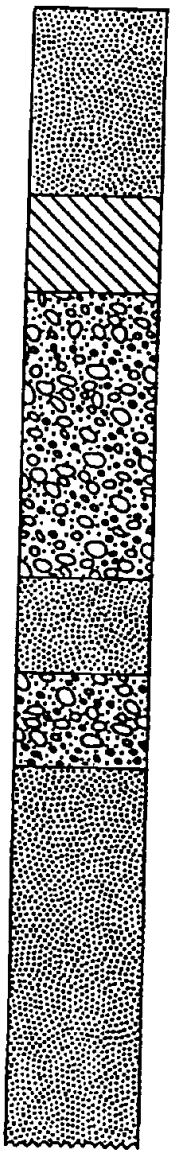
Monitor Well B was grouted from 344 ft to the surface with 7 yds.3 of Portland I neat cement.

ST = Shelby tube; SS = split-spoon; G = grab.

Log of Drilling Operations
Monitor Well #B

Location Site 5B Landfill No. 5
Log Recorded by T.K. Walters/W. Boettner
Type Drill Rig and Operator Failing 1500 Air/mud Rotary-Winnek, Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 25 November 1984 and end 30 Nov. 1984 of drilling operation
Sampling Interval (Estimated) 5(ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken*	Lithologic Description
180-				
			G	SAND; fine-medium grained, moderately sorted, subrounded, unconsolidated.
185-				
			G	SAND; red-brown, extremely hard, cemented, silt light brown clasts.
190-				
			G	CLAY; silty, much finer than above, poor plasticity, dark brown.
195-				
			G	SAND AND GRAVEL; coarse, cemented, poorly sorted, lightly calcareous, subangular, lithic 25%.
			G	GRAVEL; pebble size, angular, unconsolidated chert fragments, and other lithics 35%.
205-				
			G	GRAVEL; cobble size, high energy, angular-subrounded, slightly cemented by calcite, loosely consolidated, with lithic fragments.
210-				
			G	SAND; coarse grain with fine silty clay matrix, poorly sorted.
215-				
			G	SAND AND GRAVEL; poorly sorted, unconsolidated, subrounded, chert fragments, dull grey.
220-				
			G	SAND; with minor gravel, silty brown, poorly sorted, unconsolidated-semi cemented.
225-				
			G	SAND; medium-coarse grain, unconsolidated, poorly sorted.
230-				
			G	SAND; medium-coarse grain, unconsolidated, light brown, fairly well sorted.
235-				
			G	SAND; light brown, medium-coarse grain, subrounded, moderately sorted, slightly calcareous.
240-				

Monitor Well B was grouted from 344 ft to the surface with 7 yds.3 of Portland neat cement.

*ST = Shelby tube; SS = split-spoon; G = grab.

Log of Drilling Operations
Monitor Well #B

cation Site 5B Landfill No. 5
Log Recorded by T.K. Walters/W. Boettner
Type Drill Rig and Operator Failing 1500 Air/mud Rotary-Winnek, Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 25 November 1984 and end 30 Nov. 1985 of drilling operation
Sampling Interval (Estimated) 5(ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken*	Lithologic Description
240-				
			G	SAND; silty with clay matrix, calcite nodules 30%, much more clay than above unit.
245-				
			G	SAND; tan-brown, fine-medium grain, moderately well sorted, subangular, quartzose.
250-				
			G	SAND; same as above.
255-				
			G	SAND; buff, cemented with calcite, silty, fine grain, poorly sorted, semi-consolidated.
			G	SAND; light-brown, fine-medium grain, poorly sorted, angular, with calcite nodules, clay stringers.
265-				
			G	SAND; brown, fine-medium grain, unconsolidated with clay stringers.
270-				
			G	SAND; medium-coarse grain, moderately sorted, quartzose, sub-rounded.
275-				
			G	SAND; same as above unit.
280-				
			G	SAND; medium grained, subangular, moderately sorted.
285-				
			G	SAND; medium grain, subangular quartz, moderately sorted.
290-				
			G	SAND; fine grained, with clay matrix, quartzose, subangular.
295-				
			G	SAND; fine-coarse, poorly sorted, unconsolidated, subangular.
300-				

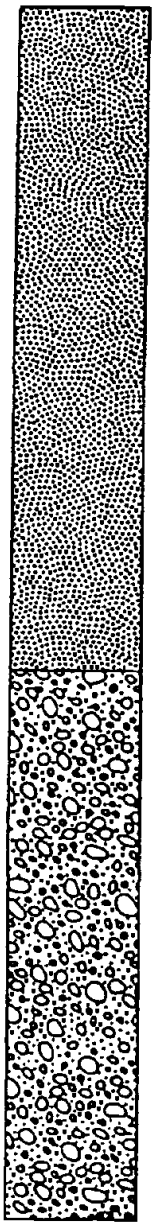
tor Well B was grouted from 344 ft to the surface with 7 yds.3 of Portland I neat cement.

ST = Shelby tube; SS = split-spoon; G = grab.

Log of Drilling Operations
Monitor Well #B

-ation Site 5B Landfill No.5
Log Recorded by T.K. Walters/W. Boettner
Type Drill Rig and Operator Failing 1500
Air/mud Rotary-Winnek, Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 25 November 1984 and end
30 Nov. 1985 of drilling operation
Sampling Interval (Estimated) 5(ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken *	Lithologic Description
300-			G	SAND; fine-medium, cemented, brown, drilling slow, bit skating occasionally.
305-			G	SAND; fine-medium, mostly quartz, plagioclase and shale.
310-			G	SAND; medium grained with minor lithic fragments.
315-			G	SAND; same as above unit.
			G	SAND; same as above unit.
325-			G	SAND; pebbles and chips of larger angular gravel, hard drilling.
330-			G	SAND AND SILT; minor gravel, caliche (calcrete?).
335-			G	SAND; with gravel, calcrete cement, resembling caliche, no water.
340-			G	SAND AND GRAVEL; angular, hard drilling.
345-			G	SAND; with gravel, drilling much faster.
350-			G	GRAVEL; hard cemented, quartzose, with olivine, lithic fragments, shale and some calcite matrix .
355-			G	GRAVEL; hard, cemented, same as above unit.
360-			G	GRAVEL; hard cemented, same as above unit.

...tor Well B was grouted from 344 ft to the surface with 7 yds.3 of Portland Type I neat cement.

ST = Shelby tube; SS = split-spoon; G = grab.

MONITORING WELL IDENTIFICATION REPORT

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS AND RADIOACTIVE MATERIALS BUREAU
525 CAMINO DE LOS MARQUEZ, SUITE 4
SANTA FE, NEW MEXICO 87502

FACILITY NAME Cannon Air Force Base

EPA I.D. NUMBER NM 7572124454

COUNTY Curry

WELL NUMBER C -- Landfill-5

WELL LOCATION (LONGITUDE) 103° 18' 08.3"

WELL LOCATION (LATITUDE) 34° 21' 56.8"

AQUIFER NAME Ogalalla

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE 01-11-1985

DRILLING METHOD HYDRT

INNER CASING DIAMETER 4 inches

BOREHOLE DIAMETER 8 inches

CASING MATERIAL PVC

METHOD OF DEVELOPMENT AIRFT

ELEV BOTTOM OF BOREHOLE 3905.90 feet above MSL

ELEV BOTTOM OF WELL CASING 3905.90 feet above MSL

ELEV BOTTOM OF SCREENED INT 3905.90 feet above MSL

ELEV OF TOP OF SCREENED INT 3920.90 feet above MSL

SURVEYED ELEV OF CASING TOP 4267.90 feet above MSL

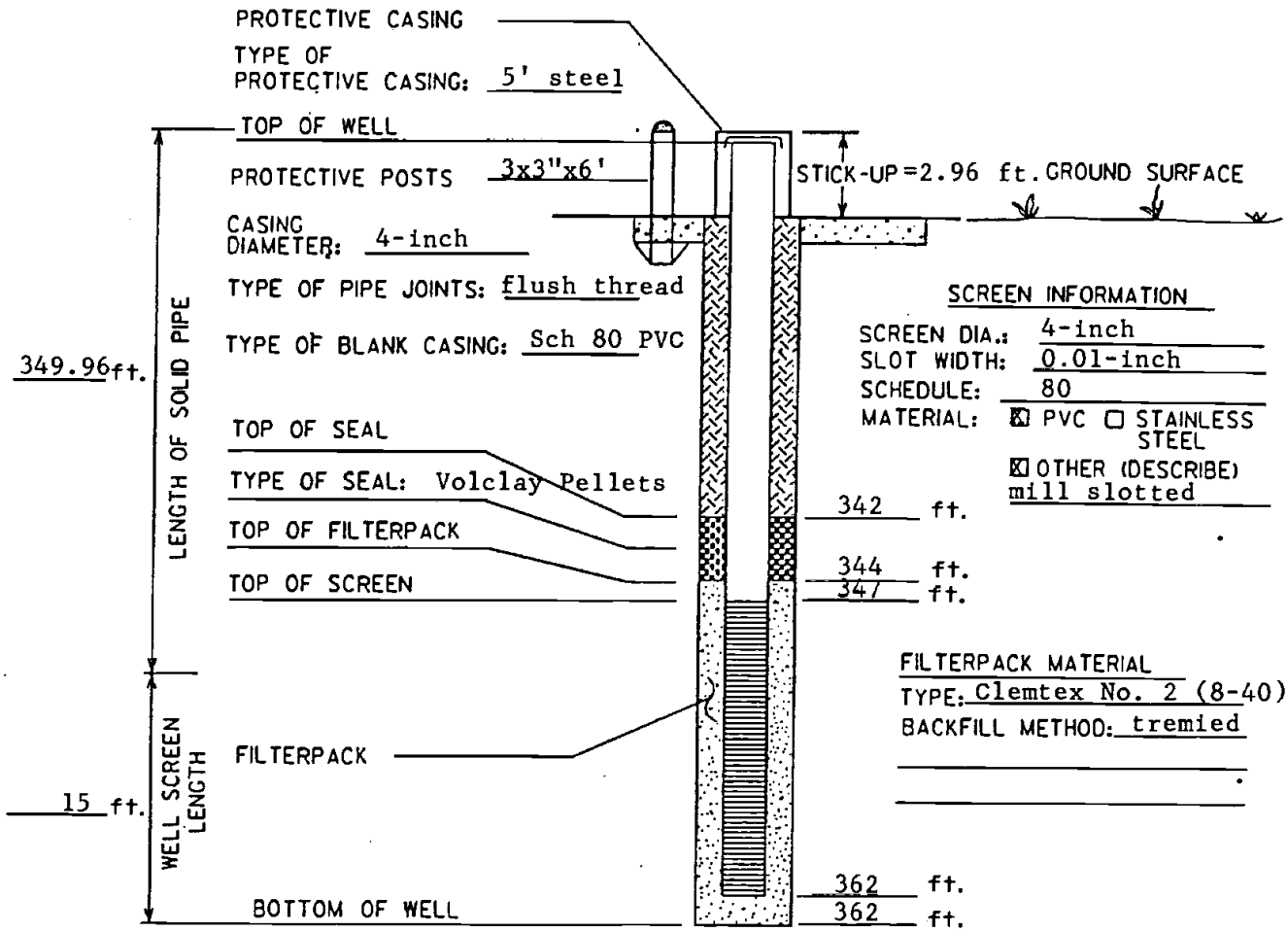
DATE OF REPORT 09-15-2003 SIGNATURE Fredrick E. Gebhardt

NAME (TYPED) Fredrick E. Gebhardt

ELEVATION GROUND WATER			PROJECT CANNON SIR FORCE BASE -- LANDFILL NO. 5
DATE INSTALLED	STARTED 1-9-85	COMPLETED 1-11-85	LOCATION (Coordinates or Station)
ELEVATION TOP OF HOLE 4264.94 ft. MSL			SIGNATURE OF INSPECTOR T. K. Walters (Radian Corporation)
TOTAL DEPTH OF HOLE 362 feet			HOLE NO. Monitoring Well C

MONITORING WELL CONSTRUCTION DIAGRAM

(ALL MEASUREMENTS FROM GROUND SURFACE)



SCREEN INFORMATION

SCREEN DIA.: 4-inch
SLOT WIDTH: 0.01-inch
SCHEDULE: 80
MATERIAL: ☒ PVC ☐ STAINLESS STEEL
☒ OTHER (DESCRIBE) mill slotted

FILTERPACK MATERIAL

TYPE: Clemtex No. 2 (8-40)
BACKFILL METHOD: tremied

WELL DEVELOPMENT

METHOD: Air Lifted
TIME SPENT DEVELOPING: 1 hr. 30 minutes
VOLUME OF WATER REMOVED: 270 gallons
VOLUME OF WATER ADDED: unknown
DESCRIPTION OF PREDEVELOPMENT WATER: unknown
DESCRIPTION OF POST DEVELOPMENT WATER: no fines when surged and backwashed

WATER LEVEL SUMMARY

WATER LEVEL MEASUREMENTS
DATE/TIME/LEVEL 1-11-85/1300/250'
1-11-85/1430/267'

DEPTH FROM TOP CASING AFTER DEVELOPMENT: 362 feet

RADIAN CORPORATION

Completion Log: Sheet 1 of 2

Well No. Monitor Well C
Location Landfill No. 5

Project Cannon AFB IRP
Log Recorded by T.K. Walters

Construction

Construction Started January 9, 1985
Completed January 11, 1985
Total Depth Drilled (ft) 362
Hole Diameter 8-inch
Drilling Method mud rotary
Problems encountered during drilling/completion none

Water source for drilling and completion procedures Base potable water well

Sampling

Number, type and disposition of samples collected water collected after well development

Sample interval (ft-ft) 362', top of Ogallala Formation

Storage and/or preservation method(s) 4°C, shipped overnight to OEHL/RAS

Materials

Casing type Schedule 80 PVC
Diameter 4 inch
Top of well casing (ft-AGL/BGL) 2.96/362
Elevation (ft-msl) 4267.90
Depth of casing (ft) 362
Screen type mill slotted
Diameter 4 inch (internal)
Slot size 0.01 inch
Screen interval (ft-ft) 362-347

Type(s) of glue used to join casing None - threaded flush joint couplings
Type of gravel/sand pack used Clemtex No. 2 (8-40 mesh)
Amount of gravel pack used 5 bags
Grain size distribution of gravel pack Retained #8 (2.0%), #16 (51.2%), #20 (62.8%)[1]
Lithology of gravel pack Mostly silica (94%)
Source (company and quarry/pit) Clemtex, Inc., Houston, Texas

Interval of gravel pack (ft-ft) 362 - 344
Interval of bentonite seal (ft-ft) 344 - 342
Interval of grouting (ft-ft) 342 - Land Surface

Comments

Type of bentonite - Pellets (Volclay)
Type of grout - Portland Type 1 (neat cement)
[1] #30 (78.4%), #40 (91.2%), #50 (98.9%), #100 (100.0%)

Description of Security Measures

N/A

Padlock ID No. N/A
Location of key(s) Cannon AFB

RADIAN CORPORATION

Well Completion Log: Sheet 2 of 2 (Development) Well C (continued)

:velopment started 11 January 1985 Development ended 11 January 1985
ıtic level of water before 250 (ft) and after 267 (ft) development
.suring point (MP) description top of steel casing

MP Height 2.96 (ft) Elevation 4267.90 (ft)
Quantity of water discharged during development 5 well volumes below static water level
Type, size/capacity of pump or bailer used for developmnt air lift development

Depth of open hole inside well (below ground level on measuring point)
Before development 362 (ft) After development 362 (ft)

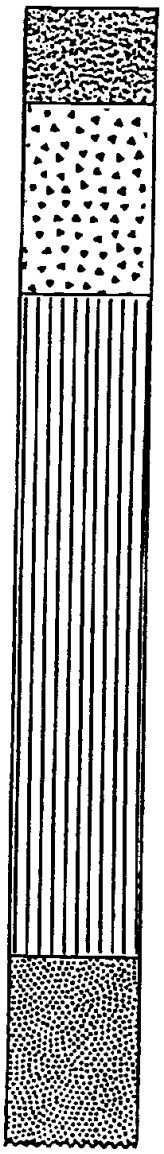
Date/Time	Discharge (GPM/Bail(s)) Note SWL start/End.(1)		Field Measurements Temperature	Conductivity	pH	Remarks
1/24/85	1300 hrs	3 gpm	18.7°	725	7.15	
	1400 hrs		18.7°	740	7.2	
	1430 hrs		18.7°	740	7.2	

NOTE: (1) Depth measurements made by Steel Tape (ST); Rope and Bailer (R/B) and Electric Line (EL).
(2) Temperature in degrees celsius.
(3) Conductivity in micromhos/centimeter at field temperature.

Log of Drilling Operations
Monitor Well #C

Location Site 5, Landfill No. 5, Cannon AFB
Log Recorded by T.K. Walters
Type Drill Rig and Operator Failing 1500 Air/Mud Rotary Rig-Winnek, Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 9 Jan. 1985 and end 10 Jan. 1985 of drilling operation
Sampling Interval (Estimated) 5 (ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken*	Lithologic Description
0–			G	TOPSOIL; dark red, loam.
5–			G	CALICHE; hard, contact at 6'.
10–			G	CALICHE; with silt, buff - slightly cemented.
15–			G	SILT; buff, with caliche, silt is cemented, hard chert streak 18'-19'.
20–			G	SILT; brown, slight consolidated, caliche nodules.
25–			G	SILT; buff, fine grained cemented with calcite, chert pebbles 5%.
30–			G	SILT; buff white, slightly cemented with clay, caliche nodules 5%.
35–			G	SILT; with caliche, cemented, fine grained.
40–			G	SILT; sandy, brown with clay, 10% caliche, loosely consolidated.
45–			G	SILT; sandy, light brown, loosely consolidated.
50–			G	SAND; silty, poorly sorted, cemented by calcite, caliche nodules present.
55–			G	SAND; silty, with caliche nodules, sand portion poorly sorted, quartzose.
60–				

Monitor Well C was grouted from 344 ft to the surface with 7 1/2 yds.^{3} of Portland Type I neat cement.

*ST = Shelby tube; SS = split-spoon; G = grab.

Log of Drilling Operations
Monitor Well #C

Location Site 5, Landfill No. 5, Cannon AFB
Log Recorded by T.K. Walters
Type Drill Rig and Operator Failing 1500 Air/Mud Rotary Rig-Winnek,Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 9 Jan. 1985 and end 10 Jan. 1985 of drilling operation
Sampling Interval (Estimated) 5 (ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken*	Lithologic Description
60-			G	SAND; fine, medium grained, poorly sorted, consolidated with caliche.
70-			G	SAND; silty brown, consolidated, fairly well sorted, cemented with caliche.
75-			G	SAND; brown, consolidated, poorly sorted, cemented by calcite.
80-			G	SAND; Brown, semi-consolidated, poorly sorted cemented by calcite.
85-			G	SAND; silty, brown, poorly sorted, loosely loosely consolidated fine to medium grained.
90-			G	SILT; sandy, brown, unconsolidated, angular grains, poorly sorted.
95-			G	SAND; loosely cemented, poorly sorted, fine-medium grained, with fine medium cemented zones.
100-			G	SAND; unconsolidated fine-medium grained, poorly sorted with caliche "float", lithics 10%.
105-			G	SAND; fine grained, buff white, hard cemented with calcite.
110-			G	SAND; fine medium grained, cemented, quartzose, clear, poorly sorted with calcite matrix.
115-			G	SAND; fine - medium grained cemented, poorly sorted, lithics 15%, clear, quartzose, angular, calcite matrix.
120-				

Monitor Well C was grouted from 344 ft to the surface with 7 1/2 yds.^{3} of Portland Type I neat cement.

*T = Shelby tube; SS = split-spoon; G = grab.

Log of Drilling Operations
Monitor Well #C

Location Site 5, Landfill No. 5, Cannon AFB
Log Recorded by T.K. Walters
Type Drill Rig and Operator Failing 1500 Air/Mud Rotary Rig-Winnek,Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 9 Jan. 1985 and end 10 Jan. 1985 of drilling operation
Sampling Interval (Estimated) 5 (ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken*	Lithologic Description
120-			G	SAND; fine grained, unconsolidated, well-sorted.
125-			G	SAND; fine - medium grained, loosely consolidated, poorly sorted.
130-			G	SAND; fine - medium grained, poorly sorted, clear quartz, angular.
135-			G	SAND; medium grained, moderately sorted, cemented, grains cemented by calcite.
140-			G	SAND; silty, fine - medium grained, poorly sorted cemented.
145-			G	SAND; fine grained, well sorted, unconsolidated.
150-			G	SAND; brown, cemented with calcite, lithics 15%, quartz, subrounded, moderately sorted.
155-			G	SAND; brown, cemented with calcite, quartz grains well sorted, subrounded.
160-			G	SAND; silty, loosely consolidated, poorly sorted with 10% lithics.
165-			G	SAND; silty, loosely consolidated, poorly sorted with 10% lithics.
170-			G	SAND; silty, poorly sorted, loosely consolidated.
175-			G	SAND; silty, fine-medium grained, cemented by calcite, moderately sorted, subrounded quartz.
180-				

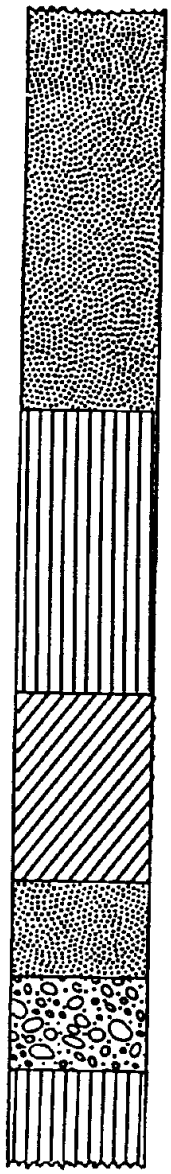
Monitor Well C was grouted from 344 ft(TD) to the surface with 7 1/2 yds.3 of Portland Type I neat cement.

*ST = Shelby tube; SS = split-spoon; G = grab.

Log of Drilling Operations
Monitor Well #C

Location Site 5, Landfill No. 5, Cannon AFB
Log Recorded by T.K. Walters
Type Drill Rig and Operator Failing 1500 Air/Mud Rotary Rig-Winnek,Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 9 Jan. 1985 and end 10 Jan. 1985 of drilling operation
Sampling Interval (Estimated) 5 (ft)



Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken*	Lithologic Description
180-			G	SAND; silty, fine grained, cemented, similar to above unit.
185-			G	SAND; silty, fine-medium, unconsolidated.
190-			G	SAND; fine-medium grained, silty, unconsolidated, poorly sorted.
195-			G	SAND; similar to above unit.
200-			G	SILT; brown, unconsolidated, little sand, sand, quartz, unconsolidated, poorly sorted.
205-			G	SILT; brown, unconsolidated, poorly cemented.
210-			G	SILT; brown with caliche clasts, and 10% sand, fine, moderately well sorted, subrounded.
215-			G	CLAY; green, with red oxidized sand clasts and fragments of grey clay and silt also.
220-			G	CLAY; silty, green, with medium grained sand, angular, lithics 10%.
225-			G	SAND; coarse, with minor gravel, poorly sorted angular, lithics 30%.
230-			G	GRAVEL; sandy with caliche nodules, unconsolidated, poorly sorted.
235-			G	SILT; buff-white, with white clay clasts, fine grained, well sorted, unconsolidated.
240-				

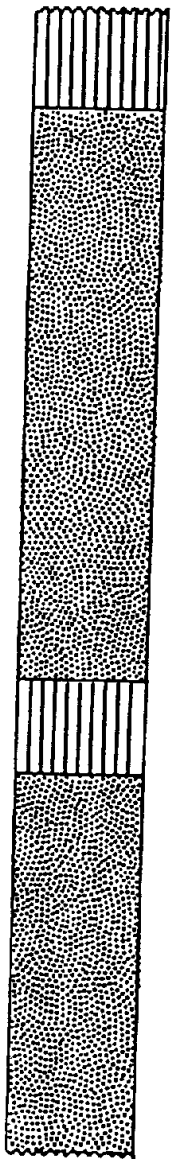
Monitor Well C was grouted from 344 ft to the surface with 7 1/2 yds.^{3} of Portland Type I neat cement.

*ST = Shelby tube; SS = split-spoon; G = grab.

Log of Drilling Operations
Monitor Well #C

Location Site 5, Landfill No. 5, Cannon AFB
Log Recorded by T.K. Walters
Type Drill Rig and Operator Failing 1500 Air/Mud Rotary Rig-Winnek,Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 9 Jan. 1985 and end 10 Jan. 1985 of drilling operation
Sampling Interval (Estimated) 5 (ft)



Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken*	Lithologic Description
240–			G	SILT; sandy, brown, poorly sorted, unconsolidated fine grained.
245–			G	SAND; silty brown, poorly sorted, unconsolidated, with caliche nodules.
250–			G	SAND; medium grained, cemented, well sorted.
255–			G	SAND; buff-white, consolidated, fine medium grained, moderately well sorted, with 10% lithics.
260–			G	SAND; white, loosely consolidated, fine-medium sorted, subrounded.
265–			G	SILT; sandy, brown, loosely consolidated fine-medium, grained, poorly sorted, with caliche nodules.
270–			G	SAND; medium-coarse grained, angular, unconsolidated poorly sorted, with 15% black lithics.
275–			G	SILT; red-brown, fine, unconsolidated slightly cemented, with minor sand.
280–			G	SAND; red-brown, silty, poorly sorted, unconsolidated, sand, angular, clear.
285–			G	SAND; coarse, with minor gravel, unconsolidated, poorly sorted, angular.
290–			G	SAND; silty, fine-coarse, red-brown, unconsolidated, poorly sorted, sub-angular, 10% lithics.
295–			G	SAND; medium-coarse, with red-brown silty zones, loosely consolidated, 10% lithics.
300–				

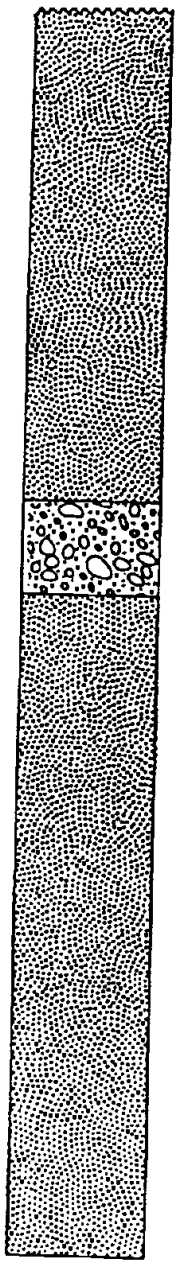
Monitor Well C was grouted from 344 ft to the surface with 7 1/2 yds.3 of Portland Type I neat cement.

*ST = Shelby tube; SS = split-spoon; G = grab.

Log of Drilling Operations
Monitor Well #C

Location Site 5, Landfill No. 5, Cannon AFB
Log Recorded by T.K. Walters
Type Drill Rig and Operator Failing 1500 Air/Mud Rotary Rig-Winnek,Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 9 Jan. 1985 and end 10 Jan. 1985 of drilling operation
Sampling Interval (Estimated) 5 (ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken	Lithologic Description
300-				
			G	SAND; silty, cemented, poorly sorted, fine-medium grained, subangular.
305-				
			G	SAND; hard cemented, medium-coarse, 1st hard streak 305'-306', out at 306', clay matrix.
310-				
			G	SAND; medium-very coarse, unconsolidated, poorly sorted, 30% lithics, angular no matrix.
315-				
			G	SAND; unconsolidated, fine-coarse, angular with 30% lithics, some calcite matrix.
320-				
			G	SAND; medium-coarse, unconsolidated, with 30% lithics, subangular, gravel 10%.
325-				
			G	SAND/GRAVEL; loosely cemented, with red silt, also hard, drilling fast, color olive-brown.
330-				
			G	SAND; medium-coarse, unconsolidated, subangular, with 30% lithics, silt 20%, color olive brown.
335-				
			G	SAND; oxidized, highly weathered, with cemented grains, hard, fine-coarse, angular lithics.
340-				
			G	SAND; fine-coarse, and red silt, mottled with green clay clasts, reworked red beds, very hard 332'345'.
345-				
			G	SAND; cemented, confining, conglomerate, extremely hard, out of hard zone 349'.
350-				
			G	SAND; coarse, with gravel, unconsolidated with clay stringers grey and red.
355-				
			G	SAND; medium-coarse, unconsolidated, poorly sorted, with 20% clay, brown, hard cemented streak 6".
360-				
			G	SAND; hard, cemented, poorly sorted, angular very slow drilling.
362-				

Monitor Well C was grouted from 344 ft to the surface using 7 1/2 yds.^{3} of Portland Type I neat cement.
*ST = Shelby tube; SS = split-spoon; G = grab.

MONITORING WELL IDENTIFICATION REPORT

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS AND RADIOACTIVE MATERIALS BUREAU
525 CAMINO DE LOS MARQUEZ, SUITE 4
SANTA FE, NEW MEXICO 87502

FACILITY NAME Cannon Air Force Base

EPA I.D. NUMBER NM 7572124454

COUNTY Curry

WELL NUMBER D -- Landfill-5

WELL LOCATION (LONGITUDE) 103 ° 18 ' 17 "

WELL LOCATION (LATITUDE) 34 ° 21 ' 57 "

AQUIFER NAME Ogallala

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE 12-16-1984

DRILLING METHOD HYDRT

INNER CASING DIAMETER 4 inches

BOREHOLE DIAMETER 8 inches

CASING MATERIAL PVC

METHOD OF DEVELOPMENT AIRFT

ELEV BOTTOM OF BOREHOLE 3909.15 feet above MSL

ELEV BOTTOM OF WELL CASING 3909.15 feet above MSL

ELEV BOTTOM OF SCREENED INT 3909.15 feet above MSL

ELEV OF TOP OF SCREENED INT 3924.15 feet above MSL

SURVEYED ELEV OF CASING TOP 4265.90 feet above MSL

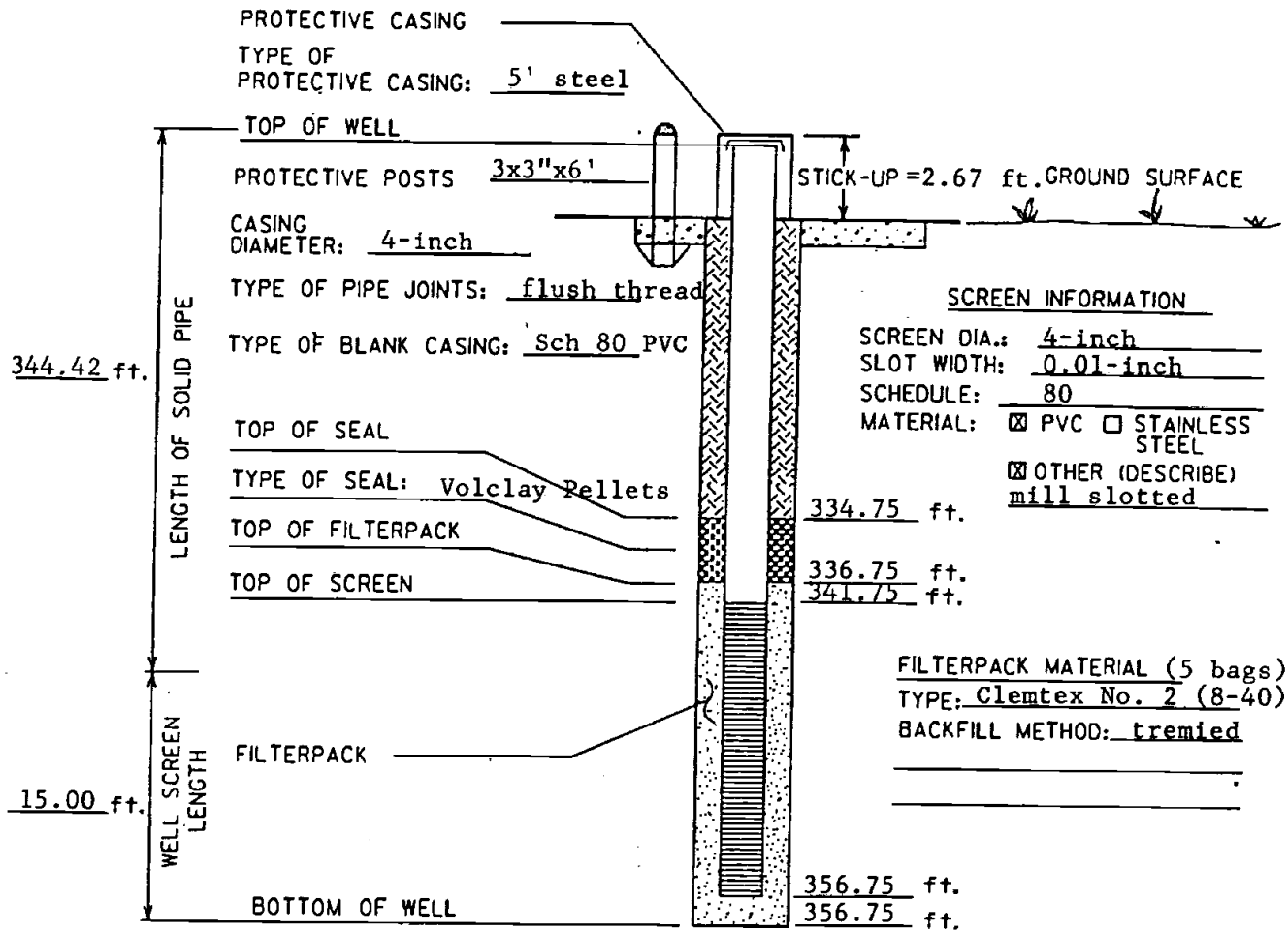
DATE OF REPORT 09-15-2003 SIGNATURE Fredrick E. Gebhardt

NAME (TYPED) Fredrick E. Gebhardt

ELEVATION GROUND WATER			PROJECT CANNON AIR FORCE BASE -- LANDFILL NO. 5
DATE INSTALLED	STARTED 12-10-84	COMPLETED 12-16-84	LOCATION (Coordinates or Station)
ELEVATION TOP OF HOLE 4263.23 ft. MSL			SIGNATURE OF INSPECTOR T. K. Walters (Radian Corporation)
TOTAL DEPTH OF HOLE 356.75 feet			HOLE NO. Monitoring Well D

MONITORING WELL CONSTRUCTION DIAGRAM

(ALL MEASUREMENTS FROM GROUND SURFACE)



SCREEN INFORMATION

SCREEN DIA.: 4-inch
SLOT WIDTH: 0.01-inch
SCHEDULE: 80
MATERIAL: ☒ PVC ☐ STAINLESS STEEL
☒ OTHER (DESCRIBE) mill slotted

FILTERPACK MATERIAL (5 bags)
TYPE: Clemtex No. 2 (8-40)
BACKFILL METHOD: tremied

WELL DEVELOPMENT

METHOD: Air Lifted
TIME SPENT DEVELOPING: 2 hrs.
VOLUME OF WATER REMOVED: 360 gallons
VOLUME OF WATER ADDED: unknown
DESCRIPTION OF PREDEVELOPMENT WATER: unknown

DESCRIPTION OF POST DEVELOPMENT WATER: no fines when surged and backwashed

WATER LEVEL SUMMARY

WATER LEVEL MEASUREMENTS
DATE/TIME/LEVEL 1-25-85/0730/265'
1-25-85/0930/265.2'

DEPTH FROM TOP CASING AFTER DEVELOPMENT: 356.75 ft.

RADIAN CORPORATION

Completion Log: Sheet 1 of 2

Well No. Monitor Well D
Location Landfill No. 5

Project Cannon AFB IRP
Log Recorded by T.K. Walters

Construction

Construction Started December 10, 1984 Completed December 16, 1984
Total Depth Drilled (ft) 356.75 Hole Diameter 8-inch
Drilling Method mud rotary
Problems encountered during drilling/completion none

Water source for drilling and completion procedures Base potable water supply well

Sampling

Number, type and disposition of samples collected water, collected after well development

Sample interval (ft-ft) 356' in top portion of Ogallala Aquifer

Storage and/or preservation method(s) 4°C, shipped overnight delivery OEHL/RAS

Materials

Casing type Schedule 80 PVC Diameter 4 inch
Top of well casing (ft-AGL/BGL) 2.67/356.75 Elevation (ft-msl) 4265.90
Depth of casing (ft) 356.75
Screen type mill slotted sch. 80 PVC Diameter 4 inch (internal)
Slot size 0.01 inch Screen interval (ft-ft) 356.75-341.

Type(s) of glue used to join casing None - threaded flush joint couplings
Type of gravel/sand pack used Clemtex No. 2 (8-40 mesh)
Amount of gravel pack used 5 bags
Grain size distribution of gravel pack Retained #8 (2.0%), #16 (51.2%), #20 (62.8%)[1]
Lithology of gravel pack Mostly silica (94%)
Source (company and quarry/pit) Clemtex, Inc., Houston, Texas

Interval of gravel pack (ft-ft) 356.75 - 336.75
Interval of bentonite seal (ft-ft) 336.75 - 334.75
Interval of grouting (ft-ft) 334.75 - land surface

Comments

Type of bentonite - Pellets (Volclay)
Type of grout - Portland Type 1 (neat cement)
[1] #30 (78.4%), #40 (91.2%), #50 (98.9%), #100 (100.0%)

Description of Security Measures

N/A

Padlock ID No. N/A Location of key(s) Cannon AFB

RADIAN CORPORATION

Well Completion Log: Sheet 2 of 2 (Development) Well D (continued)

Development started December 16, 1984 Development ended December 16, 1984
Static level of water before 265 (ft) and after 265.2 (ft) development
Measuring point (MP) description top of steel casing

MP Height 2.67 (ft) Elevation 4265.90 (ft)
Quantity of water discharged during development 5 well volumes, below static water level
Type, size/capacity of pump or bailer used for developmnt air lift development

Depth of open hole inside well (below ground level on measuring point)
Before development 356.75 (ft) After development 356.75 (ft)

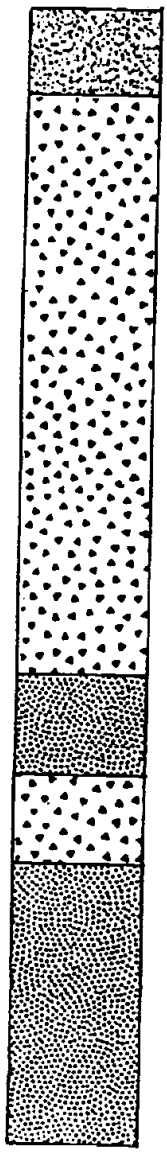
Date/Time	Discharge (GPM/Bail(s)) Note SWL start/End.(1)		Field Measurements Temperature	Conductivity	pH	Remarks
1/25/85	0730	3 gpm	19.0°	720	8.25	
	0800		18.3°	725	8.37	
	0900		18.2°	720	8.10	
	0930		18.3°	720	8.20	

NOTE: (1) Depth measurements made by Steel Tape (ST); Rope and Bailer (R/B) and Electric Line (EL).
(2) Temperature in degrees celsius.
(3) Conductivity in micromhos/centimeter at field temperature.

Log of Drilling Operations
Monitor Well #D

cation Cannon AFB, Site 5 Landfill No. 5
Log Recorded by T.K. Walters
Type Drill Rig and Operator Failing 1500
Air/mud rotary-Winnek,Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 10 December 1984 and end 16 Dec. 1984 of drilling operation
Sampling Interval (Estimated) 5(ft)



Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken*	Lithologic Description
0-			G	TOPSOIL; red, clayey with roots and organic matter.
5-			G	CALICHE; 4' with clayey silt, light grey.
10-			G	CALICHE; with silty sand.
15-			G	CALICHE; with silt, some fine sand (white nodules 19').
0-			G	CALICHE; extremely hard, silty, interbedded with fine sand.
25-			G	CALICHE; with sand, caliche nodules extremely hard, sand is cemented.
30-			G	CALICHE; with fine sand, caliche 80%, sand 20%.
35-			G	SAND; red-brown, cemented, medium-grained, oxidized, with bone grey chert and caliche fragments.
40-			G	CALICHE; with chert, buff grey, with minor sand, medium grained.
45-			G	SAND; buff grey, cemented, fine-medium grained, moderate-well sorted, grading to light tan clayey sand, cemented.
50-			G	SAND; light grey, extremely well sorted, cemented, hard.
55-			G	SAND; bone white, cemented, interbedded with red-brown, cemented sand.
60-				

or Well D was grouted from 338 ft to the surface with 5 yds.^{3} of Portland I neat cement.

*ST = Shelby tube; SS = split-spoon; G = grab.

Log of Drilling Operations
Monitor Well #D

cation Cannon AFB, Site 5 Landfill No. 5
Log Recorded by T.K. Walters
Type Drill Rig and Operator Failing 1500 Air/mud rotary-Winnek,Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 10 Dec. 1984 and end 16 Dec. 1984 of drilling operation
Sampling Interval (Estimated) 5(ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken*	Lithologic Description
60-			G	SAND; cemented, fine-medium grained, extremely well sorted, buff white.
65-			G	SAND; light brown, poorly sorted, loosely consolidated, fine-medium grained, subangular, friable, red volcanic fragments.
70-			G	SAND; brown, poorly sorted, uncemented, fine to medium grained, subangular, 10% clay.
75-			G	SAND; quartzose, fine-medium grain, well-sorted with 10% red lithic fragments, no clay or calcite cement.
80-			G	SAND; same as above, slightly finer grained.
			G	SAND; brown, fine-medium grained, very well well sorted, subrounded quartz, clear.
90-			G	SAND; brown, fine-medium grain, poorly sorted, lithics 10%, quartz well-rounded.
95-			G	SAND; brown, medium grained, moderately sorted, quartzose, subrounded, quartz (blue-clear), 10% volcanic fragments.
100-			G	SAND; brown, fine-medium, well sorted, finer than above unit.
105-			G	SAND; quartzose, brown, fine-medium grain, caliche stringer 1' thick.
110-			G	SAND; brown, fine-medium grained slightly cemented, trace of calcite cement.
115-			G	SAND; buff-white, fine grain, cemented with calcite, moderately sorted, hard.
120-				

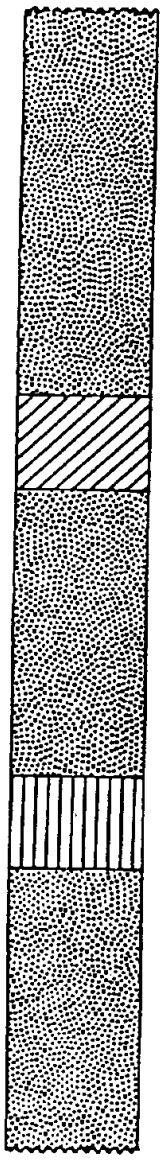
itor Well D was grouted from 338 ft to the surface with 5 yds.^{3} of land Type I neat cement.

*ST = Shelby tube; SS = split-spoon; G = grab.

Log of Drilling Operations
Monitor Well #D

Location Cannon AFB, Site 5 Landfill No. 5
Log Recorded by T.K. Walters
Type Drill Rig and Operator Failing 1500
Air/mud rotary-Winnek,Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 10 December 1984 and end
16 Dec. 1984 of drilling operation
Sampling Interval (Estimated) 5(ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken*	Lithologic Description
120-			G	SAND; brown, unconsolidated, fine-medium grained, quartzose.
125-			G	SAND; Fine-medium, quartzose, well sorted, subrounded.
130-			G	SAND; brown, fine-medium quartzose subrounded, unconsolidated.
135-			G	SAND; brown, medium grain, well sorted, subangular, quartz 90%.
40-			G	CLAY; silty, with sand, fine.
145-			G	SAND; silty, fine grained, well sorted with caliche nodules (from above).
150-			G	SAND; silty, fine, well sorted, subrounded, quartz 90%.
155-			G	SAND; silty, fine grained, well sorted, quartzose.
160-			G	SILT; sandy, fine grained, quartzose, well sorted.
165-			G	SAND; brown, fine grained, very well sorted, well-rounded.
170-			G	SAND; brown, medium grained, well sorted.
175-			G	SAND; brown, medium grained, very well sorted with 10% black lithic fragments.
180-				

[illegible]or Well D was grouted from 338 ft to the surface with 5 yds.3 of [illegible]land Type I neat cement.

*ST = Shelby tube; SS = split-spoon; G = grab.

Log of Drilling Operations
Monitor Well #D

cation Cannon AFB, Site 5 Landfill No. 5
Log Recorded by T.K. Walters
Type Drill Rig and Operator Failing 1500 Air/mud rotary-Winnek,Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 10 December 1984 and end 16 Dec. 1984 of drilling operation
Sampling Interval (Estimated) 5(ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken*	Lithologic Description
180-			G	SAND; silty, brown, fine-medium grained, well sorted, subrounded.
185-			G	SAND; brown, silty, very fine grained, well sorted, unconsolidated, finer than above.
190-			G	SAND; brown, medium grained, moderately sorted, coarser than above unit, quartz, subangular, clear, 10% lithics.
195-			G	SAND; brown, poorly sorted, fine to medium grained, 10% lithic fragments.
200-			G	SAND; brown, fine-medium grained, very little clay, 10% lithic fragments, black.
205-			G	SAND; brown, unconsolidated, silty, fine-medium grained with caliche layer at 205'-206'.
210-			G	CLAY; yellow regolith, with iron stained clasts.
215-			G	SAND; fine-coarse, poorly sorted, with 25% red and black lithics, unconsolidated gravel 18%.
220-			G	SAND; fine-medium grained, poorly sorted, finer than above unit, unconsolidated, subrounded sand and gravel.
225-			G	SAND; coarse, with 25% gravel, sand is poorly sorted, subangular, quartz is clear and yellow.
230-			G	SAND AND GRAVEL: buff-brown, cemented poorly with calcite, gravel 10%.
235-			G	SAND; buff-brown, fine-medium grained, poorly cemented, calcite matrix, lithics, 5% gravel.
240-				

itor Well D was grouted from 338 ft to the surface with 5 yds.3 of land Type I neat cement.

st = Shelby tube; SS = split-spoon; G = grab.

Log of Drilling Operations
Monitor Well #D

Location Cannon AFB, Site 5 Landfill No. 5
Log Recorded by T.K. Walters
Type Drill Rig and Operator Failing 1500 Air/mud rotary-Winnek,Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 10 December 1984 and end 16 Dec. 1984 of drilling operation
Sampling Interval (Estimated) 5(ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken*	Lithologic Description
240-			G	SAND; buff-brown, cemented, fine-medium grained, poorly sorted.
245-			G	SAND; brown, unconsolidated, medium grained, quartzose.
250-			G	SAND; coarse, unconsolidated, poorly sorted, angular, with 15% lithics, calcite cement.
255-			G	SAND; brown, unconsolidated, poorly sorted, angular with 10% lithics, calcite cement.
60-			G	SAND; fine-medium grained, poorly sorted, subangular, unconsolidated.
265-			G	SAND; brown, medium grained, very well sorted, quartz 95%, clear, rounded.
270-			G	SAND; brown, fine-medium grained, moderately sorted, 15% lithics.
275-			G	SAND; unconsolidated, well sorted, 85% quartz, rounded.
280-			G	SAND; fine-medium grained, unconsolidated, moderately well sorted, quartz 85%.
285-			G	SAND; brown, medium grained, moderately well sorted, 20% lithic fragments.
290-			G	SAND; brown, fine-medium grained, poorly sorted, unconsolidated, subrounded, 20% lithics, caliche clasts 5-10%.
295-			G	SAND; brown, well sorted, medium grained, less dirty than unit above, hard streak at 299'.
300-				

itor Well D was grouted from 338 ft to the surface with 5 yds.^{3} of land Type I neat cement.

*ST = Shelby tube; SS = split-spoon; G = grab.

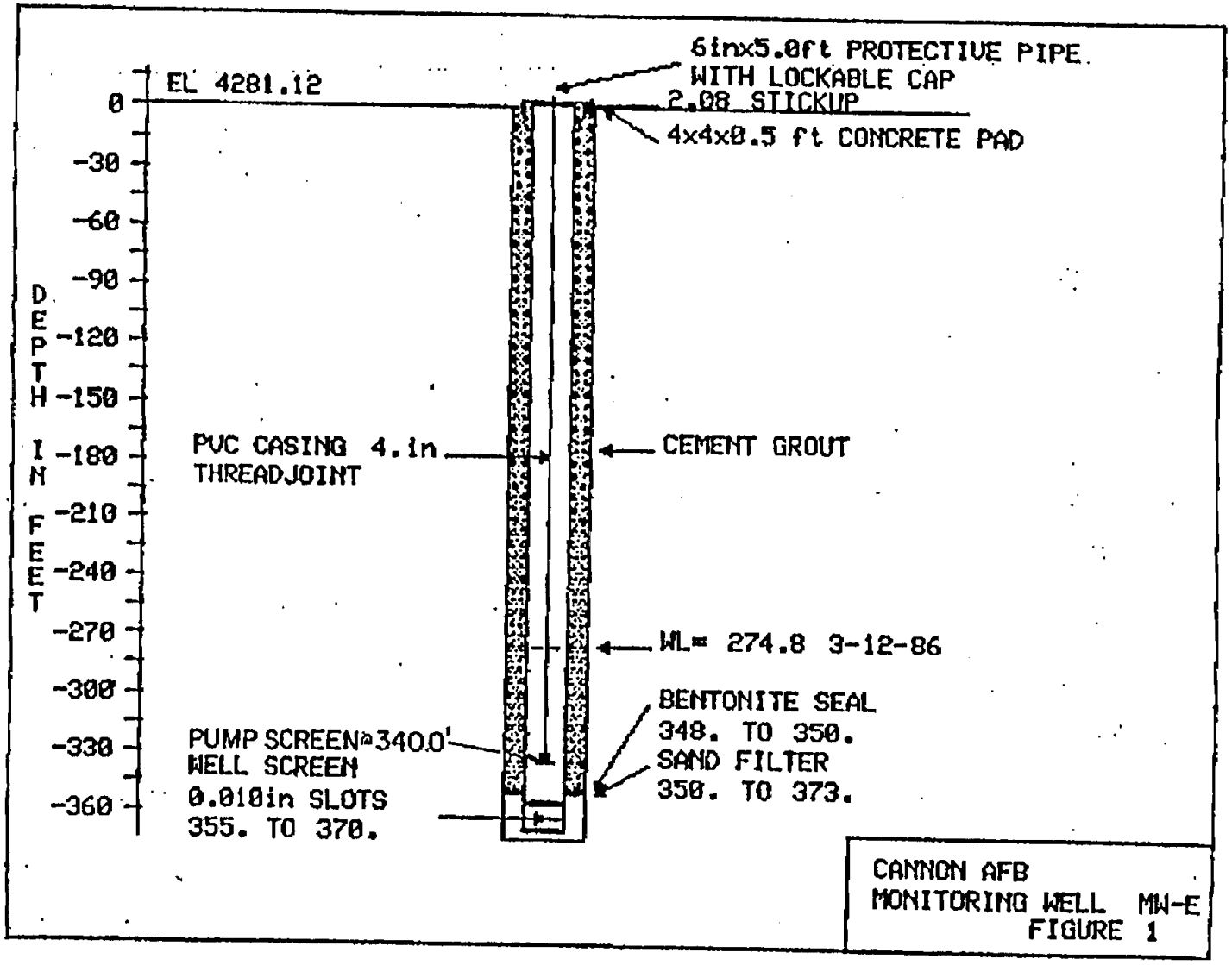
Log of Drilling Operations
Monitor Well #D

Location Cannon AFB, Site 5 Landfill No. 5
Log Recorded by T.K. Walters
Type Drill Rig and Operator Failing 1500 Air/mud rotary-Winnek,Inc.-B Holland

Project Cannon AFB-Phase II Stage I
Beginning 10 December 1984 and end 16 Dec. 1984 of drilling operation
Sampling Interval (Estimated) 5(ft)

Depth (ft)	Graphic Log	Core Sample Interval/ID	Type of Sample Taken*	Lithologic Description
300-			G	SAND; medium-coarse, poorly sorted, unconsolidated with 30% black lithic fragments.
305-			G	SAND; brown, fine grained, well sorted.
310-			G	SAND; fine-medium grained, moderately well sorted, rounded, with 10% lithics.
315-			G	SAND; brown, coarse grain, poorly sorted, subangular with 15% lithics.
320-			G	SAND; brown, fine-medium grain, poorly sorted, subrounded.
325-			G	SAND; dark brown, extremely hard zone at 329', cemented.
330-			G	SAND; very hard sand, fine grain, out of hard zone 333', in again 334'-335'.
335-			G	SAND; medium grain, 335-339' unconsolidated, cemented sand 339-340', confining.
340-			G	SAND; unconsolidated 340-342', fine-medium hard streak 342-344', medium-coarse sand with 15% lithic fragments.
345-			G	SAND; medium grained, fairly unconsolidated, drilling faster than above.
350-			G	SAND; same as above, medium grained, moderately well sorted.
355-			G	SAND; fine-medium grained, moderately well sorted , unconsolidated, hard streak at 359-360'.
360-			G	360-361' out of cemented zone. 361-362' into cemented zone.
365-	COLLAPSE		G	SAND; 362-365' unconsolidated, drilling faster.
367 1/2--			G	SAND: Same as above.

Monitor Well D was grouted from 338 ft to the surface with 5 yds.^{3} of Portland Type I neat cement.



CANNON AFB
MONITORING WELL MW-E
FIGURE 1

MONITORING WELL IDENTIFICATION REPORT

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS AND RADIOACTIVE MATERIALS BUREAU
525 CAMINO DE LOS MARQUEZ, SUITE 4
SANTA FE, NEW MEXICO 87502

FACILITY NAME Cannon Air Force Base

EPA I.D. NUMBER NM 7572124454

COUNTY Curry

WELL NUMBER E -- Sewage Lagoons

WELL LOCATION (LONGITUDE) 103° 18' 24.5"

WELL LOCATION (LATITUDE) 34° 23' 28.8"

AQUIFER NAME Ogalalla

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE 11-17-1985

DRILLING METHOD HYDRT

INNER CASING DIAMETER 4 inches

BOREHOLE DIAMETER 8 inches

CASING MATERIAL PVC

METHOD OF DEVELOPMENT AIRFT

ELEV BOTTOM OF BOREHOLE 3908.12 feet above MSL

ELEV BOTTOM OF WELL CASING 3911.12 feet above MSL

ELEV BOTTOM OF SCREENED INT 3911.12 feet above MSL

ELEV OF TOP OF SCREENED INT 3926.12 feet above MSL

SURVEYED ELEV OF CASING TOP 4281.12 feet above MSL

DATE OF REPORT 09-15-2003 SIGNATURE Fredrick E. Gebhardt

NAME (TYPED) Fredrick E. Gebhardt

478 85

Hole No. MW-"E"

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION TULSA DISTRICT	SHEET 1 OF 4 SHEETS

1. PROJECT CANNON AFB (Monitoring Wells)	10. SIZE AND TYPE OF BIT 7-7/8" Rockbit
2. LOCATION (Coordinates or Station) See Below	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY TULSA DISTRICT - Core Drill	12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500
4. HOLE NO. (As shown on drawing title and file number) MW-"E"	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED --- ; UNDISTURBED ---
5. NAME OF DRILLER CAMP	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 4008.45 (12 Mar 86)
	16. DATE HOLE: STARTED 11 Nov 85 ; COMPLETED 17 Nov 85
7. THICKNESS OF OVERBURDEN Not reached.	17. ELEVATION TOP OF HOLE 4281.12
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 373.0	19. SIGNATURE OF INSPECTOR GILBERT E.N. Gilbert

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			0.0 - 2.0 Top Soil, brown.			LOCATION: 15' west of abandoned runway and 700' south of road crossing runway.
			2.0 - 4.0 Silt, sandy, tan.			
			4.0 - 10.0 Clay, sandy, tan.			Set 355 of 4" PVC threaded pipe with 15' of slotted screen on bottom. Total 370'.
	10		10.0 - 17.0 Caliche, sandy. tan.			
			17.0 - 24.0 Clay, sandy, tan.			Material descriptions from electric and gamma ray logs, drill action and cuttings.
	20					
	30					
	40		24.0 - 41.0 Sand, fine, tan.			
			41.0 - 46.0 Clay, sandy, tan.			
			46.0 - 60.0 Sand , clay seams, tan.			
	50					
	60		60.0 - 90.0 Caliche, sandy with clay seams, tan .			
	70					
	80					
	90		90.0 - 130.0 Sand, fine, tan.			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT Cannon AFB | HOLE NO MW-E

Hole No. MW-"E"

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION TULSA DISTRICT	SHEET 2 OF 4 SHEETS

1. PROJECT CANNON AFB	10. SIZE AND TYPE OF BIT 7-7/8" Rockbit
2. LOCATION (Coordinates or Station) See Page 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Tulsa District	12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500
4. HOLE NO. (As shown on drawing title and file number) MW-E	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED ---- ; UNDISTURBED ----
5. NAME OF DRILLER CAMP	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 4008.45 (12 Mar 86)
	16. DATE HOLE: STARTED 11 Nov 85 ; COMPLETED 17 Nov 85
7. THICKNESS OF OVERBURDEN Not reached.	17. ELEVATION TOP OF HOLE 4281.12
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 373.0	19. SIGNATURE OF INSPECTOR GILBERT E.N. Gilbert

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Sand, fine, tan, continued.			
	110					
	120					
	130		130.0 - 135.0 Caliche, sandy, tan.			
			135.0 - 175.0 Sand, fine, tan.			
	140					
	150					
	160					
	170					
			175.0 - 183.0 Caliche, sandy, tan.			
	180					Rt. shift in S.P. log at 181.0' with increasingly higher amplitude deflections in curve below 235.0'.
			183.0 - 260.0 Sand, fine, tan with thin clay seams.			
	190					
	200					

Hole No. MW-"E"

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION TULSA DISTRICT	SHEET 3 OF 4 SHEETS

1. PROJECT CANNON AFB	10. SIZE AND TYPE OF BIT 7-7/8" Rockbit
2. LOCATION (Coordinates or Station) See Page 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Tulsa District	12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500
4. HOLE NO. (As shown on drawing title and file number) MW-"E"	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED ---- ; UNDISTURBED ----
5. NAME OF DRILLER CAMP	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 4008.45 (12 Mar 86)
	16. DATE HOLE: STARTED 11 Nov 85 ; COMPLETED 17 Nov 85
7. THICKNESS OF OVERBURDEN Not reached.	17. ELEVATION TOP OF HOLE 4281.12
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 373.0	19. SIGNATURE OF INSPECTOR GILBERT E.N. Gilbert

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Sand, fine, tan with thin clay seams continued.			
	210					
	220					
	230					
	240					
	250					
	260		260.0 - 270.0 Caliche, sandy, tan.			
	270		270.0 - 292.0 Sand, fine, tan.			
	280					
	290		292.0 - 295.0 Clay, sandy, tan.			
			295.0 - 304.0 Sand, medium tan.			
	300					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT CANNON AFB | HOLE NO. MW-"E"

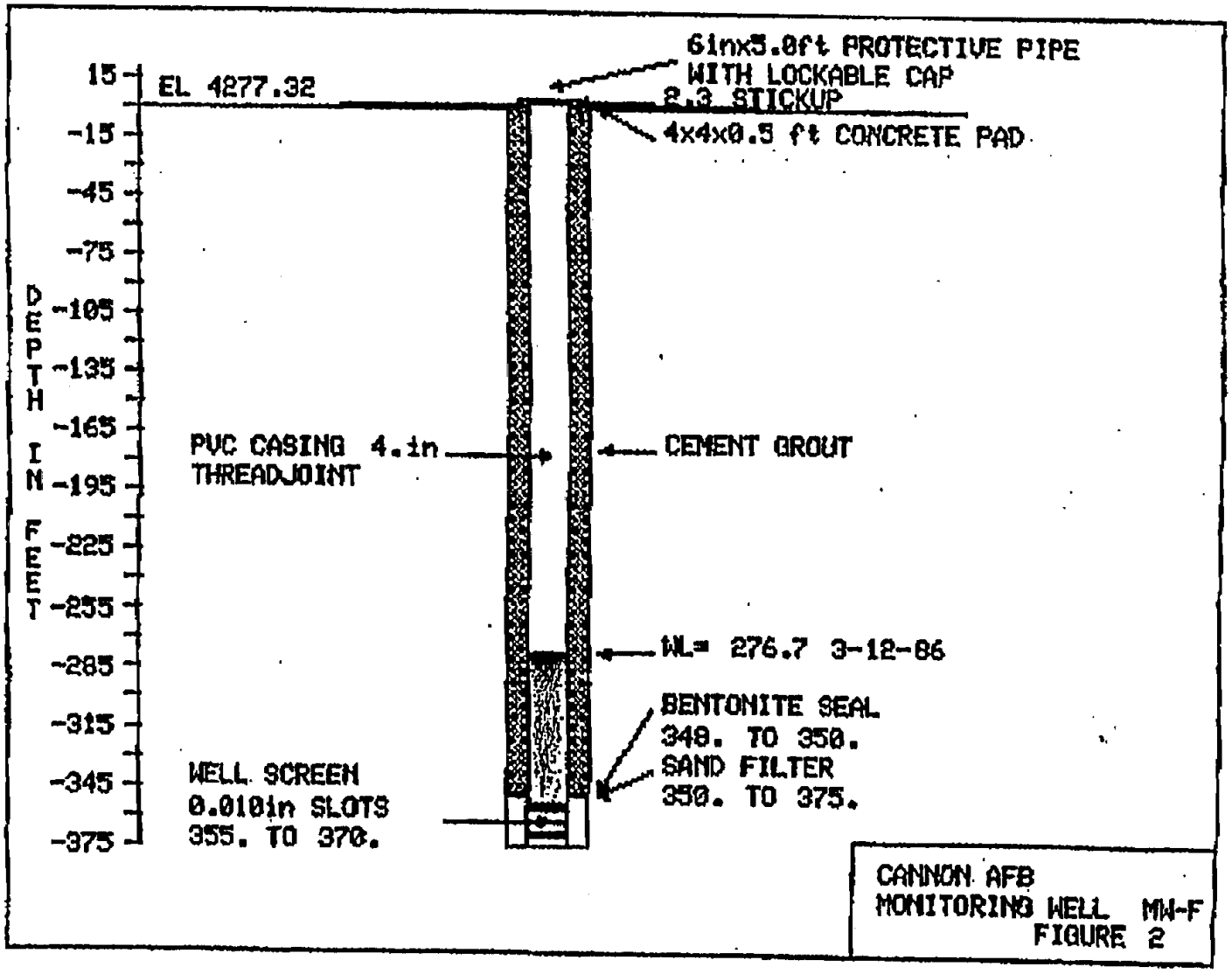
Hole No. MW-"E"

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION TULSA	SHEET 4 OF 4 SHEETS
1. PROJECT CANNON AFB		10. SIZE AND TYPE OF BIT 7-7/8" Rockbit	
2. LOCATION (Coordinates or Station) See Page 1		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY Tulsa District		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number)	MW-E	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED ---- / UNDISTURBED ----
5. NAME OF DRILLER CAMP		14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER 4008.45 (12 Mar 86)	
		16. DATE HOLE	STARTED 11 Nov 85 / COMPLETED 17 Nov 85
7. THICKNESS OF OVERBURDEN Not reached.		17. ELEVATION TOP OF HOLE 4281.12	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING %	
9. TOTAL DEPTH OF HOLE 373.0		19. SIGNATURE OF INSPECTOR GILBERT *E.N. Gilbert*	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Sand, med., tan, continued.			
			304.0 - 306.0 Clay, sandy, tan.			
	310		306.0 - 322.0 Sand, fine, tan.			
	320		322.0 - 325.0 Caliche, sandy, tan.			
	330		325.0 - 347.0 Sand, silty, tan.			
	340					
	350		347.0 - 373.0 Sand, med., tan.			
	360					
	370					
			Bottom of Hole			
	380					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT CANNON AFB | HOLE NO. MW-"E"



CANNON AFB
MONITORING WELL MW-F
FIGURE 2

MONITORING WELL IDENTIFICATION REPORT

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS AND RADIOACTIVE MATERIALS BUREAU
525 CAMINO DE LOS MARQUEZ, SUITE 4
SANTA FE, NEW MEXICO 87502

FACILITY NAME Cannon Air Force Base

EPA I.D. NUMBER NM 7572124454

COUNTY Curry

WELL NUMBER F -- Sewage Lagoons

WELL LOCATION (LONGITUDE) 103° 18' 10.5"

WELL LOCATION (LATITUDE) 34° 23' 21.4"

AQUIFER NAME Ogalalla

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE 11-19-1985

DRILLING METHOD HYDRT

INNER CASING DIAMETER 4 inches

BOREHOLE DIAMETER 8 inches

CASING MATERIAL PVC

METHOD OF DEVELOPMENT AIRFT

ELEV BOTTOM OF BOREHOLE 3902.32 feet above MSL

ELEV BOTTOM OF WELL CASING 3907.32 feet above MSL

ELEV BOTTOM OF SCREENED INT 3907.32 feet above MSL

ELEV OF TOP OF SCREENED INT 3922.32 feet above MSL

SURVEYED ELEV OF CASING TOP 4277.32 feet above MSL

DATE OF REPORT 09-15-2003 SIGNATURE Fredrick E. Gebhardt

NAME (TYPED) Fredrick E. Gebhardt

Hole No. MW-F

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION TULSA DISTRICT	SHEET 1 OF 4 SHEETS

1. PROJECT CANNON AFB - MONITORING WELLS	10. SIZE AND TYPE OF BIT 7-7/8" RockBit
2. LOCATION (Coordinates or Station) See Below	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY ROMAN WELL SERVICE	12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500 CHAIN PULLDOWN
4. HOLE NO. (As shown on drawing title and file number) MW-F	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED - ; UNDISTURBED -
5. NAME OF DRILLER Jim Roman	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 4002.93 (12 Mar 86)
	16. DATE HOLE: STARTED 19 Nov 85; COMPLETED 19 Nov 85
7. THICKNESS OF OVERBURDEN Not reached.	17. ELEVATION TOP OF HOLE 4277.32
8. DEPTH DRILLED INTO ROCK -	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 375.0	19. SIGNATURE OF INSPECTOR GILBERT E N Gilbert

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			0.0 - 2.0 Clay silty, tan			LOCATION: 38' South from the top of slope protection and at mid point of the South edge of south lagoon.
			2.0 - 7.0 Silt, sandy, tan			
			7.0 - 10.0 Sand, silty, tan			
	10		10.0 - 13.0 Clay, sandy, tan			Set 375' of 4" schedule 40 slip joint PVC Pipe. 15.0 feet of .010 slots with 5 foot length of sediment trap below slots screen depth 355 - 370 feet.
			13.0 - 21.0 Sand, silty, tan			
	20		21.0 - 25.0 Sand, fine, tan			
			25.0 - 27.0 Clay, sandy, tan.			Placed 1,000 pounds of "P" gravel filter around screen. Placed 100 pounds of bentonite pellets to make seal above screen.
			27.0 - 31.0 Sand, silty, tan			
	30		31.0 - 43.0 Sand, fine, tan			
	40		43.0 - 46.0 Caliche, sandy, tan.			Material described from interpretation of electric and gamma ray logs, drill action and cuttings.
			46.0 - 54.0 Sand, fine, tan.			
	50		54.0 - 61.0 Sand, some caliche, tan.			
	60		61.0 - 138.0 Sand, fine, tan.			
	70					
	80					
	90					
	100					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT CANNON AFB-MONITORING WELLS HOLE NO. MW-F

Hole No. MW-F

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION TULSA DISTRICT	SHEET 2 OF 4 SHEETS
1. PROJECT CANNON AFB - MONITORING WELLS		10. SIZE AND TYPE OF BIT 7-7/8" Rock Bit	
2. LOCATION (Coordinates or Station) See Page 1		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY ROMAN WELL SERVICE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500 CHAIN PULLDOWN	
4. HOLE NO. (As shown on drawing title and file number) MW-F		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED – ; UNDISTURBED –	
5. NAME OF DRILLER JIM ROMAN		14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER 4002.93 (12 Mar 86)	
		16. DATE HOLE: STARTED 19 Nov 85; COMPLETED 19 Nov 85	
7. THICKNESS OF OVERBURDEN Not reached.		17. ELEVATION TOP OF HOLE 4277.32	
8. DEPTH DRILLED INTO ROCK –		18. TOTAL CORE RECOVERY FOR BORING %	
9. TOTAL DEPTH OF HOLE 375.0		19. SIGNATURE OF INSPECTOR GILBERT *E.N. Gilbert*	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Sand, continued.			
	110					
	120					
	130					
			138.0 - 152.0 Caliche, sandy, tan.			
	140					
	150					
			152.0 - 158.0 Sand, fine, tan.			
			158.0 - 226.0 Sand, med., tan.			
	160					
	170					
	180					
	190					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. MW-F

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION TULSA DISTRICT	SHEET 3 OF 4 SHEETS

1. PROJECT CANNON AFB - MONITORING WELLS	10. SIZE AND TYPE OF BIT 7-7/8" Rock Bit
2. LOCATION (Coordinates or Station) See Page 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Jim Roman Well Service	12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500 CHAIN PULLDOWN
4. HOLE NO. (As shown on drawing title and file number) MW-F	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED - ; UNDISTURBED -
5. NAME OF DRILLER Jim Roman	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 4002.93 (12 Mar 86)
	16. DATE HOLE: STARTED 19 Nov 85; COMPLETED 19 Nov 85
7. THICKNESS OF OVERBURDEN Not reached.	17. ELEVATION TOP OF HOLE 4277.32
8. DEPTH DRILLED INTO ROCK -	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 375.0	19. SIGNATURE OF INSPECTOR GILBERT E.N. Gilbert

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Sand, continued.,			
	210					
	220					
			226.0 - 235.0 Clay, sandy, tan.			
	230					
			235.0 - 243.0 Sand, med., tan.			
	240					
			243.0 - 259.0 Clay, sandy, tan.			
	250					
	260		259.0 - 277.0 Sand, med., tan.			Probable saturated zone below 260.0'.
	270					
			277.0 - 279.0 Clay, sandy, tan.			
	280		279.0 - 283.0 Sand, med., tan.			
			283.0 - 285.0 Caliche, sandy, tan.			
			285.0 - 305.0 Sand, med., tan.			
	290					

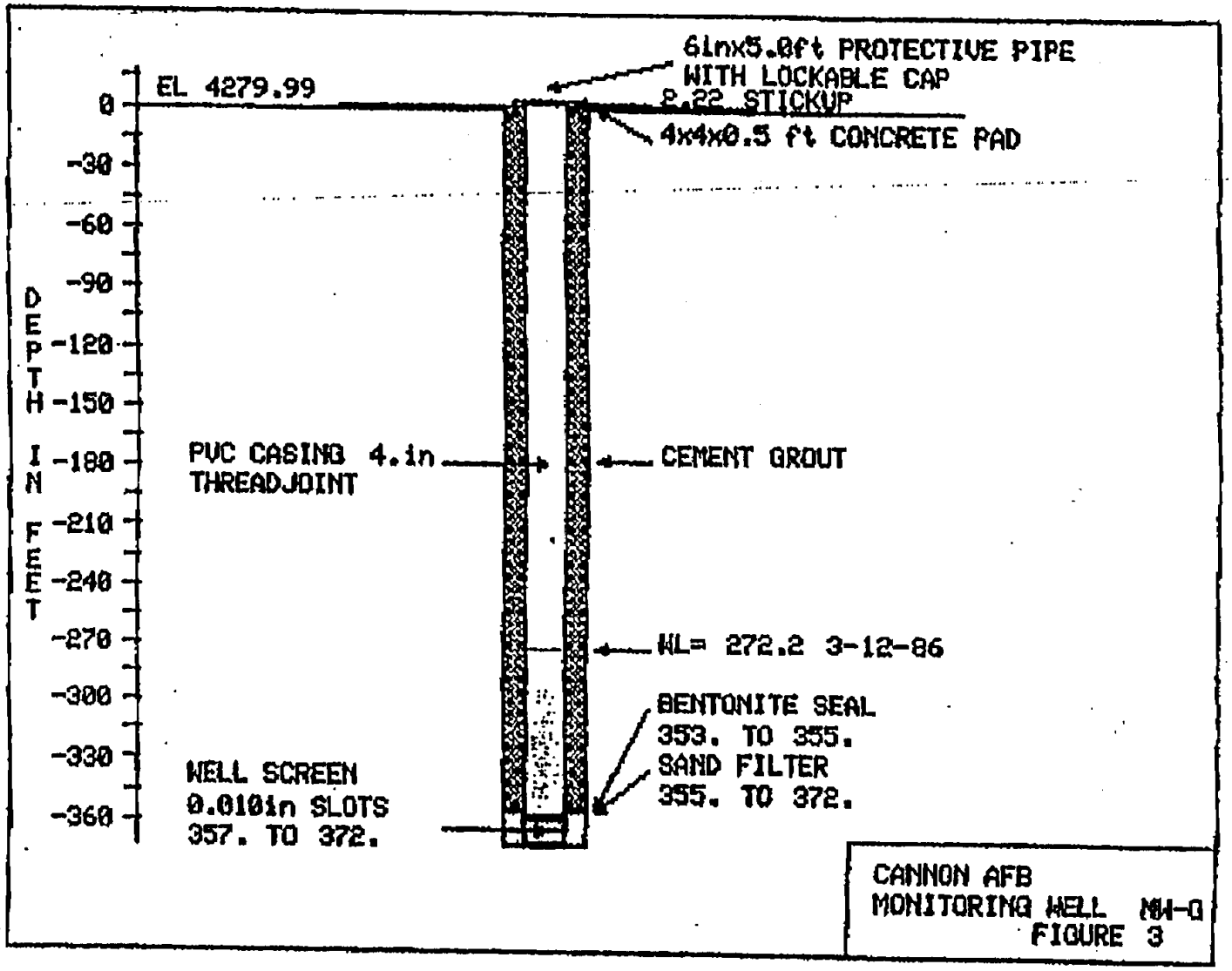
ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT CANNON AFB - MONITORING WELLS | HOLE NO. MW-F

Hole No. MW-F

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION TULSA DISTRICT	SHEET 4 OF 4 SHEETS
1. PROJECT CANNON AFB - MONITORING WELLS		10. SIZE AND TYPE OF BIT 7-7/8" Rock Bit	
2. LOCATION (Coordinates or Station) See Page 1		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY Jim Roman Well Service		12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	
4. HOLE NO. (As shown on drawing title and file number) MW-F		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED - / UNDISTURBED -
5. NAME OF DRILLER Jim Roman		14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER 4002.93 (12 Mar 86)	
		16. DATE HOLE	STARTED 19 Nov 85 / COMPLETED 19 Nov 85
7. THICKNESS OF OVERBURDEN Not reached.		17. ELEVATION TOP OF HOLE 4277.32	
8. DEPTH DRILLED INTO ROCK -		18. TOTAL CORE RECOVERY FOR BORING %	
9. TOTAL DEPTH OF HOLE 375.0		19. SIGNATURE OF INSPECTOR GILBERT *E.N. Gilbert*	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Sand, continued.			
			305.0 - 314.0 Silt, sandy, tan.			
	310					
			314.0 - 321.0 Sand, med., tan.			
	320					
			321.0 - 324.0 Silt, sandy, tan.			
			324.0 - 332.0 Sand, med, tan.			
	330					
			332.0 - 334.0 Caliche, clayey, tan.			
			334.0 - 337.0 Sand, med, tan.			
			337.0 - 354.0 Sand, gravelly, tan.			
	340					
	350					
			354.0 - 356.0 Clay, sandy, tan.			
			356.0 - 359.0 Sand, med, tan.			
	360		359.0 - 361.0 Clay, sandy, tan.			
			361.0 - 375.0 Sand, gravelly, tan.			
	370					
	375		Bottom of Hole			
	380					



CANNON AFB
MONITORING WELL MW-Q
FIGURE 3

MONITORING WELL IDENTIFICATION REPORT

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS AND RADIOACTIVE MATERIALS BUREAU
525 CAMINO DE LOS MARQUEZ, SUITE 4
SANTA FE, NEW MEXICO 87502

FACILITY NAME Cannon Air Force Base

EPA I.D. NUMBER NM 7572124454

COUNTY Curry

WELL NUMBER G -- Sewage Lagoons

WELL LOCATION (LONGITUDE) 103° 18' 08"

WELL LOCATION (LATITUDE) 34° 23' 13.4"

AQUIFER NAME Ogalalla

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE 11-10-1985

DRILLING METHOD HYDRT

INNER CASING DIAMETER 4 inches

BOREHOLE DIAMETER 8 inches

CASING MATERIAL PVC

METHOD OF DEVELOPMENT AIRFT

ELEV BOTTOM OF BOREHOLE 3907.99 feet above MSL

ELEV BOTTOM OF WELL CASING 3907.90 feet above MSL

ELEV BOTTOM OF SCREENED INT 3907.99 feet above MSL

ELEV OF TOP OF SCREENED INT 3922.99 feet above MSL

SURVEYED ELEV OF CASING TOP 4279.99 feet above MSL

DATE OF REPORT 09-15-2003 SIGNATURE Fredrick E. Gebhardt

NAME (TYPED) Fredrick E. Gebhardt

478 95

Hole No. MW-G

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION TULSA DISTRICT	SHEET 1 OF 4 SHEETS

1. PROJECT CANNON AFB - Monitoring Well	10. SIZE AND TYPE OF BIT 9½" Rock Bit.
2. LOCATION (Coordinates or Station) See Below	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Tulsa District - Core Drill	12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500
4. HOLE NO. (As shown on drawing title and file number) MW-G	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED - ; UNDISTURBED -
5. NAME OF DRILLER Wyatt & Camp	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 4007.78 (12 Mar 86)
	16. DATE HOLE: STARTED 6 Nov 85; COMPLETED 10 Nov 85
7. THICKNESS OF OVERBURDEN ---	17. ELEVATION TOP OF HOLE 4277.77
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 372.0	19. SIGNATURE OF INSPECTOR GILBERT E.N. Gilbert

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			0.0 - 0.5 Top soil, brown.			Location - 38' E. from top of slope protection and at mid point of south sewage lagoon.
			0.5 - 2.0 Caliche, silty, light tan.			
	10		2.0 - 5.0 Clay, silty, tan			Set 375 feet of 4" schedule 80 threaded PVC pipe. 15 feet of .010 slots.
			5.0 - 10.0 Sand, silty, tan			
			10.0 - 15.0 Clay, tan.			Placed 20 five gallon buckets of "P" gravel and 2 five gallon buckets of bentonite pellets.
	20		15.0 - 20.0 Caliche, tan.			
			20.0 - 22.0 Clay, tan.			
			22.0 - 25.0 Sand, fine, tan			About 1 cu. yd. of concrete placed around PVC casing.
	30		25.0 - 27.0 Silt, sandy, tan			
			27.0 - 30.0 Clay, sandy, tan			Material described from interpretation of electric and gamma ray logs, drill action and cuttings.
			30.0 - 50.0 Sand, fine, tan			
	40		50.0 - 52.0 Clay, sandy, tan			
			52.0 - 77.0 Sand, fine, tan			
			77.0 - 80.0 Clay, sandy, tan			
	50		80.0 - 120.0 Sand, silty, tan			
	60					
	70					
	80					
	90					
	100					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT CANNON AFB

HOLE NO. MW-G

Hole No. MW-G

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION TULSA DISTRICT	SHEET 3 OF 4 SHEETS
1. PROJECT CANNON AFB - Monitoring Well		10. SIZE AND TYPE OF BIT 9½" Rock Bit	
2. LOCATION (Coordinates or Station) See Page 1		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY Tulsa District - Core Drill		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) MW-G		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED - / UNDISTURBED -
5. NAME OF DRILLER Wyatt & Camp		14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER 4007.78 (12 Mar 86)	
		16. DATE HOLE	STARTED 6 Nov 85 / COMPLETED 10 Nov 85
7. THICKNESS OF OVERBURDEN ---		17. ELEVATION TOP OF HOLE 4277.77	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING %	
9. TOTAL DEPTH OF HOLE 372.0		19. SIGNATURE OF INSPECTOR GILBERT E N Gilbert	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Sand, continued.			
			205.0 - 225.0 Sand, silty, tan.			
	210					
	220					
			225.0 - 230.0 Sand, fine, tan.			
	230		230.0 - 245.0 Sand, silty, tan.			
	240					
			245.0 - 250.0 Sand, fine, tan.			
	250		250.0 - 260.0 Sand, silty, tan.			
	260		260.0 - 297.0 Sand, fine, tan.			
	270					
	280					
	290					
			297.0 - 299.0 Clay, sandy, tan.			
	300		299.0 - 303.0 Sand, fine, tan.			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT CANNON AFB | HOLE NO. MW-G

SOUTHWEST DIVISION — TULSA DISTRICT — 1 OF 4 SHEETS

1. PROJECT: CANNON AFB - Monitoring Well
2. LOCATION (Coordinates or Station): See Page 1
3. DRILLING AGENCY: Tulsa District - Core Drill
4. HOLE NO. (As shown on drawing title and file number): MW-G
5. NAME OF DRILLER: Uvatt & Camp
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: ---
8. DEPTH DRILLED INTO ROCK:
9. TOTAL DEPTH OF HOLE: 372.0
10. SIZE AND TYPE OF BIT: 9¼" Rock Bit
11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED -; UNDISTURBED -
14. TOTAL NUMBER CORE BOXES: 0
15. ELEVATION GROUND WATER: 4007.78 (12 Mar 86)
16. DATE HOLE: STARTED 6 Nov 85; COMPLETED 10 Nov 85
17. ELEVATION TOP OF HOLE: 4277.77
18. TOTAL CORE RECOVERY FOR BORING:
19. SIGNATURE OF INSPECTOR: GILBERT — E.N. Gilbert

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Sand, continued.			
	110					
	120		120.0 - 125.0 Sand, fine, tan.			
			125.0 - 130.0 Clay, sandy, tan.			
	130		130.0 - 140.0 Sand, fine, tan.			
	140		140.0 - 155.0 Sand, silty, tan.			
	150					
			155.0 - 158.0 Caliche, sandy, tan.			
			158.0 - 162.0 Sand, fine, tan.			
	160		162.0 - 168.0 Sand, silty, tan.			
			168.0 - 170.0 Caliche, tan.			
	170		170.0 - 182.0 Sand, fine, tan.			
	180		182.0 - 185.0 Caliche, tan.			
			185.0 - 188.0 Sand, silty, tan.			
			188.0 - 192.0 Sand, fine, tan.			
	190		192.0 - 198.0 Sand, silty, tan.			
			198.0 - 205.0 Sand, fine, tan.			
	200					

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PROJECT: CANNON AFB — HOLE NO. MW-G

Hole No. MW-C

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION TULSA DISTRICT	SHEET 3 OF 4 SHEETS
1. PROJECT CANNON AFB - Monitoring Well		10. SIZE AND TYPE OF BIT 9½" Rock Bit	
2. LOCATION (Coordinates or Station) See Page 1		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY Tulsa District - Core Drill		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number)	MW-C	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED – / UNDISTURBED –
5. NAME OF DRILLER Wyatt & Camp		14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER 4007.78 (12 Mar 86)	
		16. DATE HOLE	STARTED 6 Nov 85 / COMPLETED 10 Nov 85
7. THICKNESS OF OVERBURDEN ---		17. ELEVATION TOP OF HOLE 4277.77	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING %	
9. TOTAL DEPTH OF HOLE 372.0		19. SIGNATURE OF INSPECTOR GILBERT E N Gilbert	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Sand, continued.			
			205.0 - 225.0 Sand, silty, tan.			
	210					
	220					
			225.0 - 230.0 Sand, fine, tan.			
	230		230.0 - 245.0 Sand, silty, tan.			
	240					
			245.0 - 250.0 Sand, fine, tan.			
	250		250.0 - 260.0 Sand, silty, tan.			
	260		260.0 - 297.0 Sand, fine, tan.			
	270					
	280					
	290					
			297.0 - 299.0 Clay, sandy, tan.			
	300		299.0 - 303.0 Sand, fine, tan.			

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PROJECT CANNON AFB | HOLE NO. MW-C

478 99

Hole No. MW-G

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION TULSA DISTRICT	SHEET 4 OF 4 SHEETS
1. PROJECT CANNON AFB - Monitoring Well		10. SIZE AND TYPE OF BIT 9½" Rock Bit	
2. LOCATION (Coordinates or Station) See Page 1		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY Tulsa District - Core Drill		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) MW-G		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED - / UNDISTURBED -
5. NAME OF DRILLER Wyatt & Camp		14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER 4007.78 (12 Mar 86)	
		16. DATE HOLE	STARTED 6 Nov 85 / COMPLETED 10 Nov 85
7. THICKNESS OF OVERBURDEN ---		17. ELEVATION TOP OF HOLE 4277.77	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING %	
9. TOTAL DEPTH OF HOLE 372.0		19. SIGNATURE OF INSPECTOR GILBERT	E N Gilbert

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SAND - continued.			
			303.0 - 307.0 Clay, low permeability.			
			307.0 - 319.0 Sand, fine, tan.			
	310					
	320		319.0 - 321.0 Clay, sandy, tan.			
			321.0 - 326.0 Sand, silty, tan.			
			326.0 - 331.0 Sand, fine, tan.			
	330		331.0 - 346.0 Sand, silty, tan.			
	340					
			346.0 - 350.0 Sand, fine, tan.			
	350		350.0 - 360.0 Sand, silty, tan.			
	360		360.0 - 366.0 Sand, fine, tan.			
			366.0 - 367.0 Clay, sandy, tan.			
			367.0 - 372.0 Sand, fine, tan.			
	372		Bottom of Hole			

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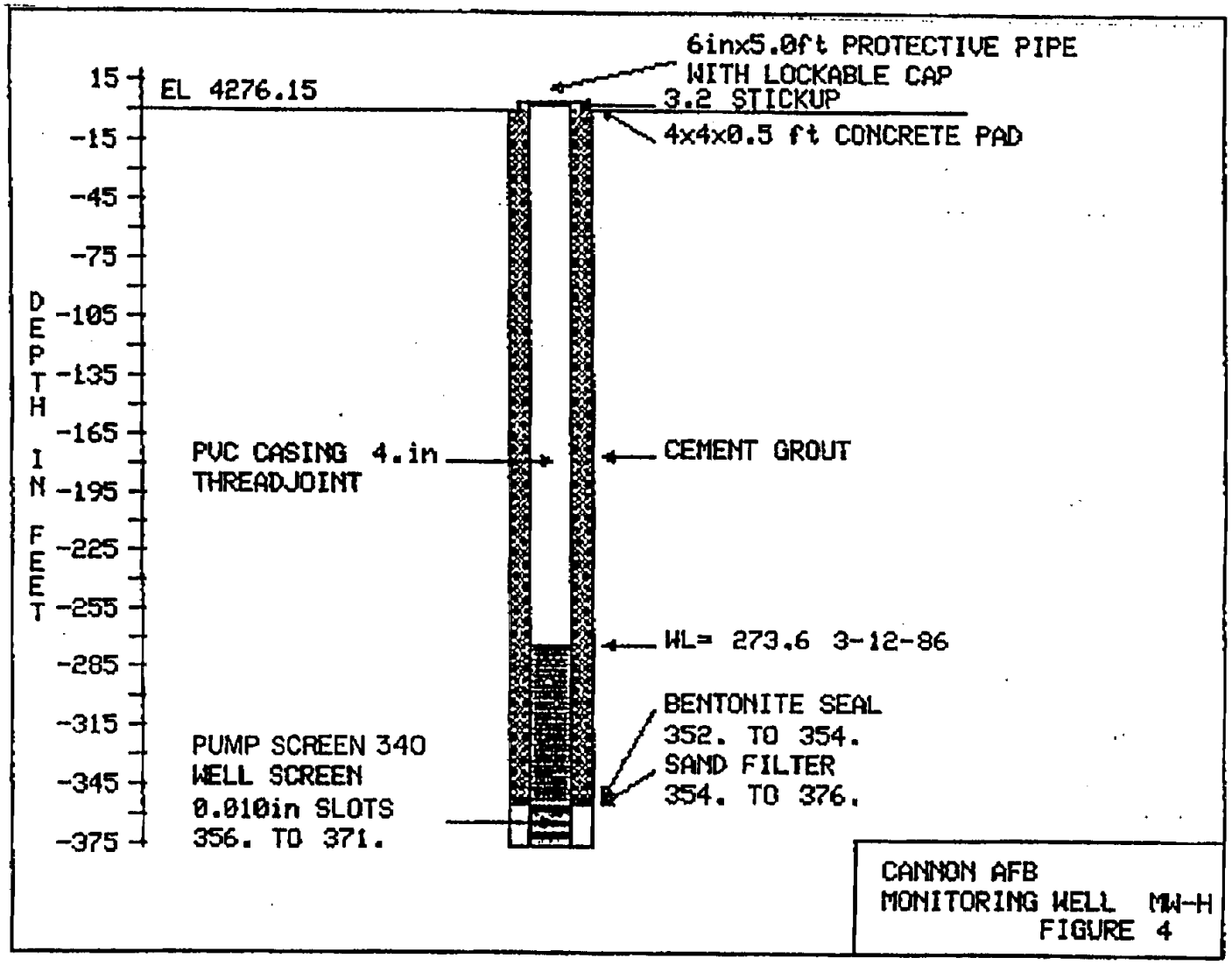
PROJECT CANNON AFB MONITORING WELL | HOLE NO. MW-G



CANNON AFB
MONITORING WELL MW-H
FIGURE 4

MONITORING WELL IDENTIFICATION REPORT

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS AND RADIOACTIVE MATERIALS BUREAU
525 CAMINO DE LOS MARQUEZ, SUITE 4
SANTA FE, NEW MEXICO 87502

FACILITY NAME Cannon Air Force Base

EPA I.D. NUMBER NM 7572124454

COUNTY Curry

WELL NUMBER H -- Sewage Lagoons

WELL LOCATION (LONGITUDE) 103° 18' 16.80"

WELL LOCATION (LATITUDE) 34° 23' 07"

AQUIFER NAME Ogalalla

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE 11-18-1985

DRILLING METHOD HYDRT

INNER CASING DIAMETER 4 inches

BOREHOLE DIAMETER 8 inches

CASING MATERIAL PVC

METHOD OF DEVELOPMENT AIRFT

ELEV BOTTOM OF BOREHOLE 3901.15 feet above MSL

ELEV BOTTOM OF WELL CASING 3901.15 feet above MSL

ELEV BOTTOM OF SCREENED INT 3901.15 feet above MSL

ELEV OF TOP OF SCREENED INT 3921.15 feet above MSL

SURVEYED ELEV OF CASING TOP 4276.15 feet above MSL

DATE OF REPORT 09-15-2003 SIGNATURE Fredrick E. Gebhardt

NAME (TYPED) Fredrick E. Gebhardt

Hole No. MW-H

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION TULSA DISTRICT	SHEET 1 OF 4 SHEETS
1. PROJECT CANNON AFB - MONITORING WELLS		10. SIZE AND TYPE OF BIT 7-7/8" Rock Bit	
2. LOCATION (Coordinates or Station) See Below		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY Roman Well Service		12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	
4. HOLE NO. (As shown on drawing title and file number) MW-H		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED - ; UNDISTURBED -	
5. NAME OF DRILLER Jimmy Roman		14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER 4005.72 (12 Mar 86)	
		16. DATE HOLE: STARTED 18 Nov 85; COMPLETED 18 Nov 85	
7. THICKNESS OF OVERBURDEN 369.0		17. ELEVATION TOP OF HOLE 4276.15	
8. DEPTH DRILLED INTO ROCK 6.0		18. TOTAL CORE RECOVERY FOR BORING %	
9. TOTAL DEPTH OF HOLE 375.0		19. SIGNATURE OF INSPECTOR GILBERT E.N. Gilbert	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			0.0 - 2.0 Topsoil. silty, brown.			Location: 45' East from the top of the Slope Protection and at mid point of the East Side of the North lagoon.
			2.0 - 5.0 Sand, silty, tan			
			5.0 - 22.0 Silt, sandy, tan.			Set 375 feet of 4-inch PVC casing with 15 feet of .010 slotted screen. 5 feet of sediment trap below screen. Screen depth below surface 355 - 370 feet.
	10					
	20		22.0 - 40.0 Sand, silty, tan.			Material described from interpretation of electric and gamma logs, drill action, and cuttings.
	30					
	40		40.0 - 50.0 Caliche, sandy, tan.			
	50		50.0 - 60.0 Sand, med., tan.			
	60		60.0 - 72.0 Caliche, sandy, tan.			
	70		72.0 - 85.0 Sand, med., tan.			
	80					
			85.0 - 89.0 Sand, silty, tan.			
	90		89.0 - 102.0 Sand, med., tan.			
	100					

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PROJECT CANNON AFB - Monitoring Well | HOLE NO. MW-H

Hole No. MW-H

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION TULSA DISTRICT	SHEET 2 OF 4 SHEETS

1. PROJECT CANNON AFB - MONITORING WELLS	10. SIZE AND TYPE OF BIT 7-7/8" Rock Bit
2. LOCATION (Coordinates or Station) See Page 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Roman Well Service	12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500
4. HOLE NO. (As shown on drawing title and file number) MW-H	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED – ; UNDISTURBED –
5. NAME OF DRILLER Jimmy Roman	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 4005.72 (12 Mar 86
	16. DATE HOLE: STARTED 18 Nov 85; COMPLETED 18 Nov 85
7. THICKNESS OF OVERBURDEN 369.0	17. ELEVATION TOP OF HOLE 4276.15
8. DEPTH DRILLED INTO ROCK 6.0	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 375.0	19. SIGNATURE OF INSPECTOR GILBERT E.N. Gilbert

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Sand, continued.			
			102.0 - 125.0 Sand, fine, tan.			
	110					
	120					
			125.0 - 130.0 Clay, silty, tan.			
	130		130.0 - 180.0 Sand, med., tan.			
	140					
	150					
	160					
	170					
	180		180.0 - 190.0 Clay, sandy, tan.			
	190		190.0 - 247.0 Sand, med., tan.			
	200					

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478 103

Hole No. MW-H

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION TULSA DISTRICT	SHEET 3 OF 4 SHEETS
1. PROJECT CANNON AFB - MONITORING WELLS		10. SIZE AND TYPE OF BIT 7-7/8" Rock Bit	
2. LOCATION (Coordinates or Station) See Page 1		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY Roman Well Service		12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	
4. HOLE NO. (As shown on drawing title and file number) MW-H		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED – / UNDISTURBED –
5. NAME OF DRILLER Jimmy Roman		14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER 4005.72 (12 Mar 86)	
		16. DATE HOLE	STARTED 18 Nov 85 / COMPLETED 18 Nov 85
7. THICKNESS OF OVERBURDEN 369.0		17. ELEVATION TOP OF HOLE 4276.15	
8. DEPTH DRILLED INTO ROCK 6.0		18. TOTAL CORE RECOVERY FOR BORING %	
9. TOTAL DEPTH OF HOLE 375.0		19. SIGNATURE OF INSPECTOR GILBERT E.N. Gilbert	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Sand, continued.			
	210					
	220					
	230					
	240					
			247.0 - 255.0 Clay, sandy, tan.			
	250					
			255.0 - 287.0 Sand, fine, tan.			
	260					
	270					
	280					
			287.0 - 290.0 Clay, sandy, tan.			
	290		290.0 - 299.0 Sand, fine, tan.			
			299.0 - 302.0 Clay, sandy, tan.			

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PROJECT CANNON AFB - MONITORING WELLS HOLE NO. MW-H

Hole No. MW-H

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION TULSA DISTRICT	SHEET 4 OF 4 SHEETS
1. PROJECT CANNON AFB - MONITORING WELLS		10. SIZE AND TYPE OF BIT 7-7/8" Rock Bit	
2. LOCATION (Coordinates or Station) See Page 1		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY Roman Well Service		12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	
4. HOLE NO. (As shown on drawing title and file number)	MW-H	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED – / UNDISTURBED –
5. NAME OF DRILLER Jimmy Roman		14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER 4005.72 (12 Mar 86)	
		16. DATE HOLE	STARTED 18 Nov 85 / COMPLETED 18 Nov 85
		17. ELEVATION TOP OF HOLE 4276.15	
7. THICKNESS OF OVERBURDEN 369.0		18. TOTAL CORE RECOVERY FOR BORING %	
8. DEPTH DRILLED INTO ROCK 6.0		19. SIGNATURE OF INSPECTOR GILBERT	E.N. Hilbert
9. TOTAL DEPTH OF HOLE 375.0			

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Sand, continued.			
	310		310.0 - 313.0 Clay, sandy, tan.			
			313.0 - 339.0 Sand, med., with clay streaks, tan.			
	320					
	330					
			339.0 - 340.0 Clay, sandy, tan.			
	340		340.0 - 355.0 Sand, med., tan.			
	350					
			355.0 - 357.0 Clay, sandy, tan.			
			357.0 - 369.0 Sand, gravelly, tan.			
	360					
			369.0 - 375.0 Redbed Shale.			
	370					
	375					
			Bottom of Hole			
	380					

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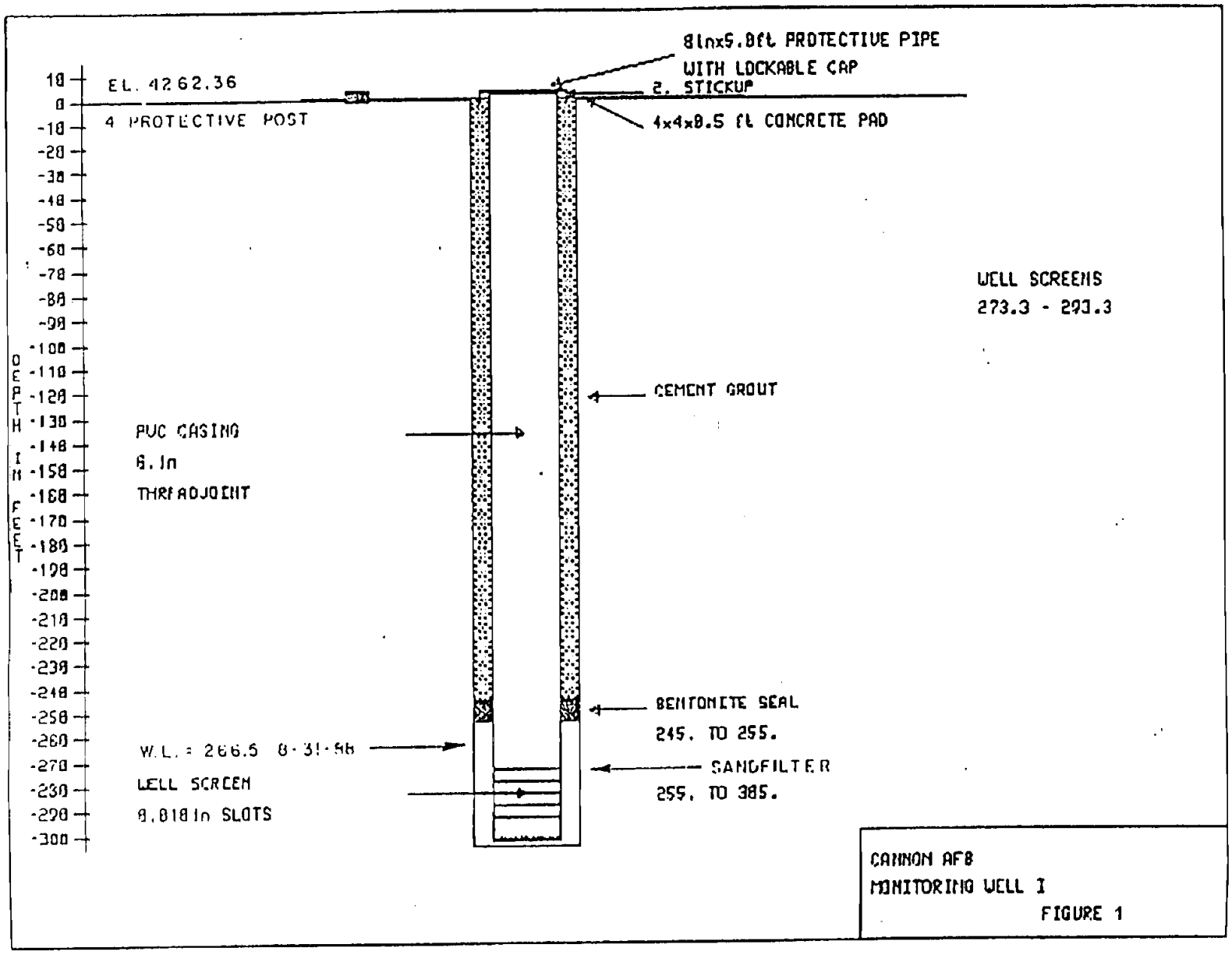
PROJECT CANNON AFB - MONITORING WELLS | HOLE NO. MW-H



CANNON AFB
MONITORING WELL I
FIGURE 1

478 105

HOLE NO. 1

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION CANNON AFB	SHEET 1 OF 2 SHEETS

1. PROJECT LANDFILL 5	10. SIZE AND TYPE OF BIT 9 5/8"
2. LOCATION (Coordinates or Station) 0.00 0.00	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
3. DRILLING AGENCY ROMAN WELL SERVICE	12. MANUFACTURER'S DESIGNATION OF DRILL FAILING
4. HOLE NO. (As shown on drawing title and file number) 1	13. TOTAL NO OF OVER- DISTURBED UNDISTURBED
5. NAME OF DRILLER JIM ROMAN	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 3997.9(8/31/88)
	16. DATE HOLE STARTED 08/10/88 COMPLETED 08/12/88
7. THICKNESS OF OVERBURDEN 0.0	17. ELEVATION TOP OF HOLE 4262.3
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING 0.0 %
9. TOTAL DEPTH OF HOLE 305.0	19. SIGNATURE OF INSPECTOR E.N. GILBERT

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
4256.3			SAND (SM) (0.0–6.0) SILTY, REDDISH BROWN			USED 9 5/8" ROCKBIT TO 305 FT. SET 273' OF BLANK 6" PVC SCHEDULE 80 FLUSH JOINT CASING WITH 20' OF .020 SLOTTED PVC SCREENS WITH A 10' SEDIMENT TRAP BELOW SCREENS FOR A SUMP.
4250.3			CALICHE (CL) (6.0 – 12.0) SILTY, LIGHT-TAN			
4239.3	20		SAND (SM) (12.0 – 23.0) FINE, TAN			
4229.3			GRAVEL (GC) (23.0 – 33.0) CLAYEY, SANDY			SANDPACK OF SMALL PEA GRAVEL FROM 255' – 305'. BENTONITE SEAL 245'– 255' CONCRETE FROM CLOVIS CONCRETE CO. ABOVE 255' 4' X 4' CONCRETE PAD, COVER PIPE, AND 4 GUARD POSTS INSTALLED.
4214.3	40		SAND (SM) (33.0 – 48.0) FINE			
4207.3			CLAY (CL) (48.0 – 55.0) SANDY			HOLE BAILED AND DEVELOPED ON 8/13/88. PUMP INSTALLED 8/18–19/88. (1 HP 220 VOLT RED JACKET) PUMPED ~500 GAL AT 10 GPM
4199.3	60		CLAY (CL) (55.0 – 63.0) SILTY			
	80		SAND (SM) (63.0 – 125.0) SANDY CLAY ZONES PRESENT			TYPE ROCK BIT — ZONE 0.0–305.0
	100				NONE	SAMPLE NONE — DEPTH 0.0–305.0
4137.3	120					
	140		SAND (SM) (125.0 – 198.0) LESS CLAY CONTENT			
	160					
	180					
			CALICHE (CL) (198.0 – 209.0) SANDY, CLAYEY			

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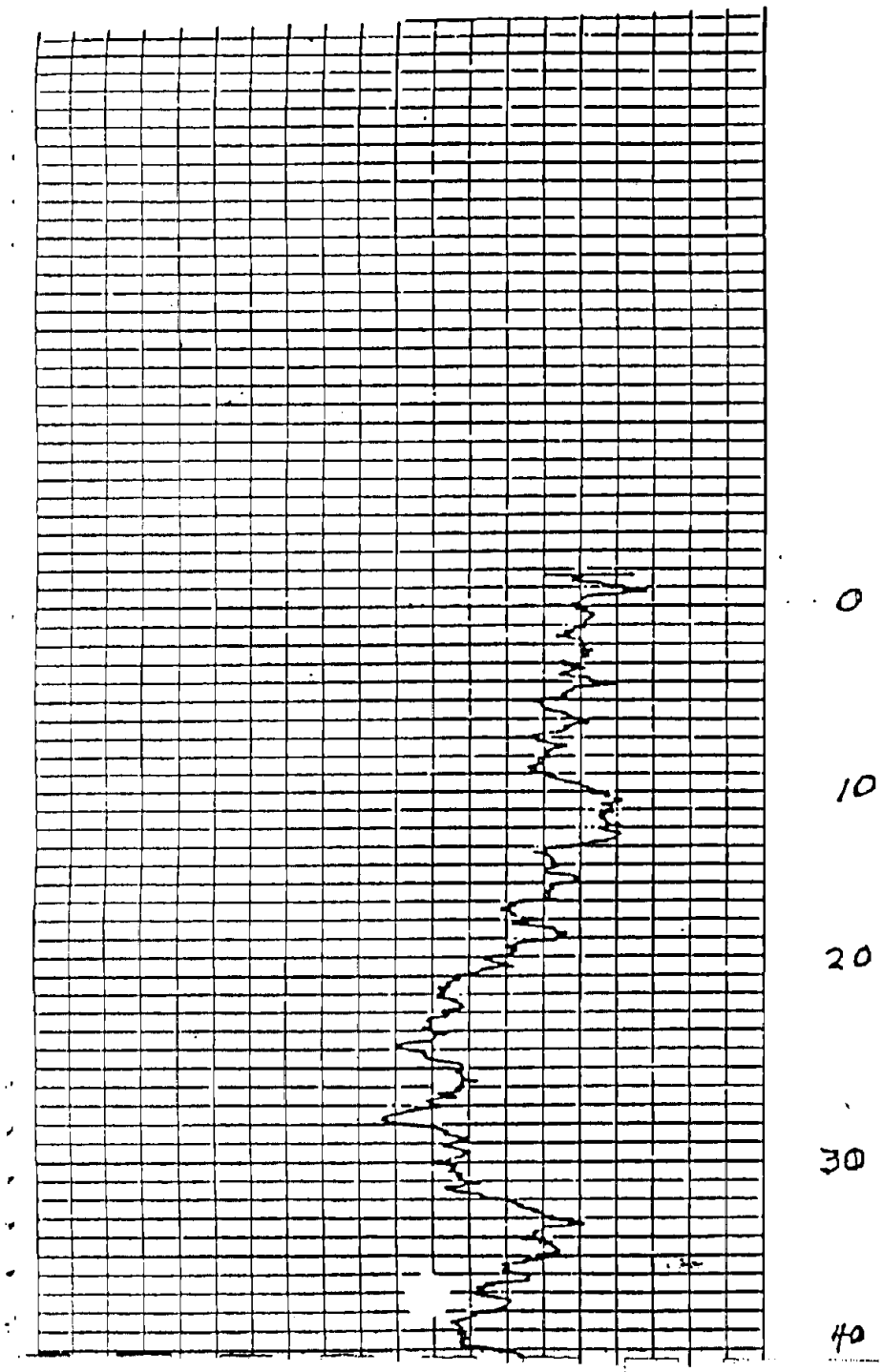
HOLE NO. 1

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION CANNON AFB	SHEET 2 OF 2 SHEETS
1. PROJECT LANDFILL 5		10. SIZE AND TYPE OF BIT 9 5/8"	
2. LOCATION (Coordinates or Station) 0.00 0.00		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY ROMAN WELL SERVICE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING	
4. HOLE NO. (As shown on drawing title and file number) 1		13. TOTAL NO OF OVER-	DISTURBED / UNDISTURBED
5. NAME OF DRILLER JIM ROMAN		14. TOTAL NUMBER CORE BOXES 0	
		15. ELEVATION GROUND WATER 3997.9(8/31/88)	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		16. DATE HOLE STARTED 08/10/88	COMPLETED 08/12/88
		17. ELEVATION TOP OF HOLE 4262.3	
7. THICKNESS OF OVERBURDEN 0.0		18. TOTAL CORE RECOVERY FOR BORING 0.0 %	
8. DEPTH DRILLED INTO ROCK 0.0		19. SIGNATURE OF INSPECTOR E.N. GILBERT	
9. TOTAL DEPTH OF HOLE 305.0			

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
4053.3			CALICHE (CL) (198.0 – 209.0) SANDY, CLAYEY			
4047.3			GRAVEL (GP) (209.0 – 215.0) SLIGHTLY CLAYEY, SANDY			
4037.3	220		GRAVEL (GM) (215.0 – 225.0) CLAYEY, SANDY			
	240		SAND (SM) (225.0 – 300.0) SILTY WITH OCCASIONAL GRAVELS. SATURATED BELOW 265 FT.		NONE	
	260					
	280					
3957.3	300		() (300.0 – 305.0) CUTTINGS BELOW 300 FT NOT LOGGED			
3957.3			BOTTOM OF HOLE 305'			
	320					
	340					
	360					
	380					
	400					

well I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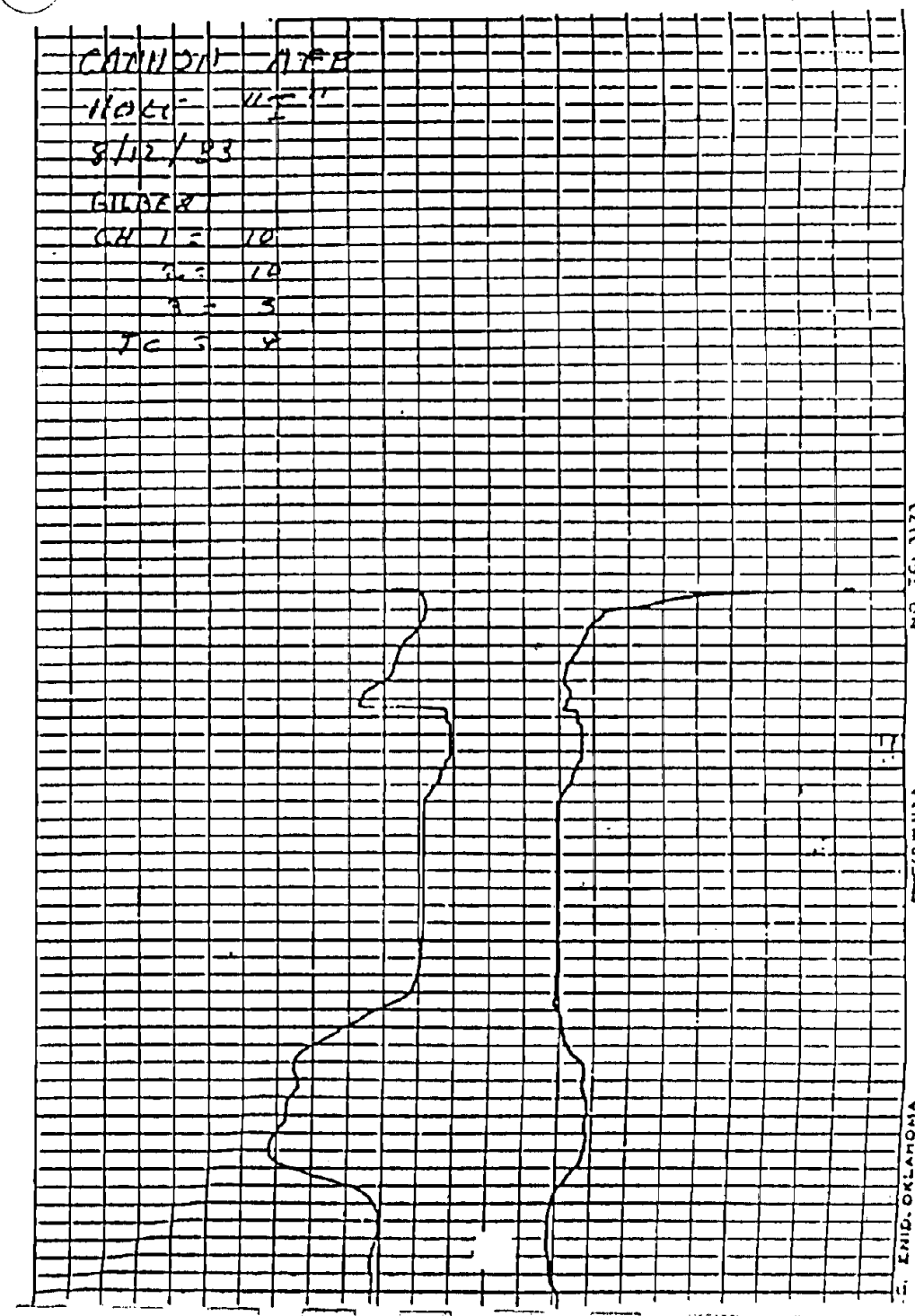
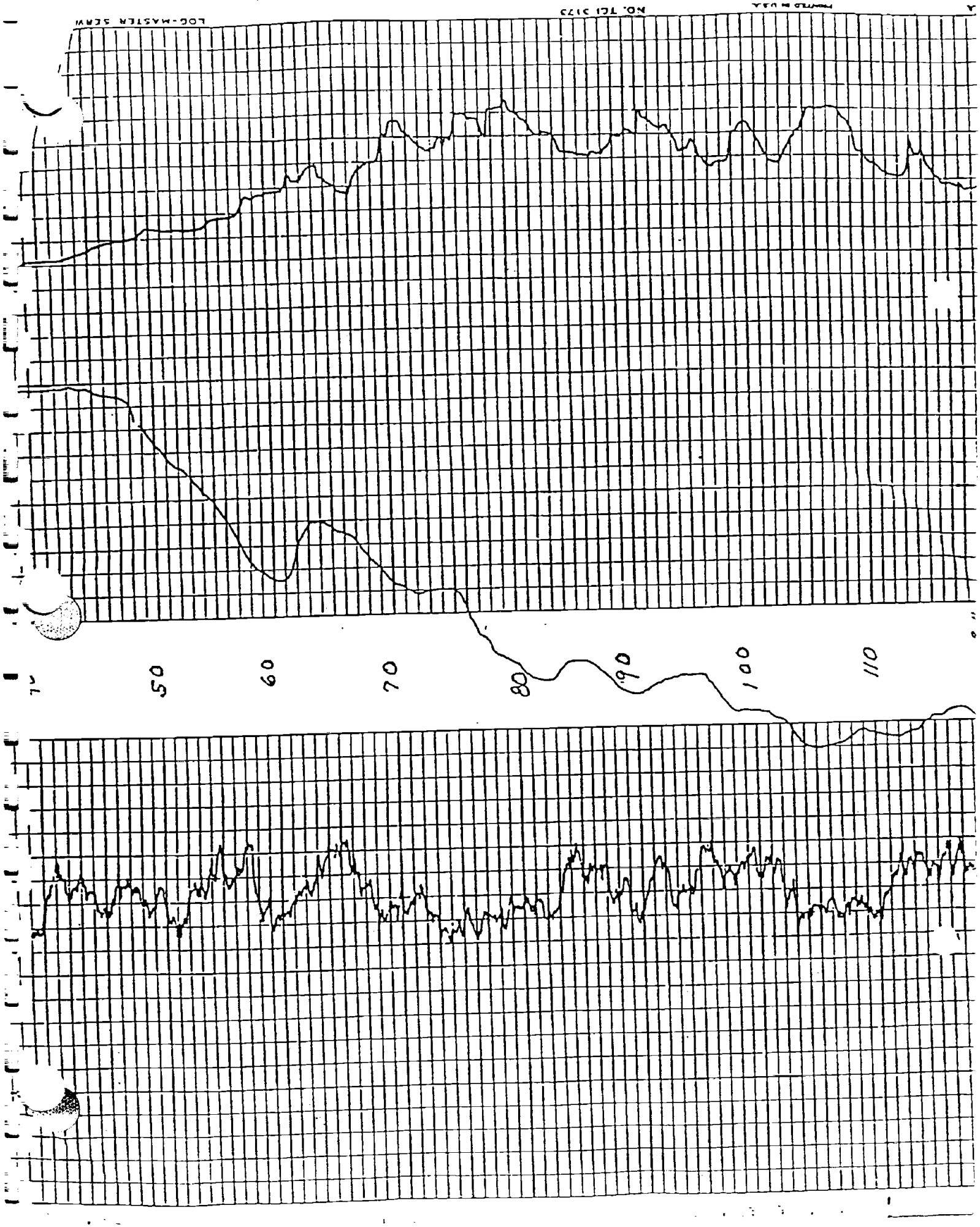

CANYON AREA
HOLE
8/12/83
GILBERT
CH 1 = 10
2 = 10
3 = 3
TC = 8
NO. TC 3173
PRINTED IN U.S.A.
E. ENID, OKLAHOMA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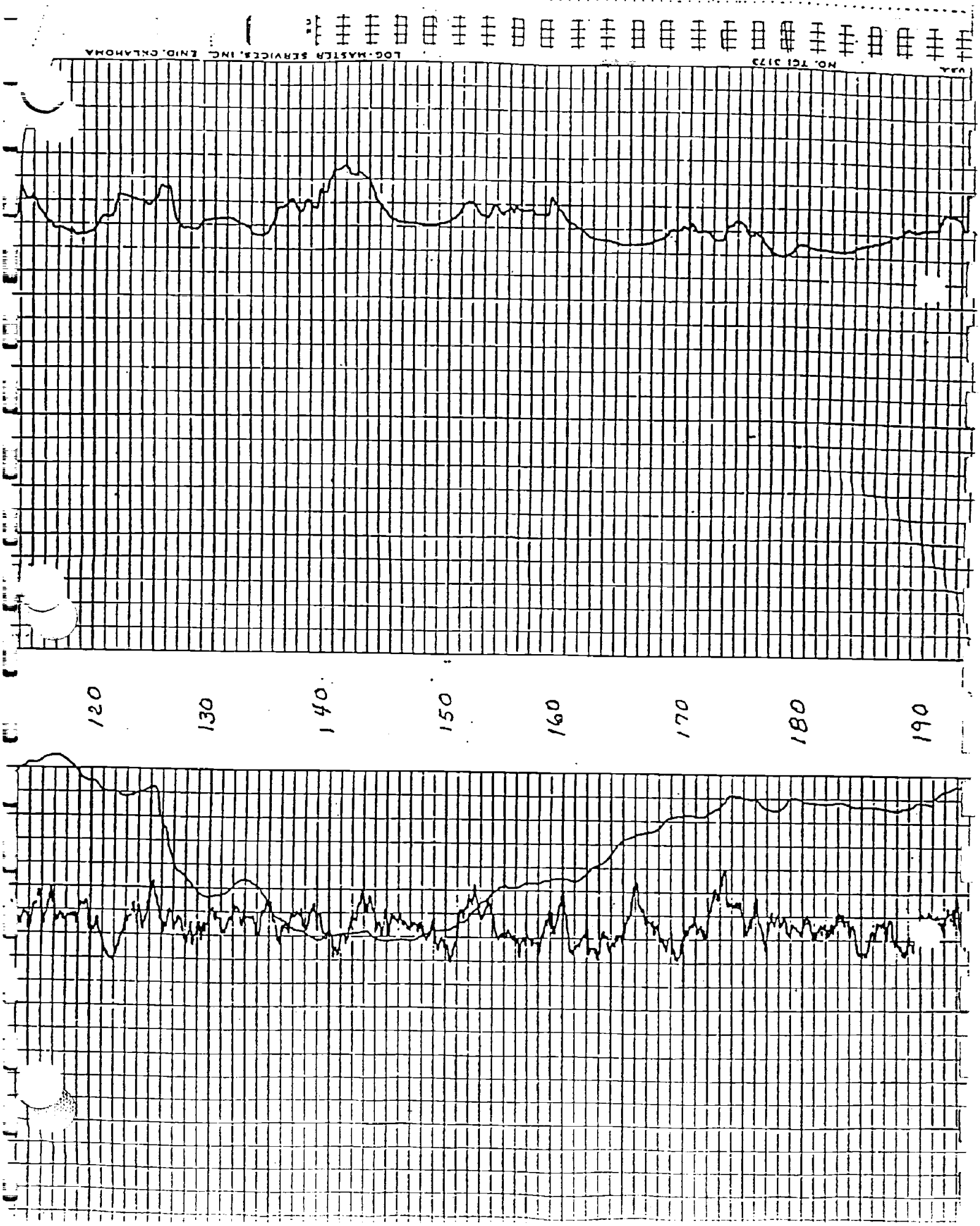
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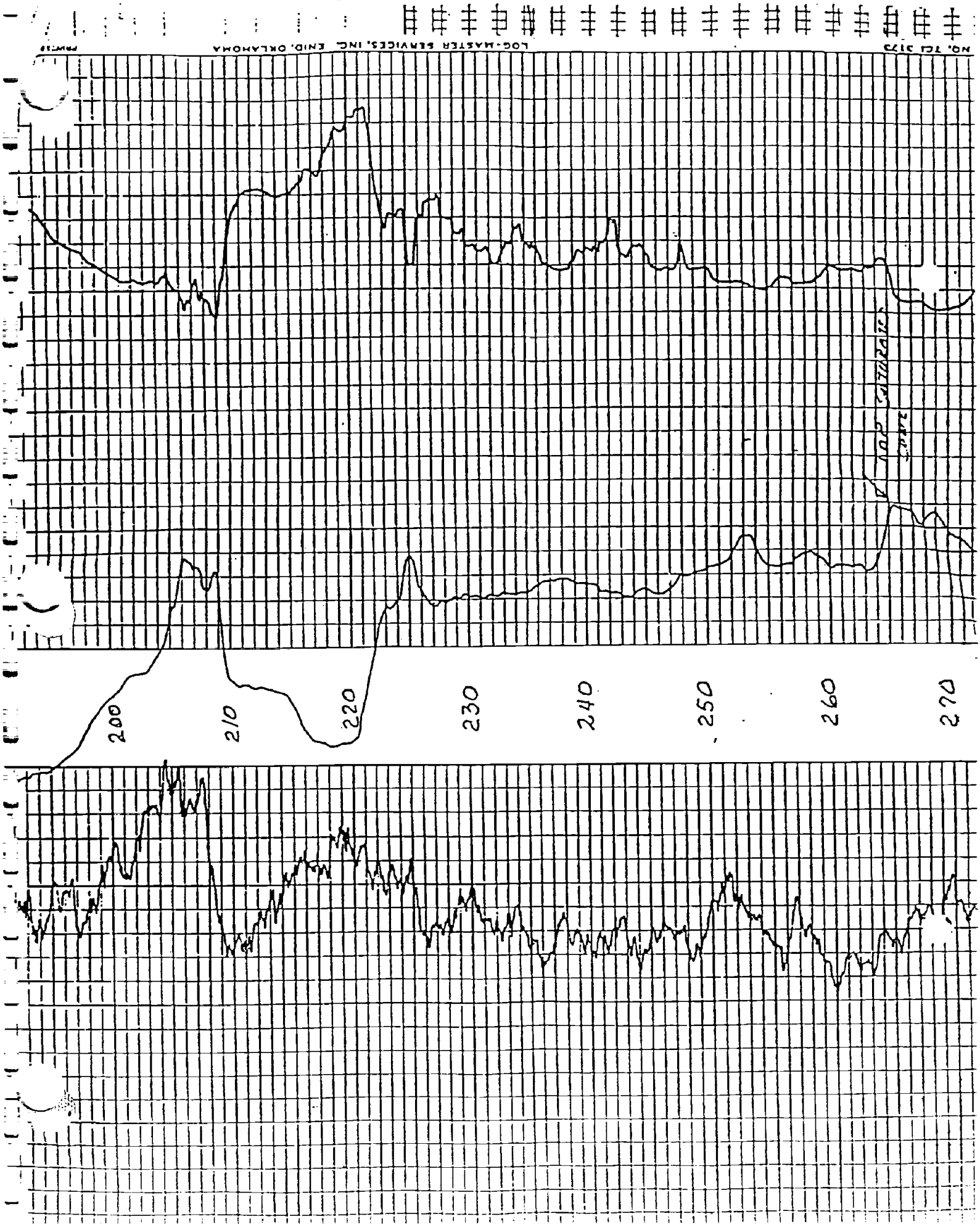
LOG-MASTER SERVICES, INC. ENID, OKLAHOMA
NO. TCI 3173
NO CALIBRATE
200
210
220
230
240
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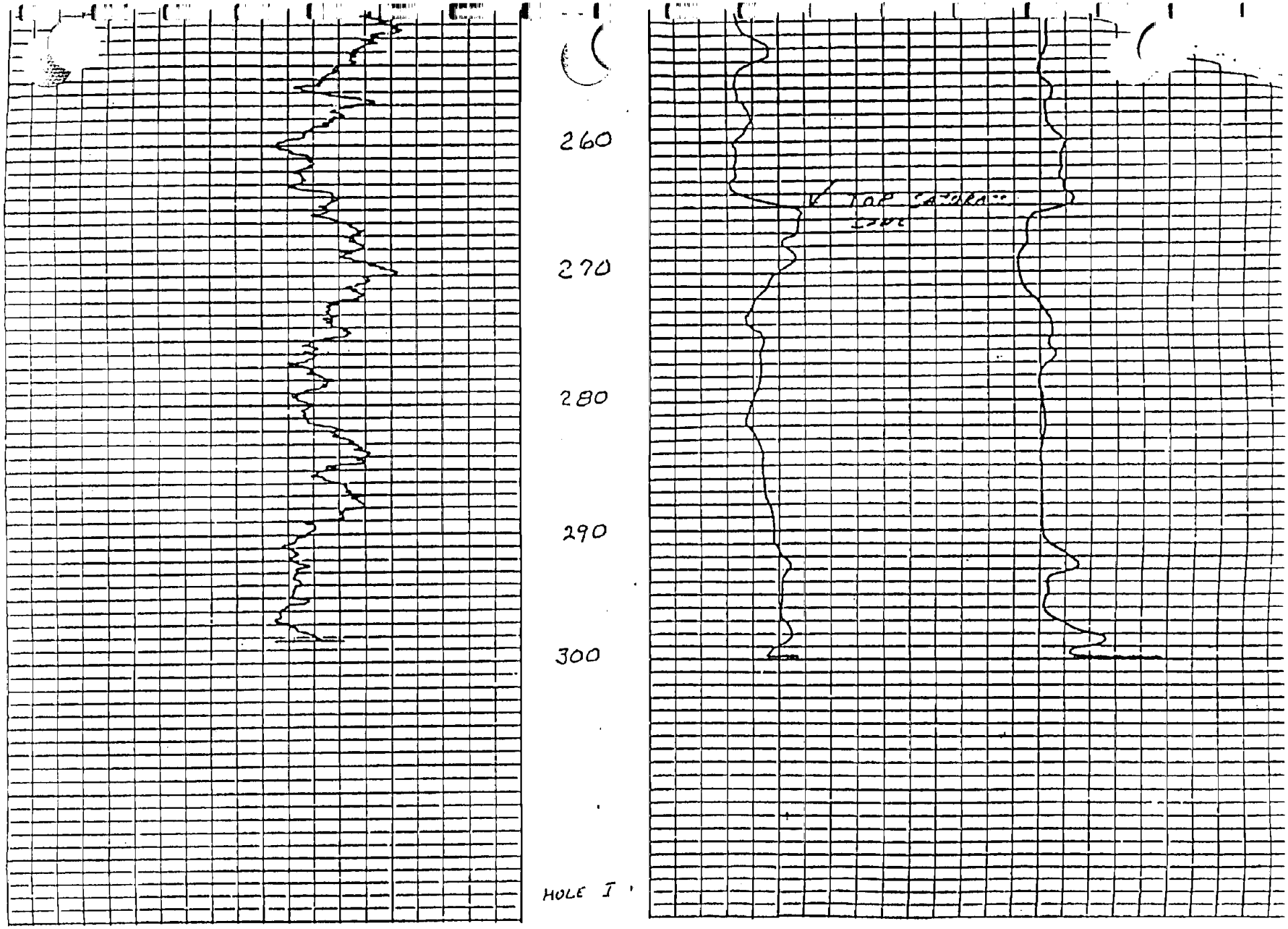
260
270



478 172

Hole No. I

DRILLING LOG	DIVISION SOUTHWESTERN	INSTALLATION CANNON AFB	SHEET 1 OF 2 SHEETS
1. PROJECT LANDFILL "5"		10. SIZE AND TYPE OF BIT 9 5/8	
2. LOCATION (Coordinates or Station) 250' N. of SE FENCE CORNER		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY ROMAN WELL SERVICE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING	
4. HOLE NO. (As shown on drawing title and file number) "I"		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED — UNDISTURBED —	
5. NAME OF DRILLER JIM ROMAN		14. TOTAL NUMBER CORE BOXES —	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
		16. DATE HOLE: STARTED 8/10/88 COMPLETED 8/12/88	
7. THICKNESS OF OVERBURDEN		17. ELEVATION TOP OF HOLE 4262.3	
8. DEPTH DRILLED INTO ROCK 0		18. TOTAL CORE RECOVERY FOR BORING 0.0 %	
9. TOTAL DEPTH OF HOLE 305.0		19. SIGNATURE OF INSPECTOR Ed Hulbert	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			0.0-0.5 SAND(SM), Topsoil silty, brown.			DRILLING — Start 8/10/88 finish 8/12/88 9 5/8" Rockbit 0.0 - 305
	10		0.5-6.0 SAND(SM) silty, reddish brown.			
	20		6.0-12.0 CALICHE silty, light tan.			
	30		12.0-23.0 SAND(SM) fine tan			Set 273' of Blank 6" PVC Schedule 80 Flush joint casing with 20' of 6" SCHEDULE 80 (.020 slot) PVC SCREENS with 10' of Blank pipe below screens for Sediment trap. Bottom plug installed.
	40		23.0-33.0 GRAVEL (GC) sandy, clayey.			
			33.0-48.0 SAND(SM) fine			
	50		48.0-55.0 CLAY (CL), sandy			
			55.0-62.0 CLAY (CL) silty.			
	60		63.0-125.0 SAND(SM) with sandy clay zones.			SAND PACK of small pea gravel From 255-305 Bentonite 245-255 Concrete from Clowis Concrete Company above 255.
	70					
			125.0-198.0 SAND(SM) with less clay content.			
	80					
	90					
	100					
	110					
	120					4X4 PAD, cover site, and 4 guard posts installed.
	130					
	140					Hole bailed and developed 8/13/88
	150					
	160					Pump installed 8/18-19/88 1 HP 220 volt Red jacket CAPACITY ABOUT 10 gpm.
	170					
	180					
	190					Pumped approximately 500 gallons at about 10 gpm.
	200					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT LANDFILL 5 HOLE NO. "I"

Hole No. I

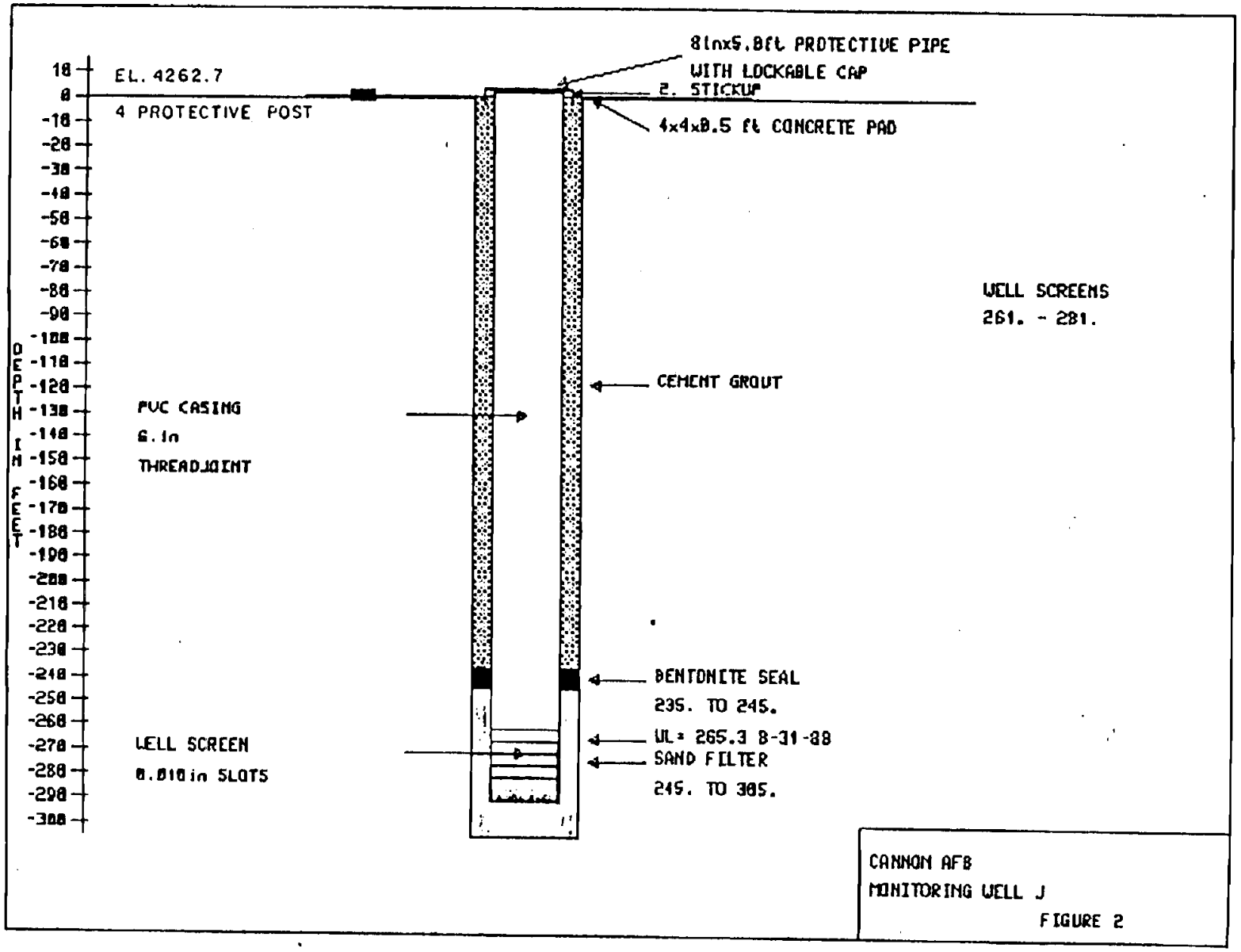
DRILLING LOG	DIVISION SOUTHWESTERN	INSTALLATION CANNON AFB	SHEET 2 OF SHEETS

1. PROJECT: LANDFILL "5"
2. LOCATION (Coordinates or Station): 250' N of SE FENCE CORNER
3. DRILLING AGENCY: ROMAN WELL SERVICE
4. HOLE NO. (As shown on drawing title and file number): I
5. NAME OF DRILLER: JIM ROMAN
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE: 305
10. SIZE AND TYPE OF BIT
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED —; UNDISTURBED —
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER
16. DATE HOLE: STARTED 8/10/83; COMPLETED 8/12/83
17. ELEVATION TOP OF HOLE: 4262.3
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR: Gilbert

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	210, 220, 230, 240, 250, 260, 270, 280, 290, 300, 305		198 – 209 CALICHE, sandy, clayey. 209 – 215.0 GRAVEL, (GP) slightly clayey, sandy. 215.0 – 225.0 GRAVEL, (GM) clayey sandy. 225.0 – 300 SAND, (SM) silty with occ. gravels. SATURATED BELOW 265'. CUTTINGS BELOW 300' NOT Logged.			MATERIAL DESCRIBED FROM INTERPRETATION OF GEOPHYSICAL LOGS AND DRILL ACTION.
	310		BOTTOM OF HOLE.	305/4265		

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT: LANDFILL "5" HOLE NO. "I"


8inx5.8ft PROTECTIVE PIPE
WITH LOCKABLE CAP
2. STICKUP
4x4x0.5 ft CONCRETE PAD
EL. 4262.7
4 PROTECTIVE POST
DEPTH IN FEET
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
-220
-230
-240
-250
-260
-270
-280
-290
-300
WELL SCREENS
261. - 281.
CEMENT GROUT
PVC CASING
6.in
THREADJOINT
BENTONITE SEAL
235. TO 245.
UL= 265.3 8-31-88
SAND FILTER
245. TO 305.
WELL SCREEN
0.010in SLOTS
CANNON AFB
MONITORING WELL J
FIGURE 2

478 115

478 116

Hole No. "J"

DRILLING LOG	DIVISION SOUTHWESTERN	INSTALLATION CANNON AFB	SHEET 1 OF 2 SHEETS

1. PROJECT: LANDFILL "S"
2. LOCATION (Coordinates or Station): 100' WEST of SE FENCE CORNER
3. DRILLING AGENCY: ROMAN WELL SERVICE
4. HOLE NO. (As shown on drawing title and file number): "J"
5. NAME OF DRILLER: JIM ROMAN
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: —
8. DEPTH DRILLED INTO ROCK: —
9. TOTAL DEPTH OF HOLE: 305.0
10. SIZE AND TYPE OF BIT: 9 5/8" ROCKBIT
11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED —; UNDISTURBED —
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER:
16. DATE HOLE: STARTED 8/16/88; COMPLETED 8/16/88
17. ELEVATION TOP OF HOLE: 4262.7
18. TOTAL CORE RECOVERY FOR BORING: — %
19. SIGNATURE OF INSPECTOR: [illegible]

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			0.0-0.5 SAND^{sm} (TOPSOIL) silty brown.			DRILL 0.0-305.0 with 9 5/8" Rockbit.
	10		0.5-5.0 SAND^{sm} silty reddish brown.			
	20		5.0-10.0 CALICHE, silty, light tan.			Set 272.63' of schedule 80 PVC 6" diameter threaded casing and 20' of screen with .020 slots. 10' of BLANK CASING and Plug BELOW SCREEN. TOTAL LENGTH 292.63 with 2' stickup
	30		10.0-15.0 SAND^{sm} silty clayey.			
	40		15.0-25.0 SAND^{sm} fine			
	50		25.0-32.0 GRAVEL^{gc} sandy CLAYEY.			
	60		32.0-52.0 SAND^{sm} fine few clay streaks.			SANDPACK (Pea gravel) 245-305 BENTONITE SEAL 235.0-245.0 Concrete from Clovis Concrete Co. above 235 4x4 Concrete pad - Casing cover pipe and 4 guard posts. HOLE BAILED AND DEVELOPED WITH BAILER. 8/17/88 1 H.P. 220 Volt Pump and 3/4" Measuring pipe installed 8/17/88 Approximately 500 gallons of water pumped at about 10 gpm.
	70		52.0-58.0 CLAY^{cc} sandy			
	80		58.0-78.0 SAND^{sc} clayey			
			78.0-100.0 SAND^{sm} silty			
	90		100.0-118.0 SAND^{sm} silty and clayey.			
	100		118.0-123.0 SAND^{sm} fine			
	110		123.0-198.0 SAND^{sm} fine few silty clay seams.			
	120					
	130					
	140					
	150					
	160					
	170					
	180					
	190					
	200					
	210					

FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT: LANDFILL "S"

HOLE NO. "J"

478 117

Hole No. "J"

DRILLING LOG	DIVISION SOUTHWESTERN	INSTALLATION CANNON AFB	SHEET 2 OF 2 SHEETS
1. PROJECT LANDFILL "5"		10. SIZE AND TYPE OF BIT 4 5/8" ROCK BIT	
2. LOCATION (Coordinates or Station) 100' W of SE FENCE CORNER		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY ROMAN WELL SERVICE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING	
4. HOLE NO. (As shown on drawing title and file number) "J"		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED / UNDISTURBED
5. NAME OF DRILLER JIM ROMAN		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
		16. DATE HOLE	STARTED / COMPLETED
7. THICKNESS OF OVERBURDEN —		17. ELEVATION TOP OF HOLE 4262.7	
8. DEPTH DRILLED INTO ROCK —		18. TOTAL CORE RECOVERY FOR BORING %	
9. TOTAL DEPTH OF HOLE 305		19. SIGNATURE OF INSPECTOR Gilbert	

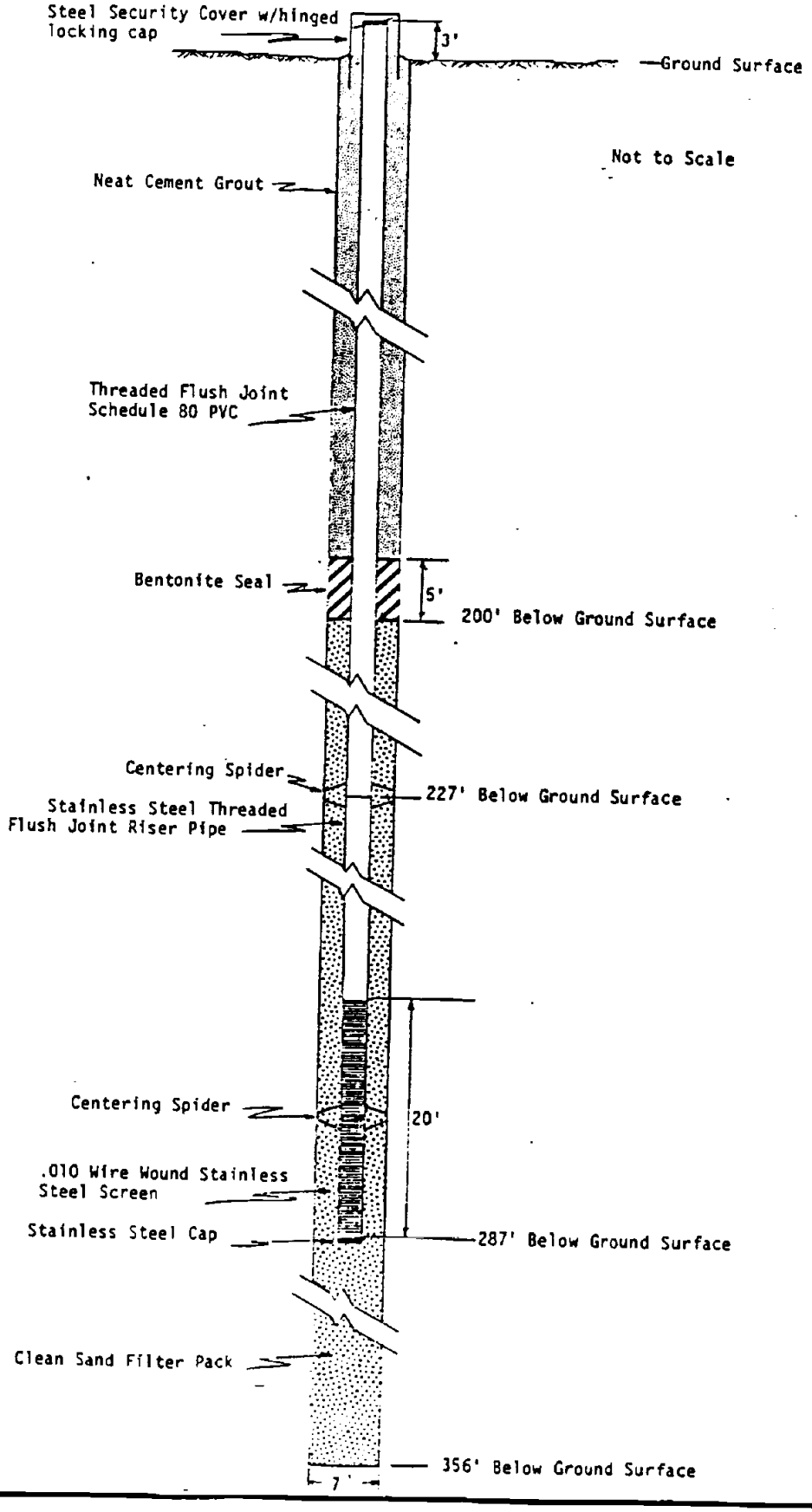
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	210		198.0-212.0 CALICHE, Slightly clayey Sandy Hard cemented zone 213.0-220.0.			
	220		220.0-232.0 GRAVEL, (GC) clayey, grading to less clay downward contains clay streaks.			
	230		232.0-248.0 SAND, (SM) gravelly clayey.			
	240		248.0-305.0 SAND, (SM) few clay and gravel streaks below 267.0			
	250		CLAY SANDY 266-267			
	260					
	270					
	280					
	290					Material described from INTERPRETATION OF GEOPHYSICAL LOGS.
	300					
	305					
	310		BOH 305.0 / 3922.7			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT LANDFILL 5 | HOLE NO. "J"

MONITOR WELL DETAIL

CANNON A.F.B.



NATIONAL SOIL SERVICES, INC.
CONSULTING ENGINEERS.

LIST AND LOCATION OF CASING IN MONITOR WELL CANNON A.F.B.

TYPE OF CASING	LENGTH	DEPTH IN FEET RELATIVE TO GROUND SURFACE FROM	TO
PVC (SCH 80)	10'	+3	-7
PVC (SCH 80)	10'	-7	-17
PVC (SCH 80)	10'	-17	-27
PVC (SCH 80)	10'	-27	-37
PVC (SCH 80)	10'	-37	-47
PVC (SCH 80)	10'	-47	-57
PVC (SCH 80)	10'	-57	-67
PVC (SCH 80)	10'	-67	-77
PVC (SCH 80)	10'	-77	-87
PVC (SCH 80)	10'	-87	-97
PVC (SCH 80)	10'	-97	-107
PVC (SCH 80)	10'	-107	-117
PVC (SCH 80)	10'	-117	-127
PVC (SCH 80)	10'	-127	-137
PVC (SCH 80)	10'	-137	-147
PVC (SCH 80)	10'	-147	-157
PVC (SCH 80)	10'	-157	-167
PVC (SCH 80)	10'	-167	-177
PVC (SCH 80)	10'	-177	-187
PVC (SCH 80)	10'	-187	-197
PVC (SCH 80)	10'	-197	-207
PVC (SCH 80)	10'	-207	-217
PVC (SCH 80)	10'	-217	-227
STAINLESS STEEL CASING	10'	-227	-237
STAINLESS STEEL CASING	10'	-237	-247
STAINLESS STEEL CASING	10'	-247	-257
STAINLESS STEEL CASING	10'	-257	-267
STAINLESS STEEL SCREEN .010 SLOT	10'	-267	-277
STAINLESS STEEL SCREEN .010 SLOT	10'	-277	-287

CANNON AIR FORCE BASE - WELL L

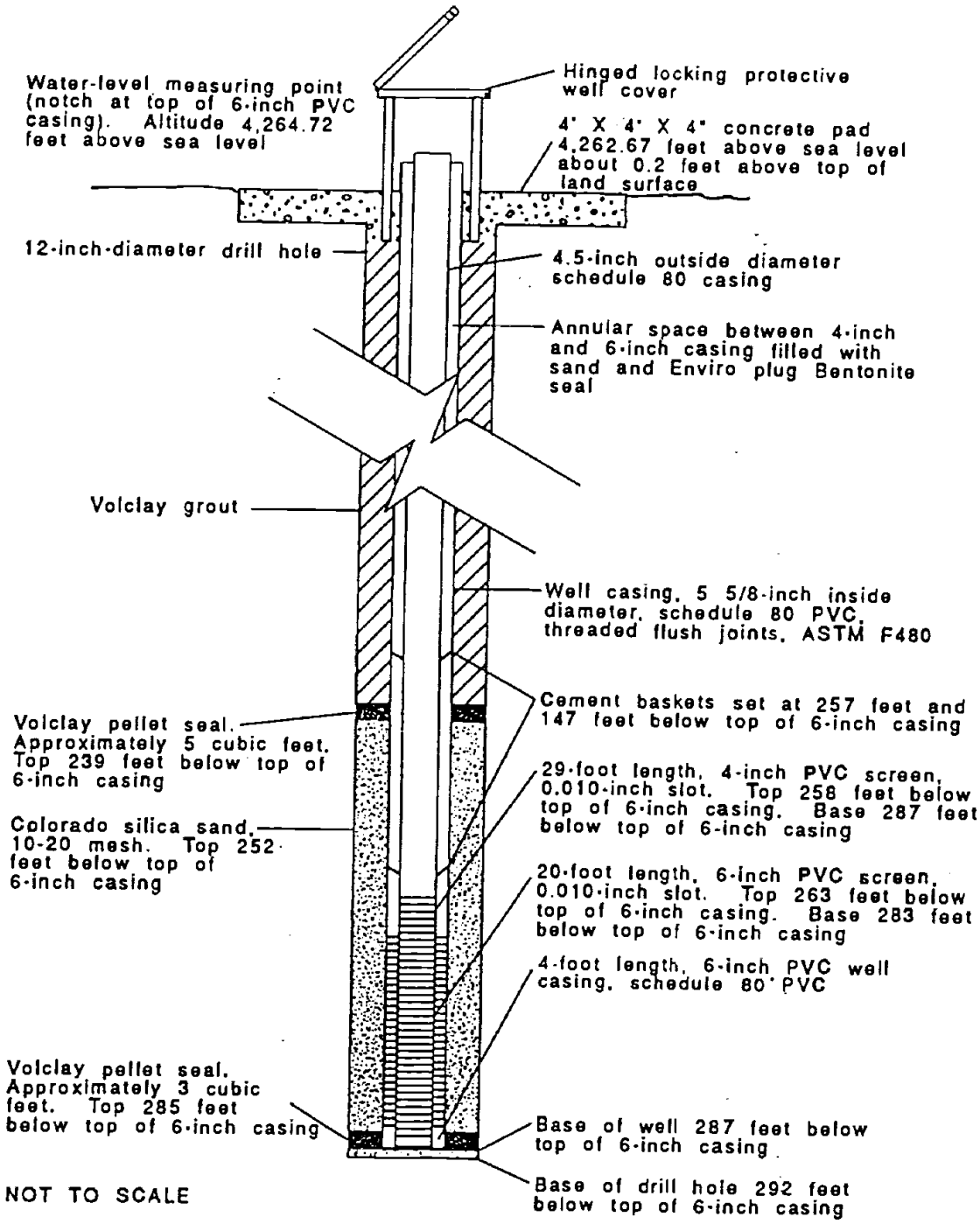


Figure 1.--Well-completion diagram for monitoring well CAFB-L drilled and completed by U.S. Geological Survey, Coal Branch, Denver, Colo. Started on 01-18-92. Completed on 06-02-92. Well drilled using mud-rotary method and Wyoming sodium bentonite drilling fluid.

This figure accurately represents the construction of well L at Cannon Air Force Base.

Peter F. Frenzel Professional Engineer, Certificate Number 9989

MONITORING WELL IDENTIFICATION REPORT

ENVIRONMENTAL IMPROVEMENT DIVISION
HAZARDOUS WASTE SECTION
1190 ST. FRANCIS DR./HAROLD RUNNELS BLDG.
SANTA FE, NEW MEXICO 87503

FACILITY NAME Cannon Air Force Base

EPA I.D. NUMBER

COUNTY Curry

WELL NUMBER Well L - Landfill 5

WELL LOCATION (LONGITUDE) 103° 18' 00''

WELL LOCATION (LATITUDE) 34° 22' 02''

AQUIFER NAME Ogallala

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE June 2, 1992

DRILLING METHOD Hydrt (mud rotary)

INNER CASING DIAMETER 4.0 inch inside 5.8 inch

BOREHOLE DIAMETER 12 inch

CASING MATERIAL PVC

METHOD OF DEVELOPMENT BAILD

ELEV BOTTOM OF BOREHOLE 3972.72

ELEV BOTTOM OF WELL CASING 3977.72

ELEV BOTTOM OF SCREENED INT 3981.72

ELEVATION OF SCREENED INT 3981.72 to 4001.72

SURVEYED ELEV OF CASING TOP 4,264.72

DATE OF REPORT 10-21-92 SIGNATURE Jerry D Larson

NAME (TYPED) Jerry D. Larson

MONITORING WELL IDENTIFICATION REPORT

ENVIRONMENTAL IMPROVEMENT DIVISION
HAZARDOUS WASTE SECTION
1190 ST. FRANCIS DR./HAROLD RUNNELS BLDG.
SANTA FE, NEW MEXICO 87503

FACILITY NAME Cannon Air Force Base

EPA I.D. NUMBER

COUNTY Curry

WELL NUMBER Well L - Landfill 5

WELL LOCATION (LONGITUDE) 103° 1' 8" 00"

WELL LOCATION (LATITUDE) 34° 22' 02"

AQUIFER NAME Ogallala

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE June 2, 1992

DRILLING METHOD Hydrt (mud rotary)

INNER CASING DIAMETER 4.0 inch inside 5.8 inch

BOREHOLE DIAMETER 12 inch

CASING MATERIAL PVC

METHOD OF DEVELOPMENT BAILD

ELEV BOTTOM OF BOREHOLE 3972.11

ELEV BOTTOM OF WELL CASING 3977.11

ELEV BOTTOM OF SCREENED INT 3973.11

ELEVATION OF SCREENED INT 3973.11 to 3993.11

SURVEYED ELEV OF CASING TOP 4,264.72

DATE OF REPORT August 4, 1992 SIGNATURE Jerry D Larson

NAME (TYPED) Jerry D. Larson

Well L
Core Description

January 20, 1992

15.0	-	15.25	Red silty clay 100% recovery
15.25	-	15.50	White caliche 100% recovery
15.50	-	18.50	Alternating streaks of white caliche and red silty sand 100% recovery
18.5	-	21.0	Alternating streaks of white caliche and red silty sand 100% recovery
21.00	-	22.00	Alternating streaks of white caliche and red silty sand 100% recovery
22.00	-	23.00	Red silty clay and sand mix 100% recovery
23.00	-	24.00	Tan to white caliche - silty sand mix 100% recovery
24.00	-	32.50	Reddish tan silt some caliche layers + sand 100 recovery

January 21, 1992

32.50	-	37.50	Cemented sand & siltstone
37.5	-	42.5	32.5 - 32.75 soft clay/caliche, 32.75 - 34.5 soft reddish orange silt 34.5 - 37.5 caliche - very hard
42.5	-	50.50	Reddish brown silt with hard siltstone lenses 100% recovery 49.5 to 50.5 silty sand
50.5	-	60.5	Mostly red cement siltstone with some sand and layers of uncemented silt 100% recovery
60.5	-	74.5	Becoming sandier mostly highly cemented silty sand red to tan some caliche and softlenses 100% recovery
74.5	-	89.0	74.5-81 soft reddish brown silty sand 81.0-82.5 hard reddish brown sandstone cemented 75% recovery 82.5-88.5 soft reddish brown silty sand 88.5-89 hard sandstone cemented
89.0	-	99	Med-fine sand and sandstone red 40% recovery
99.0	-	103	99-1025 Med-fine sand red 102.5-103 caliche layer 100% recovery
103	-	106	Mostly med-fine sand red with caliche stringers 75% recovery
106	-	109	Mostly med-fine sand red @ 108.5' caliche layer 100% recovery
109	-	114	Mostly med-fine sand, red with large caliche pieces throughout lower part of sample 95% recovery
114	-	120.5	Mostly med-fine sand-red with caliche 115 - 100% recovery
120.5	-	124.0	Med-fine sand reddish brown becoming coarser 136-138 - 100% recovery
124	-	138	Med-fine sand, reddish brown becoming coarser 136-138 - 100% recovery
138	-	153	Med-fine sand becoming finer - reddish brown 66% recovery
153	-	166	Fine sand reddish brown caliche nodules 100% recovery
166	-	179	Fine sand reddish brown caliche nodules 90% recovery
179	-	194	Reddish brown fine silty sand 100% recovery
194	-	208	Reddish brown fine silty sand 90% recovery
208	-	221	Hard caliche and then gravel 0% recovery
221	-	223	Gravel coarse 2+ inch in diameter only caught 6 boulders 10% recovery
223	-	233	Gravel coarse - coarse sands grading to fine sand and clay stringers 20% recovery
233	-	243	Fine tightly packed sand numerous sandstone nodules 100% recovery
243	-	255	Fine tightly packed sand numerous sandstone nodules plus med-fine sand-reddish brown, with few layers of clay 100% recovery
255	-	272	Fine tightly packed sand w/sandstone nodules grading to med-fine reddish brown sand with clay stringers 100% recovery

CANNON AIR FORCE BASE - WELL M

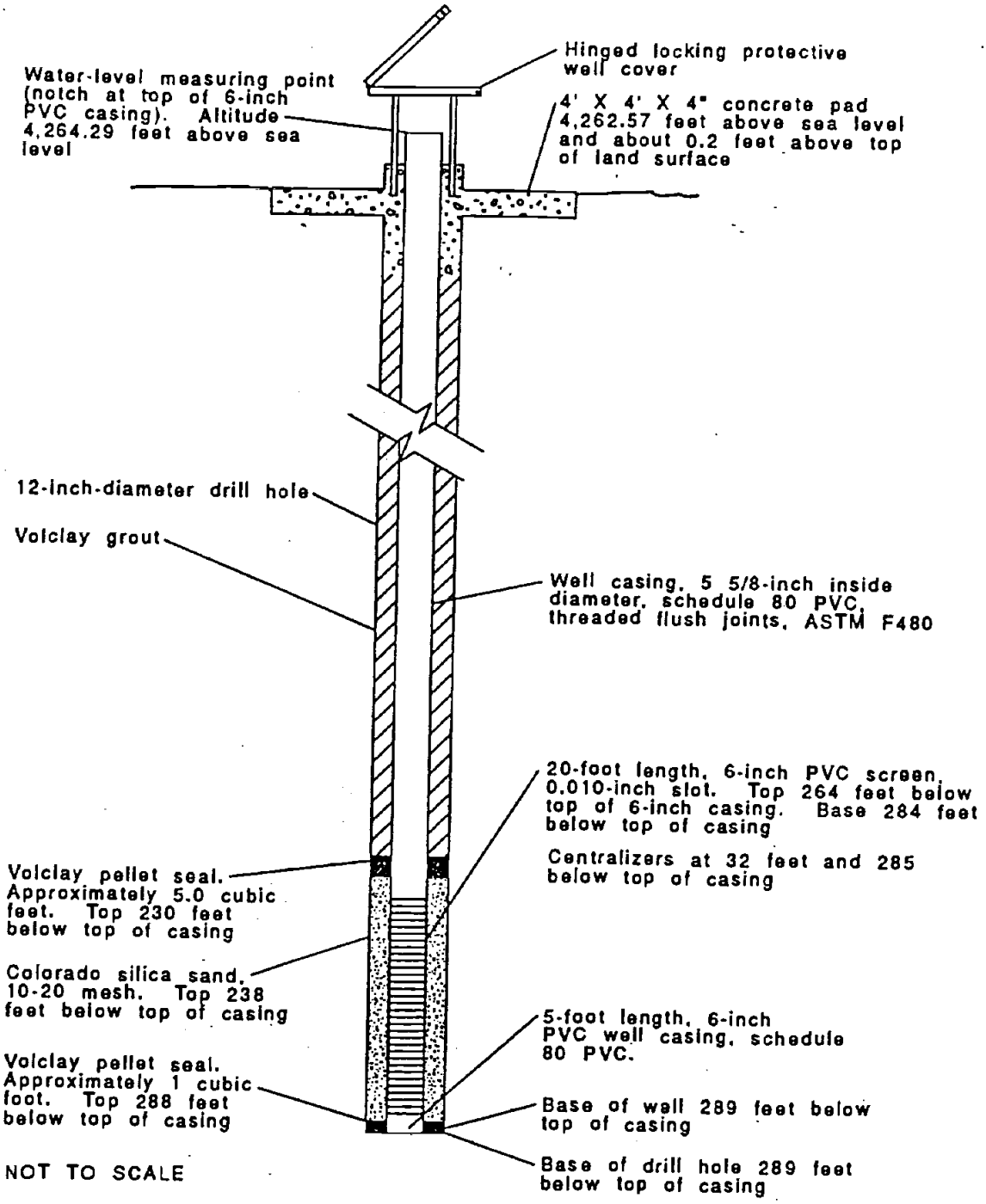


Figure 1.--Well-completion diagram for monitoring well CAFB-M drilled and completed by U.S. Geological Survey, Coal Branch, Denver, Colo. Started on 01-31-92. Completed on 02-05-92. Well drilled using mud-rotary method and Wyoming sodium bentonite drilling fluid.

This figure accurately represents the construction of well M at Cannon Air Force Base.

Peter F. Frenzel Professional Engineer,
Certificate Number 9989

MONITORING WELL IDENTIFICATION REPORT

ENVIRONMENTAL IMPROVEMENT DIVISION
HAZARDOUS WASTE SECTION
1190 ST. FRANCIS DR./HAROLD RUNNELS BLDG.
SANTA FE, NEW MEXICO 87503

FACILITY NAME Cannon Air Force Base

EPA I.D. NUMBER

COUNTY Curry

WELL NUMBER Well M - Landfill 5

WELL LOCATION (LONGITUDE) 103° 1 8 ' 0 0 "

WELL LOCATION (LATITUDE) 34° 22′ 01 "

AQUIFER NAME Ogallala

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE February 4, 1992

DRILLING METHOD HYDRT: (mud. rotary)

INNER CASING DIAMETER 5.8 inch

BOREHOLE DIAMETER 12 inch

CASING MATERIAL PVC

METHOD OF DEVELOPMENT BAILD

ELEV BOTTOM OF BOREHOLE 3975.29

ELEV BOTTOM OF WELL CASING 3975.29

ELEV BOTTOM OF SCREENED INT 3980.29

ELEVATION OF SCREENED INT 4000.29 - 3980.29

SURVEYED ELEV OF CASING TOP 4264.29

DATE OF REPORT 10-21-92 SIGNATURE Jerry D Larson

NAME (TYPED) Jerry D. Larson

MONITORING WELL IDENTIFICATION REPORT

ENVIRONMENTAL IMPROVEMENT DIVISION
HAZARDOUS WASTE SECTION
1190 ST. FRANCIS DR./HAROLD RUNNELS BLDG.
SANTA FE, NEW MEXICO 87503

FACILITY NAME Cannon Air Force Base

EPA I.D. NUMBER

COUNTY Curry

WELL NUMBER Well M - Landfill 5

WELL LOCATION (LONGITUDE) 103° 18' 00"

WELL LOCATION (LATITUDE) 34° 22' 01"

AQUIFER NAME Ogallala

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE February 4, 1992

DRILLING METHOD HYDRT: (mud rotary)

INNER CASING DIAMETER 5.8 inch

BOREHOLE DIAMETER 12 inch

CASING MATERIAL PVC

METHOD OF DEVELOPMENT BAILD

ELEV BOTTOM OF BOREHOLE 3975.~~70~~ 29

ELEV BOTTOM OF WELL CASING 3975.~~70~~ 29

ELEV BOTTOM OF SCREENED INT 3980.~~07~~ 29

ELEVATION OF SCREENED INT ~~3999.82~~ 4000.29 - 3980.~~07~~ 29

SURVEYED ELEV OF CASING TOP 4264.29

DATE OF REPORT 6-2-92 SIGNATURE Jerry D Larson

NAME (TYPED) Jerry D. Larson

Cannon Air Force Base

Well M

Lithologic Description

0-5	Top soil with red and yellow clay streaks
5-10	Red silty clay with streaks of white caliche
10-15	Red silty clay with streaks of white caliche
15-20	Alternating streaks of caliche and red silty sand
20-25	White-Tan caliche and silty sand
25-30	Reddish tan silt and sand - some caliche
35-40	Caliche-very hard with cemented sand silt
40-45	Reddish brown silt with cemented siltstone layers
45-50	Siltstone layers grading to silty sand
50-55	Red cemented siltstone with uncemented sand and silt
55-60	Red cemented siltstone with uncemented sand and silt
60-65	Mostly cemented red sand - streaks of caliche
65-70	Mostly cemented red sand - streaks of caliche
70-75	Becoming unconsolidated reddish brown silty sand
75-80	Soft reddish brown silty sand
80-85	Hard reddish brown sandstone becoming softer
85-90	Hard cemented sandstone
90-95	Med-fine red sand and sandstone
95-100	Med-fine red sand and sandstone
100-105	Med-fine red sand and sandstone and some caliche stringers
105-110	Mostly fine red sand - caliche stringers
110-115	Mostly fine red sand - caliche stringers
115-120	Mostly fine red sand - caliche stringers

Cannon Air Force Base

Well M

Lithologic Description

120-125	Medium fine reddish-brown sand
125-130	Medium fine reddish-brown sand
130-135	Medium fine reddish-brown sand
135-140	Medium fine reddish-brown sand coarser 138-140
140-145	Fine reddish-brown sand
145-150	Fine reddish-brown sand
150-155	Fine reddish-brown sand some caliche
155-160	Fine reddish-brown sand - caliche
160-180	Fine reddish-brown sand - caliche
180-195	Fine reddish brown sand - becoming silty
195-205	Reddish brown - fine silty sand
205-220	Hard caliche and gravel - very coarse
220-225	Coarse gravel
225-235	Coarse gravel turning to fine sand and clay @ 230
235-245	Fine tight sand with sandstone streaks
245-255	Fine tight sand with sandstone streaks
255-287	Hard cemented sandstone
BOH at 287	

COMPANY CANNON AIR FORCE BASE

WELL C.A.F.B.-M

FIELD

COUNTY CURRY STATE NEW MEXICO COUNTRY U.S.A.

LOCATION LAT 342201

LONG 1031800

SECTION 30 TOWNSHIP 02N. RANGE 35E. API NUM 422 A

Permanent Datum T.O.C. ; Elevation 4264.29 Elev.: K.B.

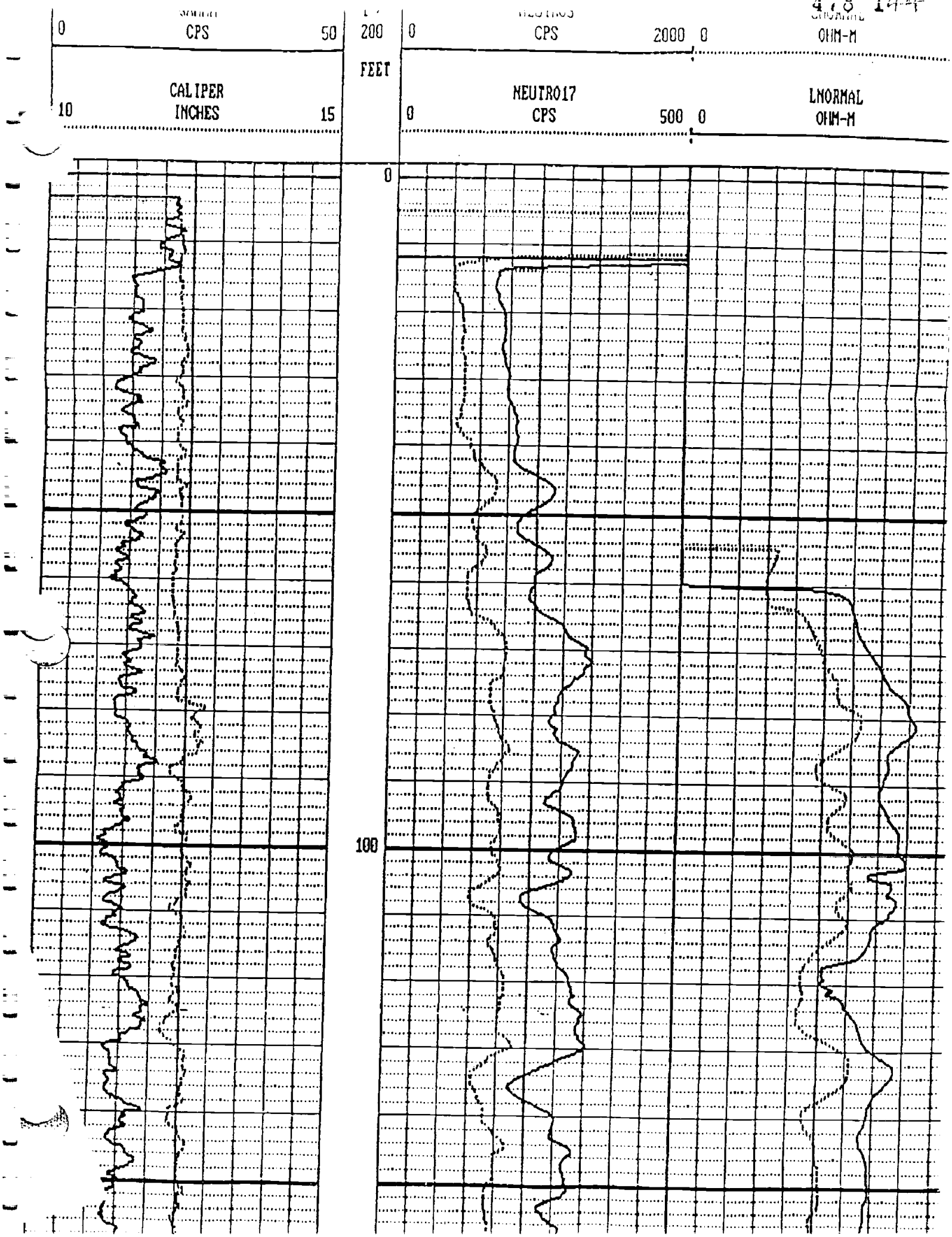
Log Measured From 4262.67 , Above Perm. Datum D.F.

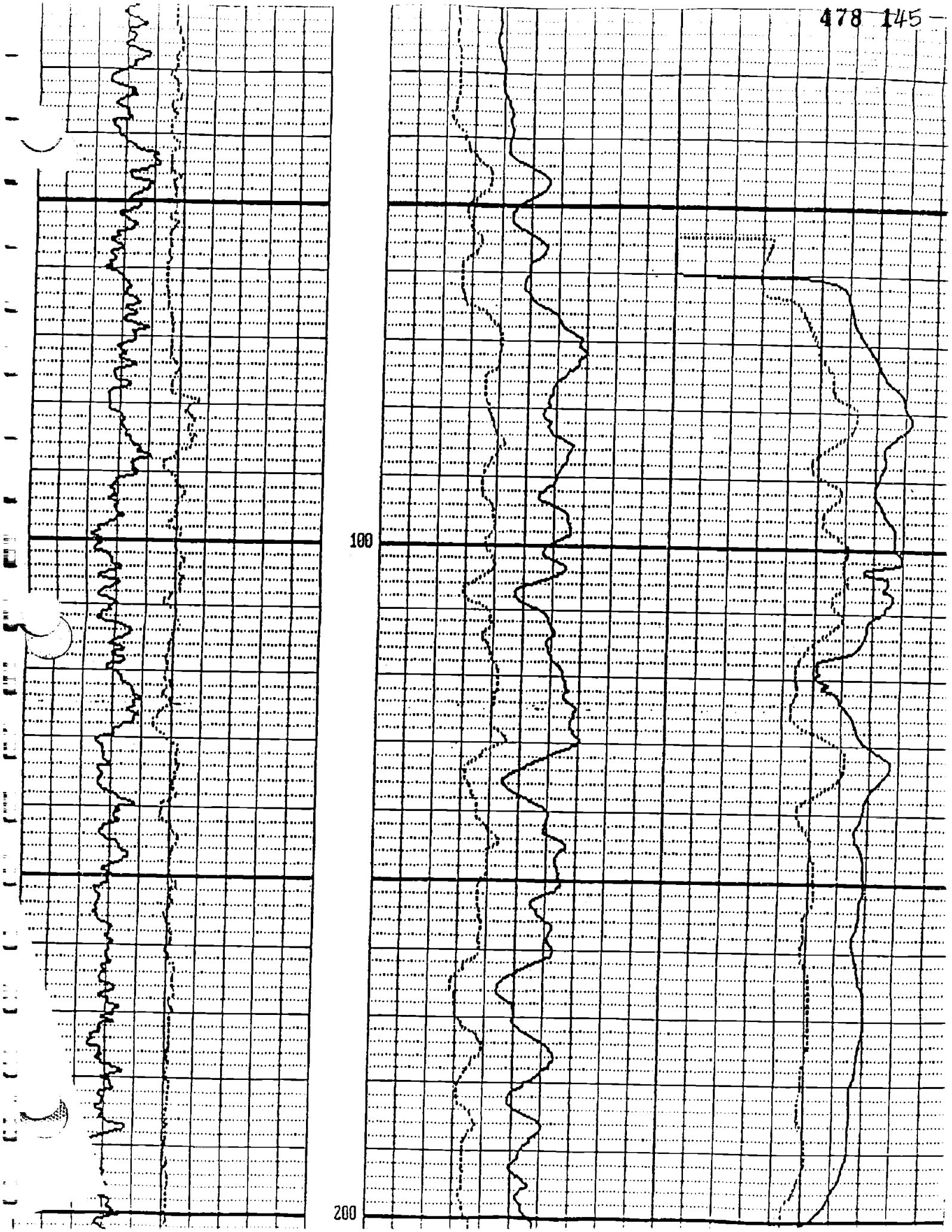
Drilling Meas From 4262.67 G.L. 4262.67

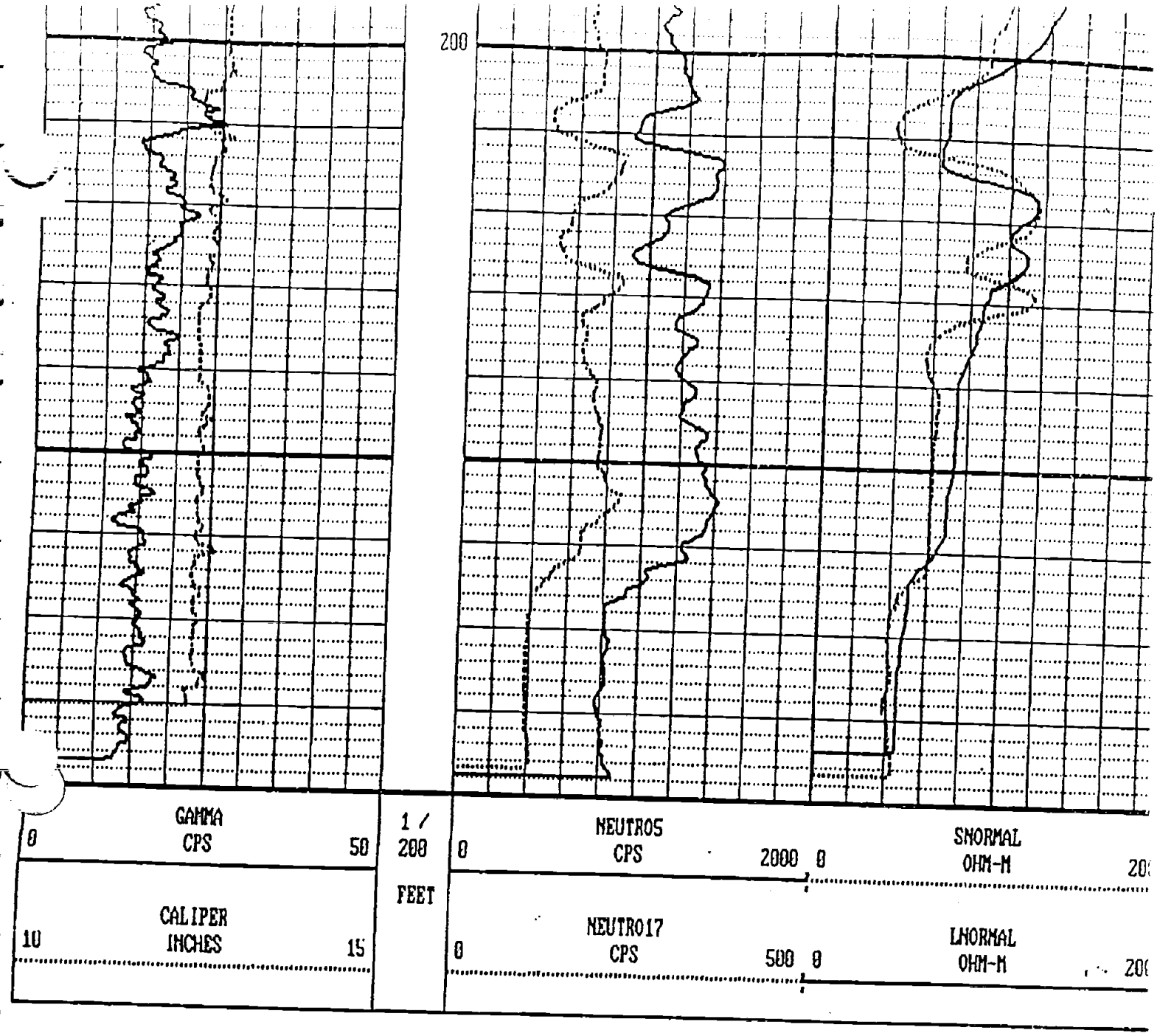
	1	2	3
Date	02/02/1992		
Depth - Driller	287.0		
Depth - Logger	287.0		
Btm Log Interval	287.0		
Top Log Interval	0.0		
Casing - Driller			
Casing - Logger			
Bitsize	12" ROLLER		
Type Fluid in Hole	NATURAL GEL		
Dens. / Visc.	/	/	/
pH / Fluid Loss	/	/	/
Source of Sample			
Rm @ Meas. Temp	@	@	@
Rmf @ Meas. Temp	@	@	@
Rmc @ Meas. Temp	@	@	@
Source: Rmf / Rmc	/	/	/
Rm @ BHT	@	@	@
Max. Rec. Temp.			

OUTPUT CURVE DEFINITIONS

GAMMA : RADIATION INCREASES RIGHT
CALIPER : 1 INCH/DIV.
NEUTRO5 : POROSITY INCREASES LEFT (5 IN. SPACING)
NEUTRO17 : POROSITY INCREASES LEFT (17 IN. SPACING)
SNORMAL : 20 OHM-M/DIV.
LNORMAL : 20 OHM-M/DIV.


0
CPS
50
CALIPER
INCHES
10
15
200
FEET
0
CPS
2000
NEUTRO17
CPS
0
500
0
OHM-M
LNORMAL
OHM-M
0
100


100
200


200
GAMMA
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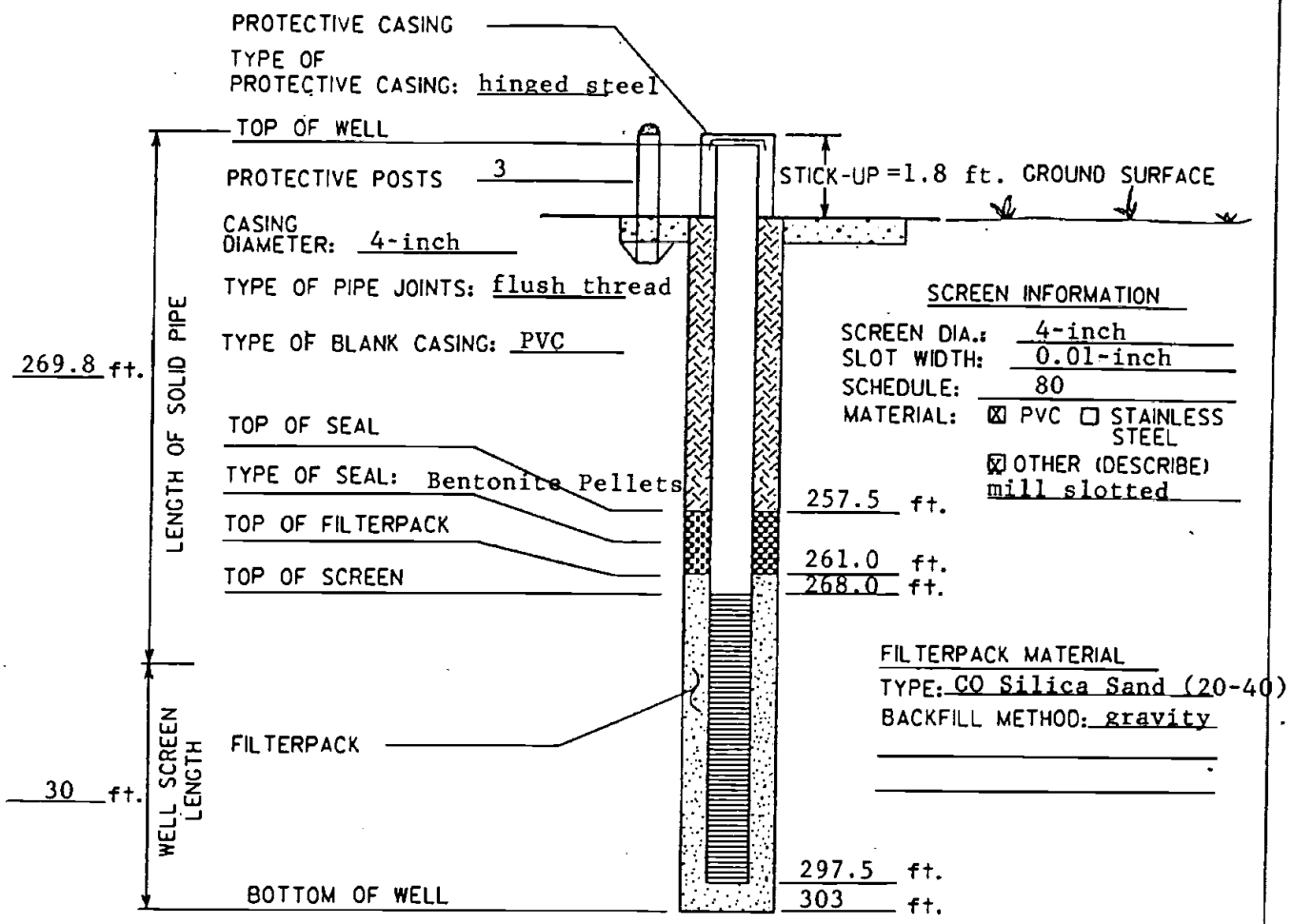
0
50
CALIPER
INCHES
10
15
1 /
200
FEET
NEUTRO5
CPS
0
2000
NEUTRO17
CPS
0
500
SNORMAL
OHM-M
0
LNORMAL
OHM-M
0

478 146

ELEVATION GROUND WATER 3996.94 ft. MSL	PROJECT CANNON AIR FORCE BASE
DATE INSTALLED 12-13-94 / STARTED 12-10-94 / COMPLETED 12-13-94	LOCATION (Coordinates or Station) N=234249.19 E=813037.28
ELEVATION TOP OF HOLE 4267.59 GS 4269.7 TOC	SIGNATURE OF INSPECTOR Joseph A. Watson
TOTAL DEPTH OF HOLE 303' BGS	HOLE NO. Monitoring Well N

MONITORING WELL CONSTRUCTION DIAGRAM

(ALL MEASUREMENTS FROM GROUND SURFACE)



SCREEN INFORMATION

SCREEN DIA.: 4-inch
SLOT WIDTH: 0.01-inch
SCHEDULE: 80
MATERIAL: ☒ PVC ☐ STAINLESS STEEL
☒ OTHER (DESCRIBE) mill slotted

FILTERPACK MATERIAL

TYPE: CO Silica Sand (20-40)
BACKFILL METHOD: gravity

WELL DEVELOPMENT

METHOD: Gross Bailer/final-3/4 HP Sub Pump
TIME SPENT DEVELOPING: 3 hrs.
VOLUME OF WATER REMOVED: 500 gallons
VOLUME OF WATER ADDED: N/A
DESCRIPTION OF PREDEVELOPMENT WATER: semi-clear
DESCRIPTION OF POST DEVELOPMENT WATER: clear

WATER LEVEL SUMMARY

WATER LEVEL MEASUREMENTS
DATE/TIME/LEVEL 12-14-94 1000 hrs 272.76 ' BTOL

DEPTH FROM TOP CASING AFTER DEVELOPMENT: 272.76 ft.

478 148

PETTIGREW and ASSOCIATES
1110 N. GRIMES
HOBBS, NEW MEXICO 88240
(505) 393-9827

DEBRA P. HICKS, P.E.
WILLIAM M. HICKS, III, P.E.
RICHARD R. PETTIGREW, P.E.-P.S.

June 18, 1996

Harding Lawson Associates
Suite 2400
707 Seventeenth Street
Denver, CO 80202

ATTN: S. Michelle Beekman

RE: Cannon AFB
Survey of Monitoring Wells N & O
HLA Project No. 33364 2.1.2

Dear Michelle:

In accordance with the above referred Subcontract, **PETTIGREW and ASSOCIATES, P.A.** has performed field surveys to determine the following data:

TABLE 1

Location	X	Y	PVC	Grd. Elev.	Top of Conc. Pad
MW-N	813,036.92	1,234,250.61	4269.09	4267.2	4267.2
MW-O	812,733.51	1,232,441.15	4272.19	4270.4	4270.4

A drawing of the points relative to Landfill No. 5 showing control data is attached. Should you have any questions regarding this transmittal, please contact this office.

Sincerely,

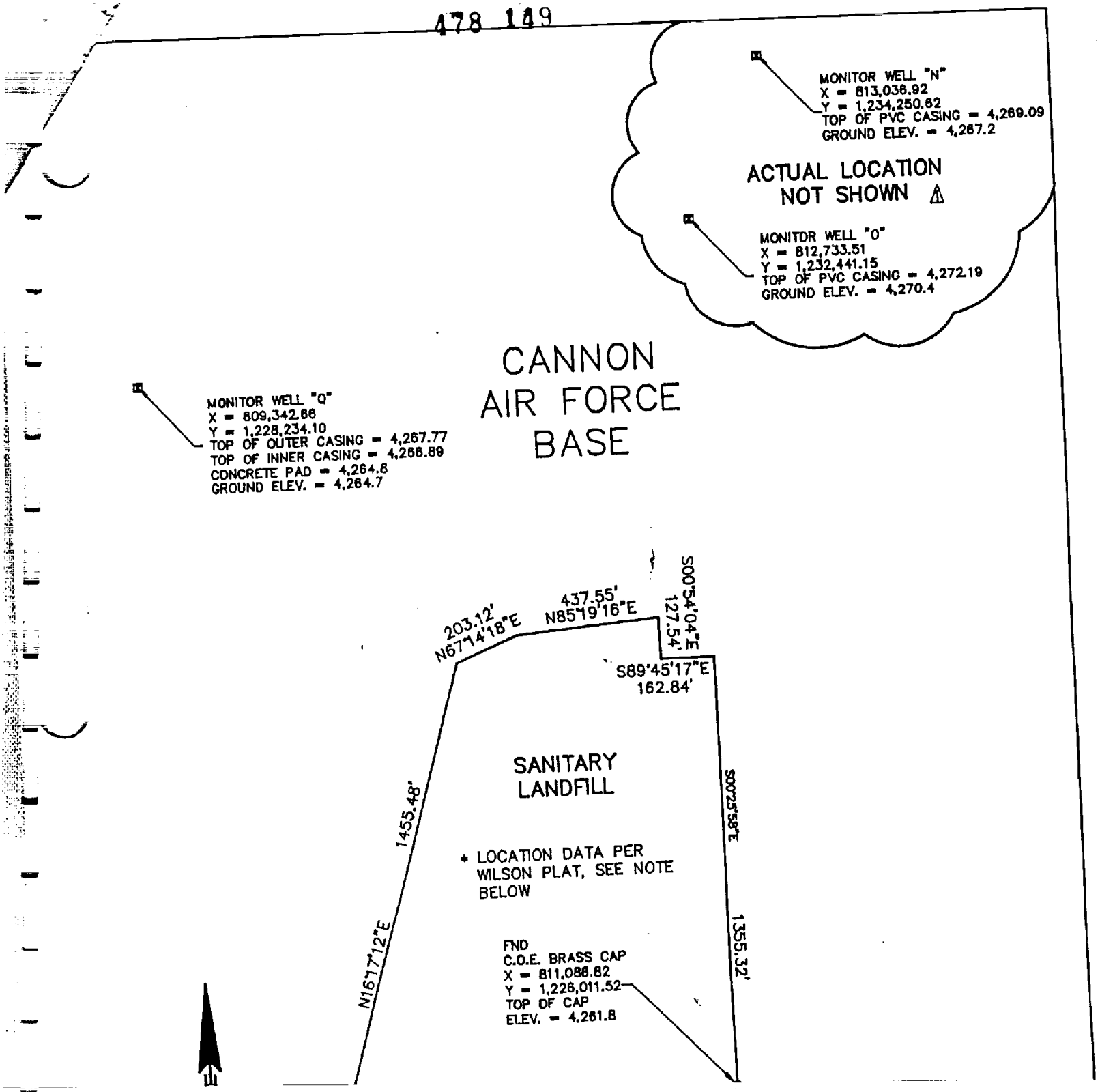
PETTIGREW and ASSOCIATES, P.A.

Debra P. Hicks

Debra P. Hicks, PE/LSI
Manager of Engineering

Attachements
xc: Jeanne Reedy

NOT A BOUNDARY


MONITOR WELL "N"
X = 813,036.92
Y = 1,234,250.62
TOP OF PVC CASING = 4,269.09
GROUND ELEV. = 4,267.2
ACTUAL LOCATION NOT SHOWN
MONITOR WELL "O"
X = 812,733.51
Y = 1,232,441.15
TOP OF PVC CASING = 4,272.19
GROUND ELEV. = 4,270.4
CANNON AIR FORCE BASE
MONITOR WELL "Q"
X = 809,342.86
Y = 1,228,234.10
TOP OF OUTER CASING = 4,267.77
TOP OF INNER CASING = 4,266.89
CONCRETE PAD = 4,264.6
GROUND ELEV. = 4,264.7
203.12'
N67°14'18"E
437.55'
N85°19'16"E
S00°54'04"E
127.54'
S89°45'17"E
162.84'
SANITARY LANDFILL
1455.48'
N16°17'12"E
S00°25'58"E
1355.32'
* LOCATION DATA PER WILSON PLAT, SEE NOTE BELOW
FND
C.O.E. BRASS CAP
X = 811,086.82
Y = 1,226,011.52
TOP OF CAP
ELEV. = 4,261.8

HTW DRILLING LOG

HOLE NO. MW-N

SHEET 1 OF 32 SHEETS

1. COMPANY NAME: Woodward-Clyde Federal Services
2. DRILLING SUBCONTRACTOR: Layne Environmental
3. PROJECT: Cannon AFB LF-3 & 4 RFI Ph II
4. LOCATION: Cannon AFB, Clovis, NM
5. NAME OF DRILLER: Benny Bludworth
6. MANUFACTURER'S DESIGNATION OF DRILL: AP-1000 Percussion Air Hammer, Rev. Circ.
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 9" Dual Wall Pipe - 10' Sec.; 9 3/4" x 1.5' Open Face Bit; 2" ID Split Spoon (Calif. tube)
8. HOLE LOCATION: Appx 600' SE of LF-4
9. SURFACE ELEVATION: 4267.59
10. DATE STARTED: 10/21/94
11. DATE COMPLETED: 12/14/94 *
12. OVERBURDEN THICKNESS: N/A
13. DEPTH DRILLED INTO ROCK: N/A
14. TOTAL DEPTH OF HOLE: 299.8
15. DEPTH GROUNDWATER ENCOUNTERED: ≈ 273' BGS
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 271.9' BGS 2 hrs
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):
18. GEOTECHNICAL SAMPLES: DISTURBED 3; UNDISTURBED
19. TOTAL NUMBER OF CORE BOXES: NA
20. SAMPLES FOR CHEMICAL ANALYSIS: None — VOC; METALS; OTHER (SPECIFY); OTHER (SPECIFY); OTHER (SPECIFY)
21. TOTAL CORE RECOVERY: %
22. DISPOSITION OF HOLE: BACKFILLED; MONITORING WELL: MW-N; OTHER (SPECIFY)
23. SIGNATURE OF INSPECTOR: [signature]

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0	Cuttings:	Calib. PID to Benzene R.F. (57ppm) w/ 100 ppm isobutylene				Alluvium
		0-5: Silty Sand (SM), fine to v. fine, poorly graded sand and silt. Strong brown (7.5 YR 4/4) Subangular to rounded grains of qtz. Very hard and dense based on drill action.	B.G = 0.0				Log is from orig. attempt at drilling/installing MW-N. Final site of MW-N Located Appx 50' N25W from the site reflected in this log. Consistency btwn MW-N & MW10 stratigraphy indicates little change in lithol. will occur over this distance.
	1	Dry.	LEL Calib to Ambient air LEL = 0%, H_2S = 0%				Start Shift 10/21/94 @ 11:00 (Rig just returned from Shop in Amarillo).
	2						
	3						
	4						
	5						

PROJECT: CAFB LF3/4 ph II

HOLE NO. MW-N

HTW DRILLING LOG

PROJECT: CAFB LF-3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-N

SHEET 2 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5	Cuttings: 5-9'					Alluvium
		Caliche - Fine sand as above with heavy matrix of pink (5YR 8/3) caliche. Dry.					
	6						
	7						
	8						
		Core	B.H. = 0.0				
	9	9-9.8: Silty sand (SM) with abnt $CaCO_3$ in matrix. Very fine sand and silt, Yellowish red (5YR 5/6) Dry.	H.S. = 1.4			20 41 41 25	Sampled @ 1130 Rec = .8'/2.0' N = 82
	10	$CaCO_3$ occurs as both disseminated blebs and pervasive in matrix					
	11	Cuttings					
		10-14': Caliche, as above. Dry, reddish yellow SM w/ $CaCO_3$ matrix cementing grains					
	12						
		14-19': SM, lighter in color, less well cemented with $CaCO_3$ (reflected by increased drill speed)					
	13						
	14						

HTW DRILLING LOG

PROJECT: CAFB LF-3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-N

SHEET 3 OF 32 SHEETS

EV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		SAME: silty SAND (SM) as above					Alluvium
	15						
	16						
	17						
	18						
		Core					
	19	19-21: Silty Sand (SM). Fine, subangular-subround qtz sand with abnt silt. $CaCO_3$ matrix. Yellowish red, (5YR 5/6). Trace localized ~~zones~~ blebs of intense $CaCO_3$. Trace MnO_2 dendrites. Soft, unconsolidated, dry.	BZ = 0.0 H.S. = 0.0			8 10 8 7	Sampled @ 1150 N = 18 Recov = 2.0/2.0
	20						
	21						
	22						
	23						
	24						

HTW DRILLING LOG

PROJECT: CAFB LF-3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-N

SHEET 4 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	24	SAME: Silty SAND (SM) as above					Alluvium
	25	Cuttings 25-26: Thin zone of more intense, heavier $CaCO_3$. Soil same as above - SM - soft & dry, yellow red.					
	26						
	27						
	28						
	29	Core 29-31.6': SM. Lt. reddish brown (5 YR 6/4), fine grained sand w/ $CaCO_3$ (caliche) cementing grains, locally quite heavily. Soft & Chalky. Dry.	BZ = 0.0 HS = 0.0			17 17	Sample @ 1235 N = 29
	30	Upper portion of cuttings and sample show a well indurated sandy Limestone, v. hard & fine grained (freshwater LS?)				12 10	Rec = 1.6/2.0'
	31						Limestone described v. similar to east shoreline of playa lake
	32	Silty SAND and SAND (SM/SP)					Alluvium
	33						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [signature]

HOLE NO.: MW-N

SHEET 5 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
							Alluvium
	34	Cuttings 32-39 : SM/SP, Salmon or yellowish red w/ abnt $CaCO_3$ as cement or void fill. Occ. clasts of LS as described above may be stuck in hose.					
	35						
	36						
	37	silty SAND (SM)					Alluvium
	38						
	39	Core 39-40.7 : SM, pinkish wht to pink (5YR 8/2 - 7/4), w/ fine, subround - subangular clasts, $CaCO_3$ infilling around grains. Bottom of Run has some chips of a yellow-red (5YR 4/6) clay with a caliche-like coating. Clay is non-calcic, w/ a smooth, greasy streak.	BZ = 0.0 H.S. = 0.0			23 35 32 32	Sample @ 1305 N = 67 Rec = 1.7/2.0
	40						
	41						
	42						
	43						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO. MW-N

SHEET 6 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Silty SAND (SM) same as above					Alluvium
		Cuttings 43-44: Thin zone of possible freshwater Limestone. Sandy and brittle, pinkish white (5YR 8/2), with fine angular to subround grains suspended in a calcic matrix.					
	44						
	45	44-49: Soft SM, pink (5YR 7/4), dry.					
	46						
	47	silty SAND and SAND (SM and SP)					Alluvium
	48						
	49	Core 49-50.9: SM/SP, As above, pink (5YR 7/3), fine sand, Subround to subangular with $CaCO_3$ matrix. Qtz rich, soft, dry, unconsolidated.	BZ = 0.0 H.S. = 0.0			11 28 29 25	Sampled @ 1335 N=57 Rec = 1.9/2.0'
	50						
	51	Cuttings 51-55': Same as above SM/SP - V. soft drilling.					
	52						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: Brian J. Ruby

HOLE NO. MW-N

SHEET 7 OF 32 SHEETS

EV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		silty SAND and SAND (SM and SP) same as above					Alluvium
	53						
	54	silty SAND (SM)					Alluvium
	55						
	56	Cuttings: 56-59'					
		SM, fine to med grained, sub-angular to subround sand.					
	57	Appx 10% med grained. Calcite, dry. Pink (5YR 7/4)					
	58						
	59	Core: 59-61: Same as entry above, SM, w/ local zones of more intense $CaCO_3$ flooding matrix. Very qtz rich.	BZ = 0.0			19	Sample @ 1400
			H.S. = 0.1				N = 37
	60					18	Rec = 2.0/2.0
						19	
						24	
	61						
	62						

HTW DRILLING LOG

HOLE NO. MW-N

PROJECT CAFB LF 3/4 RFI PhII

INSPECTOR [signature]

SHEET 8 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	62	Cuttings					Alluvium
		61-70: Poorly graded sand (SP). Fine, subang-round, with 20% med grain fraction, which is well rounded. QTZ, Pink in color (7.5 YR 7/4), Dry.					
	63						
	64						
	65						
	66						
	67						
	68						
	69						
	70	Core					
		70-70.6: Poorly graded sand (SP). Very clean, fine-medium sand, 10% med. grained is well rounded. Dry non-calcic, Red-yellow (7.5 YR 7/6).	B.Z. = 0.0			26	Sampled @ 1455
			H.S = 0.0			31	N = 63
						32	Rec = 1.6/2.0
	71	70.6-71.6 · Similar sand, but has calcic interstitial fill. Wht to pink				40	

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-N

SHEET 9 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		(7.5 YR 7/4), Dry. Soft. SAND (SP), same as above					Alluvium
	72						
	73						
	74						
	75						
	76						
	77						
	78						
	79						
	80	Core: 80-82: SP, poorly graded, fine, subround - subangular qtz sand with local zones of $CaCO_3$ filling interstitial space. Soft	B.Z. = 0.0 H.S. = 0.0			12 18 25	Sample @ 1525 N = 43 Rec = 1.8/2.0
	81						

HTW DRILLING LOG

HOLE NO. MW-N

PROJECT CAFB LF 3/4 RFI Ph II

INSPECTOR [illegible]

SHEET 10 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	81	Unconsolidated. Very clean, pink (7.5YR 7/4), Dry. SAND (SP) same as above				27	Alluvium
	82						
		Cuttings					
	83	82-90: Clean, fine grained, poorly graded sand (SP). Subround - round qtz, Pink (5YR 7/4). Slightly damp.					
	84						
	85						
	86						
	87						
	88						
	89						
		Core:					
	90	90-91.6: Poorly graded sand (SP). Fine, round to subround	BZ=0.0			7	Sample @ 1610

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: Brian [illegible]

HOLE NO. MW-N

SHEET 11 OF 32 SHEETS

LEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Qtz. Very clean w/ occ. blebs of MnOx disseminated in matrix. Soft, non-calcic. Dry. Reddish yellow (5YR 7/6)				17 24 30	Alluvium N=65 Rec=1.6/2.0
	91						
		SAND (SP) same as above				X	
	92						
	93						
	94	92-100: Cuttings show some clasts of weakly cemented zones ($CaCO_3$) of sand similar to last entry.					
	95						
	96						
	97						
	98						
	99						
	100						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-N

SHEET 12 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	100	Core SAND(SP) same as above				18	~~Alluvium~~ Sampled @ 1625
		100-102: SP as above.				28	N=65
		Pink to wht, very fine to fine, well rounded qtz, w/ local zones of caliche-like cement, elsewhere unconsolidated. Dry.	BZ=0.0 HS=0.0			37 50	Rec=2.0/2.0
	101						
	102						
	103						
	104						
	105						
	106	106: Cuttings indicate thin zone of $CaCO_3$ cemented sand @ 106', pink, lightly cemented, friable.					
	107						
	108						
	109						

HTW DRILLING LOG

HOLE NO. MW-N

PROJECT CAFB LF 3/4 RFI Ph II

INSPECTOR Brian G. Pahy

SHEET 13 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		SAND (SP) same as above					Alluvium
	110	Core					
		110-111.4: SP, clean, fine grained, rounded qtz sand. Soft, unconsolidated, Reddish yellow (7.5YR 6/6). Trace of MnOx as disseminations.	BZ = 0.0 H.S. = 0.0			6 19 35 47	Sample @ 1650 N = 54 Rec = 1.4/2.0
	111						
	112						
	113						
	114						
	115						
	116	Cuttings: Appx 116-120': Sand as above, but more strongly cemented w/ CaCO3.					
	117						
	118						
	119						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI ~~#~~ Ph II

INSPECTOR: Brian A. [illegible]

HOLE NO.: MW-N

SHEET 14 OF 32 SHEETS

EV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		SAND (SP) Same as above					Alluvium
	120	Core:					
		120 - 121.4: Poorly graded sand, fine subangular to round qtz grains. Non-calcic, very clean. Unconsolidated, soft & dry	BZ = 0.0 HS = 0.0			19 40 50 NA	Sample @ 1745 N = 90 Rec. = 1.4/1.5
	121						
	122						
	123						
	124						
	125						
	126						
	127						
	128						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-N

SHEET 15 OF 32 SHEETS

LEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		SAND (SP) same as above					Alluvium
	129						
	130	Core 130-131.3: SP as above. fine, poorly graded, well-rounded to subround grains. Very clean Trace $CaCO_3$. Soft, dry, unconsolidated.				16 41 50 NA	Sample @ 1800 N = 91 Rec. = 1.3/1.5'
	131						
	132	132-140 - Cuttings becoming damper, same lithology as above.					
	133						
	134						
	135						
	136						
	137						
	138						

HTW DRILLING LOG

HOLE NO. MW-N

PROJECT CAFB LF 3/4 RFI Ph II

INSPECTOR [illegible]

SHEET 16 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		SAND (SP) same as above					Alluvium
	139						1815 - At 139.5' End of Shift 10/21/94
	140	Core 139.5-141: SP, very fine to fine grained sand, round - subround qtz sand. Clean. Reddish yellow (5YR 7/6). Dry, non-calcic. V. soft, unconsolidated.	Calib. PID to Benzene RF w/ 100ppm isobutylene. BG = 0.0 LEL = 0.0 H_2S = 0.0 BZ = 0.0 H_2S = 0.1			13 27 50 NA	Begin shift 10/22/94 @ 715. N = 77 Rec. = 1.4/1.5 Sample @ 750
	141						
		SILTY SAND (SM) Cuttings: 141-149: SM. Sand as above with increasing silt content. Damp.					
	142						
	143						
	144						
	145						
	146						
	147						

HTW DRILLING LOG

PROJECT: CAFB LF-3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-N

SHEET 17 OF 32 SHEETS

EV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Silty SAND (SM) same as above					Alluvium
	148						
		Core:					
	149	149-150.5: SM; Silty, fine to very fine sand, round to subangular qtz. Reddish yellow (5YR 6/6). Loosely consolidated (easily crumbled in fingers). Damp. Appx 20% silt w/ Mnox disseminated.	BZ = 0.0 H.S. = 0.1			19 33 50	Sampled @ 815 N = 83 Rec. = 1.5/1.5
	150						
	151	Cuttings: 151-159: Show increased degree of induration and cementation. Friable, moderately consolidated.					
	152						
	153						
	154						
	155						
	156						
	157						

HTW DRILLING LOG

HOLE NO. MW-N

PROJECT CAFB LF 3/4 RFI Ph II

INSPECTOR Brian J. Reilly

SHEET 19 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	157	Silty SAND (SM) same as above					Alluvium
	158						
	159	Core					
		159-160 Poorly graded sand (SP). Very clean, fine, rounded qtz w/ occasional blebs of $CaCO_3$. Generally non-calcic & unconsolidated. Lt. reddish yellow (7.5 YR 7/6) Dry.	BZ = 0.1 HS = 0.1			19 50	Alluvium Sample @ 895 N = 50 Rec. = 1.0/1.0
	160						
	161						
	162						
	163						
	164						
	165						
	166						

HTW DRILLING LOG

HOLE NO. MW-N

PROJECT CAFB LF 3/4 RFI Ph II

INSPECTOR [illegible]

SHEET 19 OF 32 SHEETS

LEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		SAND (SP) same as above					Alluvium
	167						
	168						
	169						
	170	Core: 170-171.5: SP: well sorted fine sand, qtz, subangular to round, very clean, soft and unconsolidated. Damp, non-calcic Reddish yellow (7.5YR 7/6).	BZ = 0.0 H.S. = 0.0			7 35 50	Sampled @ 910 N = 85 Rec. = 1.4/1.5'
	171						
	172						
	173						
	174						
	175						
	176						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-N

SHEET 20 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	176	SAND (SP) same as above					Alluvium
	177						
	178						
	179						
	180						
	181	Core: 180.5 - 181.9: SP very clean, round-subround fine sand, Reddish yellow (7.5YR 7/6), non calcic, dry	BZ=0.1 H.S=0.0			7 32 50/5"	Sample @ 9:45 N=82 Rec = 1.4/1.5
	182						
	183						
	184						
	185						

HTW DRILLING LOG

PROJECT: CAFB LF-3/4 RFI PhII

INSPECTOR: Brian J. Cody

HOLE NO.: MW-N

SHEET 21 OF 32 SHEETS

EV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		SAND (SP) same as above					Alluvium
	186	Cuttings: 186-190: Sandstone Well indurated, well sorted, fine grain ss. Very similar in all respects to unconsolidated sand above, except strong $CaCO_3$ cement. Recovered clasts have poorly to well developed dissolution texture. Pink (5YR 7/3) w/ trace matics (2%) & mn oxides.					
	187						
	188						
	189						
	190	Core 190-~~190.5~~ 190.5 - Same well cemented sandston described above.	B.Z. = 0.4			7	Sample @ 1205
			H.S. = 0.0			37	N = 87
						50	Rec = 1.2/1.5
		~~190.2~~ 190.5 - 191.2: Reddish Yellow (7.5 YR 6/6), very fine-fine, silty sand (SM). Occ. clasts of cemented sand as above. Overall, soft and unconsolidated. Noticeably finer sand than seen from 160' → 190'.					Alluvium
	191						
	192						1215: Rig leaking Hydraulic Oil. Shutdown to Fix.
	193						
	194						1315: Restart Drilling
	195						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-N

SHEET 22 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	195	silty SAND (Sm) same as above					Alluvium
	196						
	197						
	198	silty SAND with cobbles (Sm w/Gm)					Alluvium
	199						
	200	200-201.5 - Core: Sm/Gm					
		Fine sand and silt as above w/ large (up to 1" diam) clasts & cobbles of calcic cemented fine sandstone. Damp, reddish yellow (5YR 6/6). Appearance of clasts suspended in sand/silt imply possible depositional origin of clasts, rather than weathering of more cemented units as diagenetic effect.	BZ = 0.4 HS = 0.4			16 50 50 50/4"	sample @ 1350 N = 100 Rec. = 1.4/1.8
	201						
	202						
	203						
	204						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI PhII

INSPECTOR: [illegible]

HOLE NO.: MW-N

SHEET 23 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		silty sand w/cobbles (Sm w/Gm) same as above					Alluvium
	205	Cuttings 201-210: Lrg gravels and cobbles to .3' diam. suspended in fine-v. fine silty sand. Sand is round-subangular qtzose. Cobbles are well cemented (CaCO3), moderately friable fine sand to stone, w/ well developed dissolution structures and cavities. MnOx on weathered face as blebs. Some possible worm burrows (Gm)					Alluvium
	206		Recal. PID to 57 ppm w/ 100 ppm Isobutylene				Recal @ 1430
	207						
	208						
	209						
	210	Core 210-212: Gm as above, gravel content decreasing below 211'. Matrix is fine silty sand, unconsolidated and non-calcic, fine to very fine, round to subround qtz, v. well sorted.	BZ - 0.0 H.S. = 0.0			15 38 46 50	Sample @ 1435 N = 84 Rec = 1.8/2.0
	211						
	212						
	213						
	214						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-N

SHEET 24 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Silty GRAVEL (GM) same as above					Alluvium
	215						
	216						
	217						
	218						
	219						
	220	Core: 220-221.5					
		GM as above - Silty sand with gravel of calcic SS, V. fine silt to fine grained sand matrix, Soft, unconsolidated, damp. Reddish Yellow, grains are slightly more angular - Subangular than previously seen	BZ = 0.0 H.S. = 0.0			12 36 50 50	Sample @ 1505 N = ~~88~~ 86 Rec = 1.5/2.0
	221						
	222						
	223						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO. MW-N

SHEET 25 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		silty GRAVEL (Gm) same as above					Alluvium
	224	Cuttings 222-230: Same as above; fine sand and silt with gravel. Gm					
	225						
	226						
	227						
	228	silty GRAVEL and sandy GRAVEL (Gm and GP)					Alluvium
	229						
	230	Core 230 - 231.3: Sand and gravel as above to 230.9', then hard, well indurated & cemented SS w/ calcic cement, Possibly a cobble which was driven into the split spoon. (Gm/GP)	BZ = 0.0 H.S. = 0.0			3 29 50/4"	Sample @ 1540 N = 79 Rec. = 1.3/1.3
	231						
	232	sandy GRAVEL (Gm) with very fine sand					Alluvium
	233						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [signature]

HOLE NO. MW-N

SHEET 26 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
							Alluvium
		Cuttings 232-240:					
	234	Cobbly, fine sand with increasing moisture content. Round-subround qtz sand clasts as described in entries above.					
	235	(GM) same as above					
	236						
	237						
	238						
	239						
	240	Core 240-241.5:					
	241	Clean, poorly graded, fine qtz sand (SP), with appx 10% Silt. Yellow red (7.5YR, 6/8). With increasing moisture. No cobbles or gravel. Sand is well rounded to subround qtz, soft and unconsolidated.	BZ = 0.0 HS = 0.0			6 25 43 50/3"	Alluvium Sample @ 1620 N = 68 Rec = 1.5'/1.5'
	242						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-N

SHEET 27 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		SAND(SP) same as above					Alluvium
	243	Cuttings 242-250:					
		Cuttings are similar to sand described above, but cobbles up to 4" of calcic, well-indurated fine SS. Cobbles are slightly friable. Local blebs of white calcite in sand matrix. Drill action indicates a layer of these cobbles @ 246-247', which is then underlain by soft sand.					
	244						
	245						
	246						
	247						
	248						
	249						
	250	Core 250-251.5:					
		Probable stuff of fine silty sand with gravel cal clasts to 1" diameter.	BZ = 0.0 H.S = 0.0			4 2 2 2 33	N = 4 Rec = 1.5/2.5' Driller thinks boring caved some while lifting drill pipe in attempt to clean hole. Take extra 6" drive.
	251						
	252						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: Brian [illegible]

HOLE NO. MW-N

SHEET 28 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS
		SAND (SP) same as above					Alluvium SAMPLE CONTINUED FROM ABOVE
	253	Cuttings - 253-260: Clayey sand, Reddish brown (10YR, 4/4). Fine grained qtz, round - subround with Appx 20% Clay. Low plasticity, damp. SC					Alluvium
	254						
	255						
	256						
	257						
	258	Core: 258-260' Well sorted, yellow-red, fine grained sand as above. Soft Unconsolidated, damp.	BZ = 0.0 H.S. = 0.0			9 23 33 50/4"	Sample @ 1745 N = 56 Rec = 2/2, upper .7' = Stuff.
	259						
	260						
	261						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-N

SHEET 29 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		clayey SAND (SC) same as above					Alluvium
	262	Cuttings 260-270 - SC -					
		Wet interbedded fine sand, as above, with thin layers of dark reddish brown sandy clay. Drill action gives no indication how thick the clay units are, Only seen in cuttings.					1805 - Ck water level @ 270'. Not encountered.
	263						
	264						
	265						
	266						
	267						
	268						
	269						
		Core 270-271.5					
	270	Poorly graded fine sand, round-Subround qtz, soft unconsolidated Reddish Yellow (5YR 6/8)	BZ = 0.0	MW-N 270		27	Alluvium Sampled @ 1830
			HS = 0.0			34	N = 85
	271	270.5-271: Sandy clay, yellow (SP)				51	Rec = 2/2 (1.5' stuff)

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-N

SHEET 30 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		SAND (SP) Same as above red (5 YR 5/6), moderate plasticity, wet, w/ MnOx dendrites.					Alluvium 1835 - End of shift.
	272	271-271.5: SP; poorly graded fine sand, round-subround, with occ. med size angular frags. Unconsolidated, wet. Top of Water very close.	Calib. PID to ~~5~~ 57ppm Benzene R.F w/ 100 ppm isobutylene				10/23/94 - Start Shift 7:15.
	273						
	274	Cuttings 272-280: Fine, poorly graded sand, (SP). Brown, (7.5 YR 5/4), wet, well rounded and sorted, with apparent thin interbeds of drk red (2.5YR 3/6) claystone. Claystone is clean with a waxy luster, & MnOx on Fxs.	B.G = 0.0				
	275						
	276						
	277						
	278						
	279						
	280	Core: 280-282 Poorly graded sand (SP). Fine, well rounded qtz grains. Reddish	B Z = 0.0	MW-N-280		16	Sample @ 0800

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-N

SHEET 31 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS
	281	brown (5YR 5/4) w/ locally lighter zones of $CaCO_3$. Soft & unconsolidated. Occ. clasts of consolidated SS w/ calcic cement. Saturated SAND (SP) same as above	H.S. = 1.7			48 46 40	Alluvium BR S N=94 Rec = 2.0/2.0 Start Rising Head test @ 820
	282	Cutting: 282-289: SP as above, w/ some clasts of dark, red claystone as at 272-280' and calcic cement SS cobbles up to .4' long.					1020 - Water @ 271.9' BGS 1040 - Continue Drilling.
	283						
	284						
	285						
	286						
	287						
	288						
	289	Core 289 - 290.5 Poorly graded fine sand (SP) Well rounded qtz, v. dense, wet but water appears to have drained from pore space. Brown (7.5YR 5/4)	Bz = 0.1 H = 1.3	MW-N-290		25 49	Sample @ 1150 N = 99 Rec = 2.0/1.5
	290						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI

INSPECTOR: Brian G. Rich

HOLE NO.: MW-N

SHEET 32 OF 32 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Local zones of weak $CaCO_3$ cementation. SAND(SP) same as above				50	Alluvium
	291						
	292						
	293						
	294						
	295	Cuttings 5-295: Dark red siltstone w/ mnOx. damp.					Alluvium
	296						
	297						
	298						Note: Monitoring well set 50 feet to north in new boring as this boring had to be abandoned.
	299	T.D. = 299'					Bottom of boring at 299.0 feet.

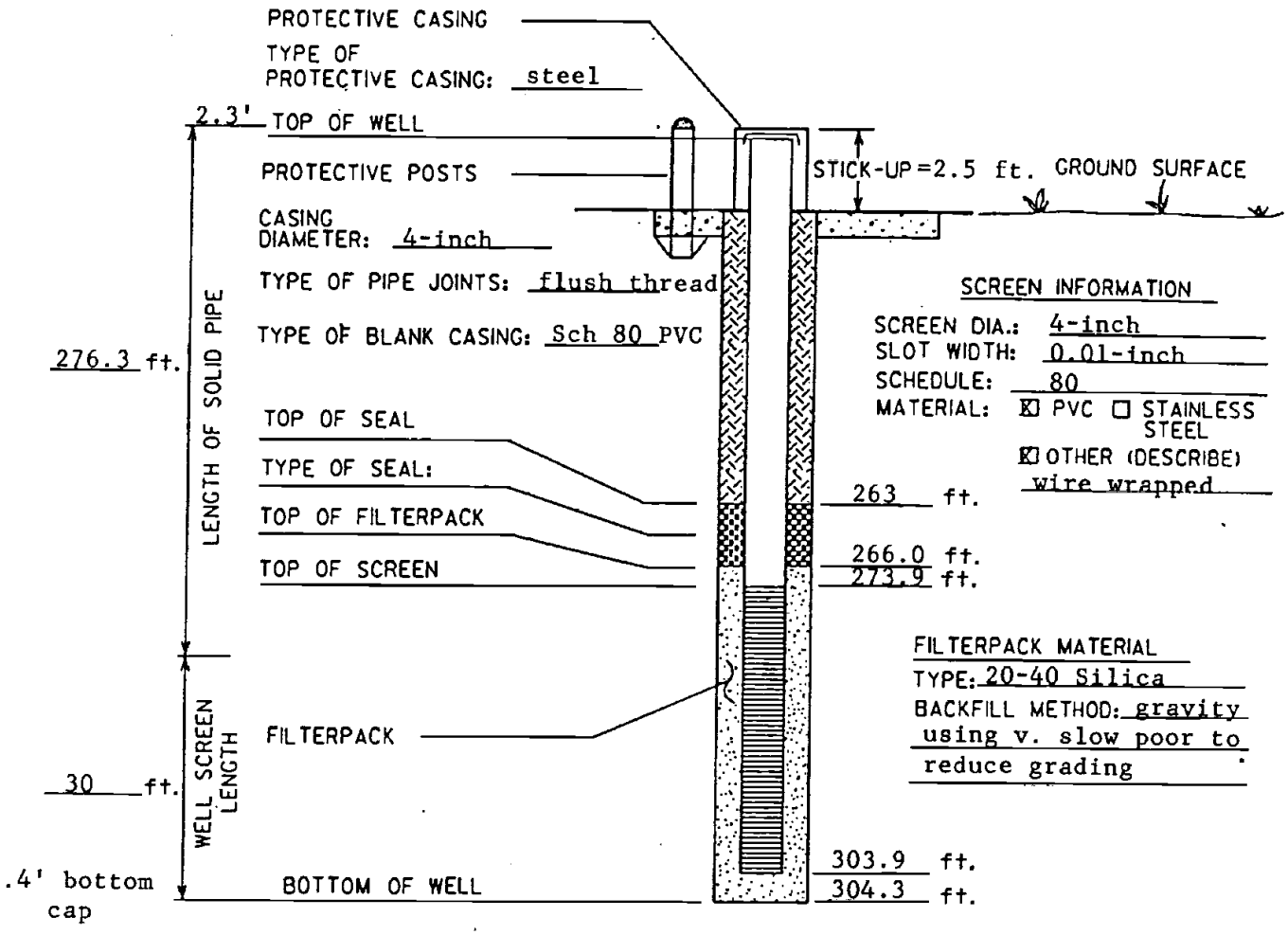
PROJECT: CAFB LF3/4 ph II

HOLE NO.: MW-N

ELEVATION GROUND WATER 3994.80 ft. MSL			PROJECT CANNON AIR FORCE BASE
DATE INSTALLED 10-30-94	STARTED 10-28-94	COMPLETED 10-30-94	LOCATION (Coordinates or Station) N=232439.95 E=812733.50
ELEVATION TOP OF HOLE 4271.00 GS 4273.1 TOC			SIGNATURE OF INSPECTOR Brian J. Ruby (Woodward-Clyde Consult.)
TOTAL DEPTH OF HOLE 304.3 BGS			HOLE NO. Monitoring Well O

MONITORING WELL CONSTRUCTION DIAGRAM

(ALL MEASUREMENTS FROM GROUND SURFACE)



SCREEN INFORMATION

SCREEN DIA.: 4-inch
SLOT WIDTH: 0.01-inch
SCHEDULE: 80
MATERIAL: ☒ PVC ☐ STAINLESS STEEL
☒ OTHER (DESCRIBE) wire wrapped

FILTERPACK MATERIAL

TYPE: 20-40 Silica
BACKFILL METHOD: gravity using v. slow poor to reduce grading

WELL DEVELOPMENT

METHOD: Bailing and pumping
TIME SPENT DEVELOPING: approx 2 hrs.
VOLUME OF WATER REMOVED: 200 gallons
VOLUME OF WATER ADDED: N/A
DESCRIPTION OF PREDEVELOPMENT WATER: reddish brown, silty
DESCRIPTION OF POST DEVELOPMENT WATER: clear and bright, 8 NTU

WATER LEVEL SUMMARY

WATER LEVEL MEASUREMENTS
DATE/TIME/LEVEL 11/2-3/94, 280.09 TOC
10/28/94, 278.3 BGS
10/27/94, 278.2 BGS

DEPTH FROM TOP CASING AFTER DEVELOPMENT:
280.09 TOC (to water)

HTW DRILLING LOG

HOLE NO. MW-0
SHEET 1 OF 33 SHEETS

1. COMPANY NAME: Woodward-Clyde Federal Services
2. DRILLING SUBCONTRACTOR: LAYNE ENVIRONMENTAL
3. PROJECT: F-3 & LF-4 RFI Phase II
4. LOCATION: CANNON AFB, N.M.
5. NAME OF DRILLER: Ben Bludworth
6. MANUFACTURER'S DESIGNATION OF DRILL: AP-1000 Percussion Hammer Rig
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 9" O.D. 6" ID Dual Wall Pipe (10') 9 3/4" O.D. Open Face Bit (15' long) 2" California Tube Sampler
8. HOLE LOCATION: S. Side of LF-3 (LF-3)
9. SURFACE ELEVATION: 4271.00
10. DATE STARTED: 10/25/94
11. DATE COMPLETED: 10/30/94
12. OVERBURDEN THICKNESS: N/A
13. DEPTH DRILLED INTO ROCK: N/A
14. TOTAL DEPTH OF HOLE: 304.3'
15. DEPTH GROUNDWATER ENCOUNTERED: 280'
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 278.3' BGS 13 hrs
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):
18. GEOTECHNICAL SAMPLES: DISTURBED 3; UNDISTURBED
19. TOTAL NUMBER OF CORE BOXES:
20. SAMPLES FOR CHEMICAL ANALYSIS: None

VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)

21. TOTAL CORE RECOVERY: %
22. DISPOSITION OF HOLE: BACKFILLED; MONITORING WELL: MW-0; OTHER (SPECIFY):
23. SIGNATURE OF INSPECTOR: Brian A. Pike

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	1	0-~~8~~ 90 Cuttings: Silty sand (SM). Red (2.5YR 4/8) v. fn-fine, well rounded qtz grading to yellowish red fine sand @ 5' (SP) dry fine sand.	PID cal. w/ 100 ppm Isobutylene to Benzene R.F. B.G. = 0.0				Alluvium
	2		LEL/H_2S calib to ambient air LEL = 0% H_2S = 0 ppm				
	3						
	4						
	5						

PROJECT: CAFB LF 3/4 ph II
HOLE NO. MW-0

HTW DRILLING LOG

PROJECT: CAFB LF-3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-0

SHEET 2 OF 33 SHEETS

LEV.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5	Silty SAND (SM) same as above					Alluvium
	6						
	7						Alluvium
	8						
	9	Core (SP) 9-9.8': Yellow red, poorly graded fine round sand with clasts of caliche floating in sandy matrix	B.Z. = 0.0 BH = 0.0 H.S. = 0.0			10 12 15 14	Sample @ 1120 N = 27 Rec = 2.0'
	10	9.8-11'- Caliche; fine round qtz sand w/ $CaCO_3$ cement, soft, dry, easily broken with fingers, continues to 19'					
	11						
	12						
	13						
	14						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI

INSPECTOR: Brian G. [illegible]

HOLE NO.: MW-D

SHEET 3 OF 33 SHEETS

V.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		SAND (SP) same as above					Alluvium
	15						
	16						
	17						
	18						
	19						
		Core: 19.5-20.5: Clay (CL) clean reddish yellow (7.5 YR 6/8) mod. plasticity, Dry.	BZ = 0.0 H.S = 0.0			23 47 50/5"	Sample @ 1810 Rec = 1.2'/1.5' N = 97
	20						
		20.5-21: Caliche; fine sand w/ heavy $CaCO_3$ cement pink (7.5 YR 8/3) Dry.					
	21	silty SAND (SM), red-yellow (5YR 6/6) w/ fine, subangular qtz grains. caliche pebbles floating					Alluvium
	22						
	23						
	24						

HTW DRILLING LOG

PROJECT: CAFB LF-3/4 RFI Ph II

INSPECTOR: [signature]

HOLE NO. MW-0

SHEET 4 OF 33 SHEETS

EV.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	24	Silty SAND (SM) same as above	PID cal. w/ 100 ppm isobutylene to Benzene R.F. BG = 0.0 BZ = 0.0 H.S. = 0.1				~~Alluvium~~ Begin shift 7:00 10/26/94
	25	Cuttings: 25-29'+ Red yellow (5YR 6/6) silty sand (SM) with fine, sub-angular qtz grains. Caliche pebbles floating.					
	26						
	27						
	28						
	29	Core 29 - 30.5 - Interbedded fine sand and silt (SM) with thin caliche layers (up to .4'). Sand is yellowish red (5YR 7/4), caliche is reddish yellow (5YR 7/6) and cements silty sand. Some hard wht clasts of caliche as stuff indicate more massive caliche zones also present.				43 45 50/4"	Sample @ 7:40 N = 95 Rec = 1.3/1.3
	30						
	31						
	32						
	33						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO. MW-0

SHEET 5 OF 33 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Silty SAND (SM) same as above					Alluvium
	34	Cuttings 30.5 - 39: Varigated zone of soft unconsolidated silty sand (SM) with massive, hard ~~caliche~~ to soft and chalky caliche layers. Sand is pink with $CaCO_3$ dendrites, fx filling and void filling.					
	35						
	36						
	37						
	38						
	39	Core 39-41: Silty sand (SM) v. similar to 29-30.5' interval. Reddish yellow, fine - v. fine sand, with locally heavy $CaCO_3$ cement.	BZ = 0.0 H.S. = 0.0			26 29 25 20	Sample @ 800 N = 54 R = 1.5/2.0
	40						
	41						
	42						
	43						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: Brian A. Pirky

HOLE NO.: MW-0

SHEET 6 OF 33 SHEETS

V.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		silty SAND (SM) same as above					Alluvium
	44						
	45						
	46	Cuttings: 46-47: Pinkish gray, sandy limestone cobbles, then reddish yellow (5YR 6/6) silty sand as above					
	47						
	48						
	49	Core 49-50.1: Fragments of sandy LS cobbles in silty sand matrix. Abnt $CaCO_3$ in matrix, but soft and dry. Red-yellow as above. (SM)	B.Z. = 0.0 H.S. = 0.0			5 8 27 26	Sample @ 820 Rec. = 1.1 N: 35
	50						Alluvium
		Cuttings 50-51: Gravelly sand (SP). Cobbles of limey sand/sandy LS coming up w pink silty sand.					
	51						
	52						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-0

SHEET 7 OF 33 SHEETS

ELEV.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		gravelly SAND (SP) same as above					Alluvium
	53						
	54						
	55						
	56						
	57						
	58						
	59	CORE 59-60.6: Silty sand (SM) reddish yellow (5 YR 4/6). Angular-subround, soft unconsolidated, fine to V. fine qtz sand. Non-calcc	B.Z = 0.0 H.S. = 0.0			7 11 12 15	Alluvium 59' - Possible top of Ogallala? Sample @ 840 N = 23 Rec. = 1.6/2.0
	60						
	61	silty SAND (SM), V. soft, unconsolidated, v. fine to fine qtz. sand					Alluvium
	62						

PROJECT: CAFB LF 3/4 RFI

HOLE NO.: MW-0

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: Brian J. Reilly

HOLE NO.: MW-0

SHEET 9 OF 53 SHEETS

ELEV.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	62	Silty SAND (SM) same as above					Alluvium
		Cuttings					
		61-69': Silty sand (SM)					
	63	V. soft, unconsolidated, v. fine to fine ~~sand~~. qtz sand.					
	64						
	65						
	66						
	67						
	68						
		Core					
	69	69-70.5: Silty sand (SM)				6	Sample @ 850
		brown (7.5 YR 5/4) Round - subang,	BZ = 0.0			13	N = 28
		fine - med grain qtz. More	BH = 0.0			15	Rec = 1.5/2.0
	70	pronounced quantity of well	H.S. = 0.0			27	
		rounded, clear qtz grains. Damp.					
		Non-calcic, soft, unconsolidated,					
		with occ. clasts of moderately					
	71	cemented calcic sand.					

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: Brian G. Ruby

HOLE NO.: MW-0

SHEET 9 OF 33 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Silty SAND (SM) same as above					Alluvium
	72						
	73						
	74						
	75						
	76						
	77						
	78						
	79	Core 79-81: Poorly graded sand (SP) Fine to v. fine sand, reddish yellow (5 YR 6/6), soft, unconsolidated. Subang-subround qtz, non-calcre. Cobbles of calcic cemented fine sand floating in soft matrix. Damp.	BZ = 0.0 BH = 0.0 H.S. = 0.0			6 11 19 36	Alluvium Sample @ 91B N = 30 Rec = 1.8/2.0
	80						
	81						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-0

SHEET 10 OF 53 SHEETS

E.V.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	81	SAND (SP) Same as above					Alluvium
		Cuttings: 81-89 - Same as above					
	82						
	83						
	84						
	85						
	86						
	87						
	88						
	89	Core 89-90.5: Poorly graded sand (SP), v. fine - fine qtz, Round to subangular, Reddish yellow (7.5YR 6/6). Soft, unconsolidated, damp, non-calcrc.	BZ = 0.0 BH = 0.0 H.S. = 0.0			10 19 27 35	Sample @ 925 N = 46 Rec = 1.5/2.0
	90						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [signature]

HOLE NO. MW-0

SHEET 11 OF 33 SHEETS

E.V.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		SAND (SP) Same as above					Alluvium
	91	Cuttings:					
		90.5-99: Same as above					
	92						
	93						
	94						
	95						
	96						
	97						
	98						
	99	Core:					
		99-100.6 - Silty Sand (SM). Fine, round-subround qtz sand, w/ Appx 25% silt. Soft, unconsolidated, Non-calcic and damp. Red-Yellow (7.5 YR 6/6)	BZ = 0.0 BH = 0.0 H.S. = 0.0			11 18 25 39	Sample @ 945 N: 43 Rec = 1.6/2.0
	100						

PROJECT: CAFB LF 3/4 PL II RFI HOLE NO. MW-0

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-0

SHEET 12 OF 33 SHEETS

LEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	100	silty SAND (SM) same as above					Alluvium sample continued from above
	101	Cuttings 101-109: Same as above, w/ zones of moderately consolidated sand or cobbles with $CaCO_3$ cement.					
	102						
	103						
	104						
	105						
	106						
	107						
	108						
	109	SAND (SP) see description below				S	Alluvium

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [signature]

HOLE NO.: MW-0

SHEET 13 OF 33 SHEETS

ELEV.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		~~SAND (SP) same as above~~					~~Alluvium~~
		Core: 109-110.5 - Poorly graded				16	Sample @1010
	110	Sand (SP). Very well sorted	BZ = 0.0			32	N = 48
		fine sand, well rounded to	H.S = 0.0			50	Rec = 1.5/2.0
		Subround qtz, very clean, non-	BH = 0.0				
	111	calcec. Reddish yellow (7.5YR 6/8). Soft and unconsolidated,					
		damp.					
	112						1040: Early lunch - Compressor solenoid breaks, drillers go purchase parts.
	113						
	114						
	115						
	116						
	117						
	118						
	119						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI ~~#~~ Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-D

SHEET 14 OF 33 SHEETS

EV.	DEPTH b.	DESCRIPTION OF MATERIALS SAND (SP) same as above	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	119	Core 119-120.7 - Poorly graded sand (SP), fine, sub-round - subangular qtz, with localized $CaCO_3$ disseminations and clasts of $CaCO_3$ cemented fine sandstone, v. similar to host sand. Damp. Reddish yellow, soft.				9	Alluvium Sampled @ 1300
	120		HS = 0.3			23	Rec. = 1.7'/1.7'
						48	N = 71
						50/3"	
	121						
	122						
	123						
	124						
	125						
	126						
	127						
	128						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-0

SHEET 15 OF 33 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		SAND(SP) same as above					Alluvium
	129	Core: 129-130.5 - Silty Sand (SM). V. fine - fine grain qtz, sub-angular to subround with $CaCO_3$. Soft, damp, unconsolidated w/ occ. clasts of $CaCO_3$ cemented SS. Reddish yellow (7.5 YR 6/6)	B.Z. = 0.0 H.S. = 0.1			11 25 44 50/5"	Alluvium sampled @ 1320 N = 69 Rec. = 1.5'/1.9'
	130						
	131						
	132						
	133						
	134						
	135						
	136						
	137						
	138						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-0

SHEET 16 OF 33 SHEETS

ELEV.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Silty SAND (SM) same as above					Alluvium
		Core					Alluvium
	139	139-140.7: Poorly graded sand (SP). Very fine - fine grained qtz, round - subangular, soft, damp. No clasts, v. clean. Reddish yellow (7.5 YR 6/6) Trace MnOx as disseminations	BZ = 0.0 H.S. = 0.2 BH = 0.1			9 25 50 50/5"	Sampled @ 1395 N = 75 Rec = 1.7/1.8'
	140						
	141						
	142						
	143	Cuttings 141-149 - Same as above					
	144						
	145						
	146						
	147						

HTW DRILLING LOG

PROJECT: CAFB LF-3/4 RFI Ph II

INSPECTOR: Brian [illegible]

HOLE NO.: MW-0

SHEET 17 OF 33 SHEETS

DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	SAND (SP) Same as above					Alluvium
148						
149	Core					
	149-150.5: Poorly graded fine sand (SP). Round-subangular qtz with occ. clasts of $CaCO_3$ cemented sandstone floating in matrix. Non-calcic, soft and damp, with MnOx disseminations.	BZ = 0.0 BH = 0.0 H.S. = 0.0			8 44 50/9"	Sampled @ 1420 Rec = 1.4/1.4 N = 94
150						
151						
152						
153						
154						
155						
156						
157						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-0

SHEET 18 OF 33 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	157	SAND (SP) same as above					Alluvium
	158						
		Core					
	159	159-160.4: Poorly graded sand (SP), similar in all respects to interval above. Damp				6 45 50/4"	Sampled @ 1445, N=95 Rec. = 1.4'/1.4'
	160						
	161	Cuttings					
		161-169: More abnt cobbles of calcic cemented sandstone. This sandstone is a densely packed, well rounded, fine sand, with distinct dissolution features on the weathered exterior. Reddish yellow (7.5 YR 6/6) Damp.					Are cobbles w/ dissolution features a depositional feature, or calcic beds affected by percolating groundwater?
	162						
	163						
	164						
	165						
	166						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-0

SHEET 19 OF 33 SHEETS

ELEV.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		SAND (SP) same as above					Alluvium
	167						
	168						
	169	Core 169-170.4: Poorly graded sand (SP). well sorted, fine qtz, slightly calcite locally, soft, reddish yellow (7.5YR 6/6) v. clean, damp.	BZ = 0.0 B.H. = 0.1 H.S. = 0.0			10 32 50/4"	Sampled @ 1520 N = 82 Rec = 1.4/1.4'
	170						
	171	Cuttings 171-179: (SP) As above, v. clean fine sand, soft with occ cobbles of $CaCO_3$ cemented ss, fine grained, w/ dissolution features (worm burrows, stems etc.) Damp reddish yellow.					
	172						
	173						
	174						
	175						
	176						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [signature]

HOLE NO. MW-D

SHEET 20 OF 33 SHEETS

V.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	176	SAND(SP) same as above					Alluvium
	177	silty SAND(SM) see description below					Alluvium
	178						
	179	Core 179 - 180.4: Silty sand (SM). V. fine-fine grained, round-sub-angular qtz. Soft, unconsolidated. Reddish yellow (5YR 6/6). Damp, w/ clast of well indurated, fine ~~SS~~ grained, carbonate cemented SS recovered (1.25" x 3")	B.Z. = 0.0 H.S. = 0.0			6 20 50/5"	Sample @ 1545 N = 70 Rec = 1.4/1.4'
	180						
	181						
	182						
	183						
	184						
	185						

HTW DRILLING LOG

PROJECT: CAFB LF-3/4 RFI Ph II

INSPECTOR: Brian J. Pirsky

HOLE NO.: MW-0

SHEET 21 OF 33 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Silty SAND (SM) same as above					Alluvium
	186						
	187						
	188						
	189						
		Core					
	190	190-191.4: Silty Sand (SM) Reddish yellow (5YR 6/6). Moist V. fine-fine grained qtz, round to subangular, soft, unconsolidated, non-calcic.	BZ = 0.0 H.S. = 0.0 BH = 0.0			14 33 50/4"	Sample @ 1615 N = 83 Rec = 1.4/1.4
	191						
	192						
	193						
	194						
	195						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-0

SHEET 22 OF 33 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	195	Silty SAND (SM) same as above					Alluvium
		Cuttings 194-200': Cuttings continue to show cobbles and clasts of $CaCO_3$ cemented, fine, rounded ss.					
	196						
	197						
	198						
	199						
	200	Core					
		200 - 201.6: Silty sand (SM) as above, with erratic pebbles and gravel of lime cemented fine ss at 200.4'-200.8' & @ 201 - 201.6. Moist, soft & Unconsolidated.	HS = 0.0			12 35 50/5"	Sampled @ 1640 N = 85 Rec = 1.6/1.5'
	201						
	202						
	203						
	204						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: Brian G. Parker

HOLE NO.: MW-0

SHEET 23 OF 33 SHEETS

EV.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Silty SAND (SM) Same as above					Alluvium
	205	202-210: Cuttings show erratic cobbles and gravel of limey sandstone in soft, silty sand as above.					
	206						
	207						
	208						
	209						
	210	Core 210-211.5: Silty sand (SM) Strong brown (7.5 YR 5/6). Non-calcic, damp, subangular with some rounded grains. V. soft. Unconsolidated.	BZ = 0.0 HS = 0.0			6 24 39 47	Sampled @1720 N = 63 Rec = 1.5/2.0
	211						
	212						
	213						
	214						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: Brian G. Pugh

HOLE NO. MW-0

SHEET 24 OF 33 SHEETS

T.V.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		silty SAND (SM) same as above					Alluvium
	215						
	216						
	217						
	218						
	219						
	220	Core 220-221.3: Sandy silt as above (SM). Damp with clasts of sandstone occurring every .3-.4' in core. Sandstone is similar to unconsolidated sand matrix, except has $CaCO_3$ cemat.	B.Z. = 0.0 H.S = 0.0			28 47 50/4"	Sampled @ 1745 N = 97 Rec = 1.3/1.4
	221						
	222						
	223						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: Brian J. Rudy

HOLE NO. MW-0

SHEET 25 OF 33 SHEETS

ELEV.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Silty SAND (SM) same as above					Alluvium
	224	221-230: SM as above, from cuttings.					
	225						
	226						
	227						
	228						
	229						
	230	Core 230-231.5: Sandy Silt (SM) with erratic limey cobbles as above. Matrix is fine - v. fine, subround to subangular qtz. Calcic only near clasts, as they appear to be weathering. Soft, Damp.	B.Z. = 0.0 H.S. = 0.0			16 30 48 49	Sampled @ 1815 N = 78 Rec = 1.5/2.0 END of SHIFT
	231						
	232						
	233						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: Brian [illegible]

HOLE NO. MW-0

SHEET 26 OF 33 SHEETS

ELEV.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Silty SAND (SM) same as above					Alluvium
	234						
	235						
	236						
	237						
	238		PID cal. to 57 ppm (Benzene R.F.) w/ 100 ppm isobutylene.				Start Shift @ 1415, 10/27/94 after digging up diesel spill.
	239		B.G. = 0.1 B.Z. = 0.1				
	240	Core 240 - 241.7: Upper .3' is Calcic cemented fine grained SS, v. dense. Lower 1.5' is Silty Sand (SM), red yellow (7.5YR 6/6), soft and unconsolidated. Sand is round to subangular qtz, v. similar to all sand drilled to this depth.	B.Z. = 0.1 H.S. = 0.2 B.H. = 0.1			11 18 33 50/5"	Sampled @ 1430 N = 51 Rec. = 1.7/1.9'
	241						
	242						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-0

SHEET 27 OF 33 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		silty SAND (SM) same as above					Alluvium
	243						
	244						
	245	245 - Cuttings show thicker bed of calcic ss with dissolution textures, .5-1.0' thick at this depth. Paleocaliche, ~~or~~ lakebed, or calcic member?					
	246						
	247						
	248						
	249						
	250	Core 250-251.8: Silty sand (SM), as above. Reddish yellow (7.5 YR 6/6). Calcic ss clast 2"x2" @ 250-250.1', followed by .8' of soft sand and silt with abnt chalky wht $CaCO_3$ matrix (caliche?)	BZ = 0.2 H.S = 0.1			17 27 35 36	Sample @ 1510 N = 62 Rec = 1.8/2.0
	251	250.8-251.8 - Sandy silt, (SM) non-calcic, v. fine-fine, subangular to round qtz grains soft, uncon solidated DAMP.					
	252						

PROJECT: CAFB LF 3/4 pl II RFI HOLE NO.: MW-0

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: Brian G. Ruby

HOLE NO.: MW-0

SHEET 28 OF 33 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Silty SAND (Sm) same as above					Alluvium
	253						
	254						
	255						
	256						
	257						
	258	Core 258-259.7': Silty Sand (Sm) w/ erratic sandstone cobbles. Light brown (7.5 YR 6/4), v. fine to fine sand w/ subangular to round grains. Equal parts sand to silt. Soft, non-calcic except for clasts and cobbles.	BZ = 0.2 H.S = 0.0			14 34 45 50	Sample @ 1550 N = 79 Rec = 1.7/2.0
	259						
	260						
	261						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: Brian [illegible]

HOLE NO.: MW-0

SHEET 29 OF 33 SHEETS

EV.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		silty SAND (SM) same as above					Alluvium
	262						
	263						
	264						
	265	SAND (SP) see description below					Alluvium
	266						
	267						
	268	Core					
		268 - 269.5: Poorly graded sand, fine, w/ sharp contact w/ med. grained, well rounded, soft sand @ 268.8: Very clean, <5% silt, non-calcic, v. well sorted. Clast of weak red claystone @ 268.5 - 268.8.	BZ = 0.0 H.S. = 0.0			14 34 50/4"	Sample @ 1632 N = 84 Rec = 1.5/1.3'
	269						
	270						
	271						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-0

SHEET 30 OF 33 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		SAND (SP) same as above					Alluvium
		Cuttings					
	272	270 - 279: Poorly graded sand (SP). Very well sorted, fine, pink (7.5YR 8/2) sand with occ.					
	273	clasts of claystone up to 3" diameter, apparently floating in the sand matrix. Claystone is weak red. Damp.					
	274						
	275						
	276						
	277						
	278					▼	Water level @ 278.2' after taking 279-281' Sample. Stabilized @ 278.3 after 13 hrs
		Core					
	279	279.1 - 289.1: Fine to med. grained, poorly graded sand (SP) w/ Appx 10% Silt. Round - subang. Qtz grains. Brown (7.5 YR 5/4).	BZ = 0.0 BH = 0.0 HS = 0.0	MW-0 280		10 23 33 39	Sample @ 1710 N = 56 Rec = 2.0/2.0'
	280	Erratic clasts of $CaCO_3$ cemented SS at top of run.					
		Saturated:					

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI Ph II

INSPECTOR: [illegible]

HOLE NO.: MW-0

SHEET 31 OF 33 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		SAND(SP) Same as above					Alluvium sample continued from above
	281						
	282						
	283						
	284						
	285						
	286						
	287	Core 287.7-289.9: Poorly graded sand (SP). Very well sorted med. grained sand, clean. Round to subround qtz, Reddish brown (5 YR 5/4). Soft, unconsolidated, Wet (saturated). Dark red brown clay @ 289.5-289.6 (.1'), difficult to determine if clay is a clast or a lens.	BZ = 0.0 H.S. = 0.0				
	288			MW-0 290		6 18 31 50/5"	Sample @ 1820 Rec = 2.2/2.0 N = 49
	289						END of Shift @ 1830. Rising head test will cont. overnight.
	290						

HTW DRILLING LOG

PROJECT: CAFB LF 3/4 RFI

INSPECTOR: Brian J. Riley

HOLE NO.: MW-0

SHEET 32 OF 33 SHEETS

DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	SAND (SP) same as above	PID calib. to 57 ppm Benzene R.F. w/ 100ppm isobutylene. BG = 0.0 BZ = 0.0				Alluvium 10/28/94 - Start Shift @ 720
291						
292						
293						
294						
295						
296						
297						
298						
299	Core 299-299.5: Poorly graded Sand, (SP) med. grained, reddish brown (5YR 5/4). Saturated, soft, Round - subangular, Clst cobbles & chats in Sample	HS = 0.1	MW-0 300		19 50/4"	Sample @ 920 N = 50+ Rec = 2.0 w/ 1.5' sleff.

PROJECT: CAFB LF 3/4, LII RFI

HOLE NO.: MW-0

HTW DRILLING LOG

HOLE NO. MW-0

SHEET 33 OF 33 SHEETS

PROJECT CAFB ~~MW~~ LF 3/4 RFI Ph II

INSPECTOR [illegible]

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		SAND (SP) same as above Cuttings					Alluvium
	300	299.5 – 303.5: Sand (SP) as above, grading to a coarse, well graded sand w/ pebbles to .3". Color as above					
	301	Thin red clay appx 4" @ 302, then sharp contact w/ fine, poorly graded sand.					Fine, saturated sand heaving to 300-301. Must repeatedly blow hole and condition with water to hold hole open. (Appx 50 bals used)
	302						
	303						
	304	T.D @ 304.3'					
							Bottom of boring at 304.3 feet

478 216

N M ENVIRONMENT DEPARTMENT - GROUND WATER SECTION MONITOR WELL CONSTRUCTION AND ABANDONMENT GUIDELINES

Purpose: These guidelines provide minimum construction and abandonment standards for drilled monitor wells which are to be sampled for general chemistry analyses. There may be additional requirements if hydrocarbons or other chemicals are involved. Also different guidelines may apply for other types of well construction such as driven wells.

General Drilling Specifications

1. The bore hole shall be drilled a minimum of 4 inches larger than the casing diameter to allow for the emplacement of sand and sealant.
2. No contaminants shall be present in the drilling mud.
3. All drill bits, drill rods, and down-hole tools shall be thoroughly cleaned prior to the start of drilling.
4. After completing the well casing installation, the well shall be developed so that formation water flows freely through the screen and is not turbid, and all sediment has been removed from the well.

Well Specifications (Refer to figure on reverse side.)

1. Use Schedule 40 or heavier PVC pipe, not less than 2 inches ID, as casing. The casing shall extend from the top of the screen to at least one foot above ground surface. The top of the casing must be protected by a cap, and the exposed casing must be protected by a locking shroud. The shroud shall be large enough in diameter to allow easy access for removal of the plastic cap on the PVC casing.
2. Use a minimum 20-foot section of machine slotted or other manufactured screen. A slot size of 0.010-inch generally is adequate for most installations. (No on-site, hack-saw slotting.)
3. The top of the screen shall be 5 feet above the water table, allowing for seasonal fluctuations.
4. The screen section should have centralizers at the top and bottom.
5. The annular space from the bottom of the screen (2 feet below the bottom of the screen if a blank section of casing is placed below the screen) to 2 feet above the screen shall be packed with sand. Clean, medium to coarse sand is recommended. The sand pack should be properly sized to prevent fines in the formation from entering the well. For deeper wells the sand shall be placed by a tremmie pipe.
6. The annular space above the gravel pack shall be grouted or sealed. Pressure grouting with bentonite or cement using a tremmie pipe is preferred. The alternative is to form a bentonite seal by placing bentonite pellets (1/4 or 1/2 inch in size) for at least 2 feet above the gravel pack and proceding in accordance with Item 7 below.
7. The annular space above the bentonite seal can be filled with drill cuttings, or clean sandy clay or tighter soil to within 10 feet of the ground surface. The remaining 10 feet must be sealed with a bentonite-cement grout seal (two to eight percent bentonite by weight).
8. A two-foot minimum radius, four inch minimum thickness concrete pad shall be poured around the shroud. The concrete shall be sloped that rainfall and runoff flows away from the shroud.

Abandonment: Monitor wells no longer in use shall be plugged in such a manner as to preclude migration of surface runoff or ground water along the length of the well. Where possible, this shall be accomplished by removing the well casing and pumping expanding cement from the bottom to the top of the well using a tremmie pipe. If the casing cannot be removed, the casing shall be ripped or perforated along its entire length if possible, and grouted. Filling with bentonite pellets from the bottom to the top is an acceptable alternative to pressure grouting.

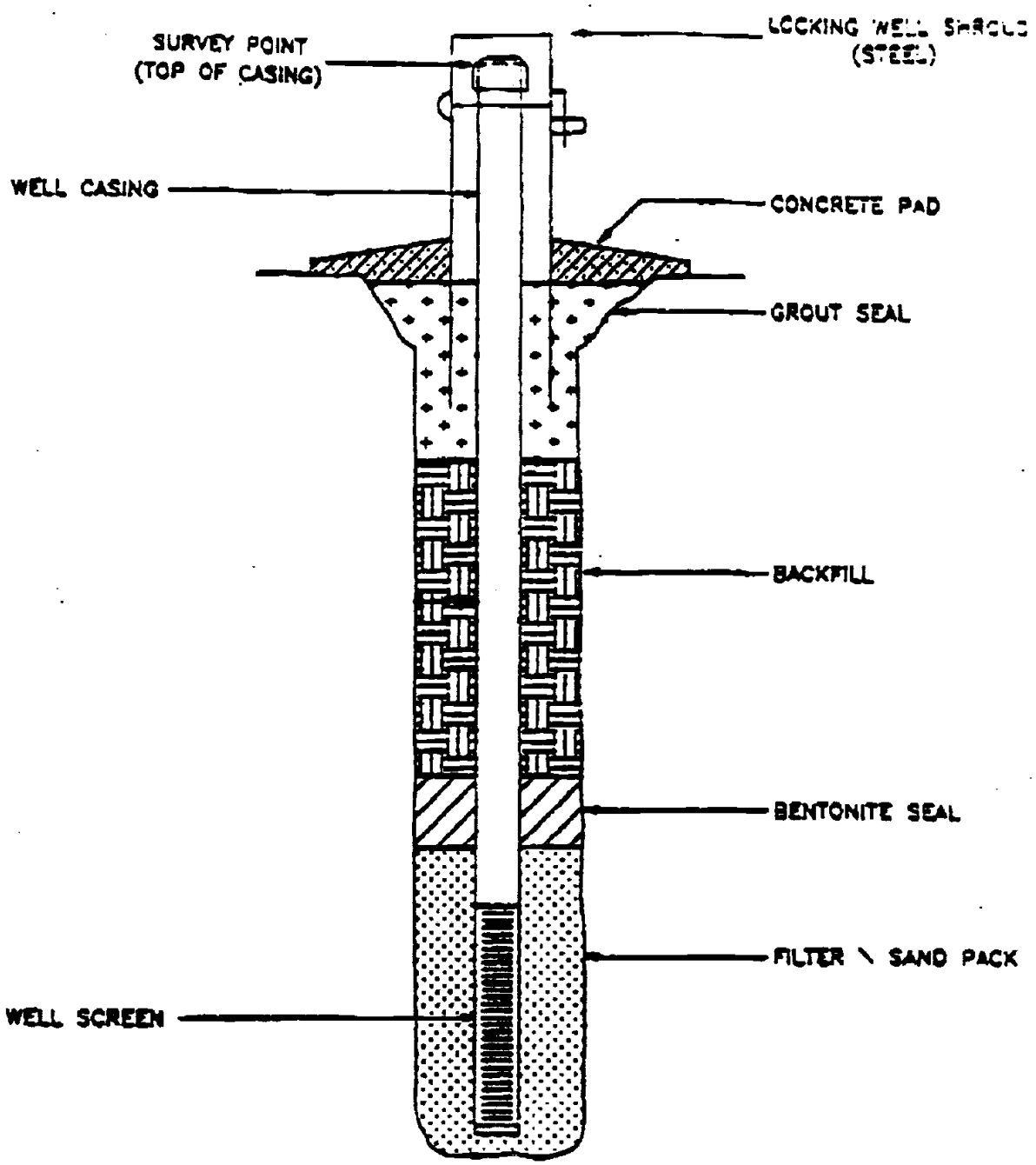
Variances: Requests for variances from these guidelines shall be in writing to the Program Manager, NMED Ground Water Section, 1190 St. Francis Drive, P. O. Box 26110, Santa Fe, NM 87502. Each request shall explain in detail the evidence supporting the request. The GWS approval also shall be in writing.

Date: 8/15/92

sbuck, Program Manager, Ground Water Section

Post-it® Fax Note 7671	Date 11-22-94	# of pages ▶ 2
To Mike Sanderman	From Mary Leavitt	
Dept. Woodward Clyde	Co. Ground Water Sec	
Phone #	Phone # 827-2919	
Fax # (842) 334-1984	Fax # 827-2965	

Mary Leavitt
NMED Groundwater Section
505/827-2965



GENERALIZED MONITORING WELL SCHEMATIC

(Not To Scale)

MONITORING WELL IDENTIFICATION REPORT

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS AND RADIOACTIVE MATERIALS BUREAU
525 CAMINO DE LOS MARQUEZ, SUITE 4
SANTA FE, NEW MEXICO 87502

FACILITY NAME Cannon Air Force Base

EPA I.D. NUMBER NM 7572124454

COUNTY Curry

WELL NUMBER Q -- Landfill-5

WELL LOCATION (LONGITUDE) 103° 18' 31"

WELL LOCATION (LATITUDE) 34° 22' 19"

AQUIFER NAME Ogallala

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE 02-24-1996

DRILLING METHOD Unknown

INNER CASING DIAMETER 4 inches

BOREHOLE DIAMETER 8 inches

CASING MATERIAL PVC

METHOD OF DEVELOPMENT BAILD

ELEV BOTTOM OF BOREHOLE 3,969.30 feet above MSL

ELEV BOTTOM OF WELL CASING 3,970.30 feet above MSL

ELEV BOTTOM OF SCREENED INT 3,970.30 feet above MSL

ELEV OF TOP OF SCREENED INT 4,000.30 feet above MSL

SURVEYED ELEV OF CASING TOP 4,266.89 feet above MSL

DATE OF REPORT 09-15-2003 SIGNATURE Fredrick E. Gebhardt

NAME (TYPED) Fredrick E. Gebhardt

HTRW DRILLING LOG

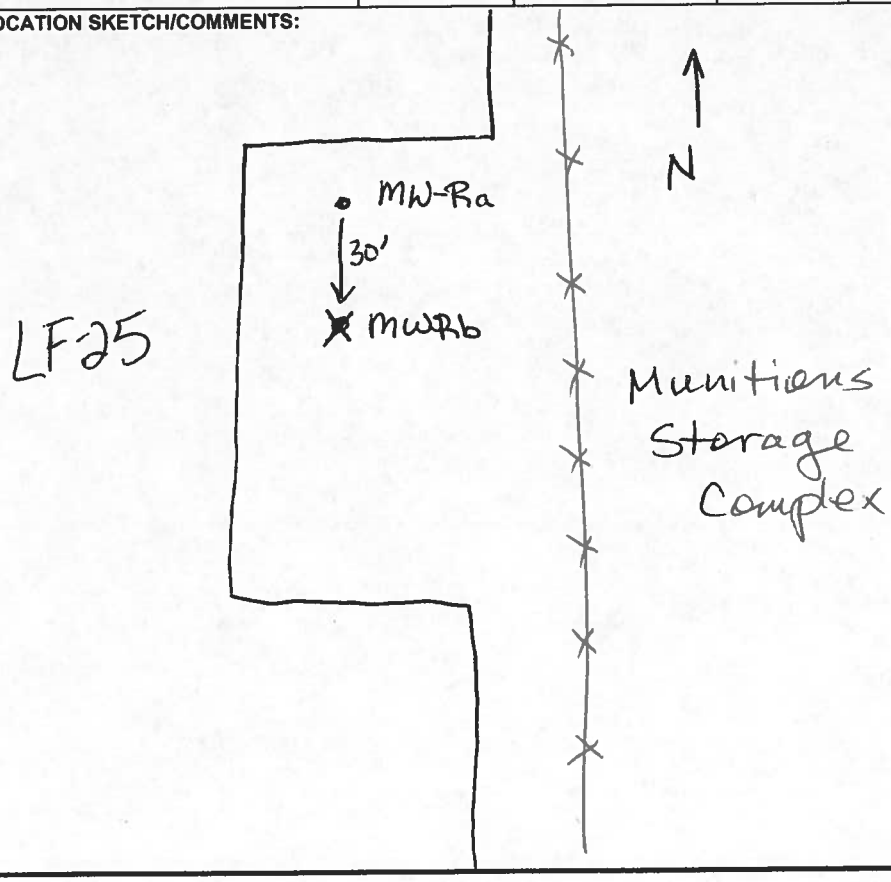
DISTRICT	OMAHA
SAMPLE LOCATION	MW-Rb
1. COMPANY NAME	Tetra Tech, Inc.
2. DRILLING SUBCONTRACTOR	National EWP, Inc.
SHEET	1 OF 19
3. SITE	Cannon AFB, NM
4. LOCATION	SWMU 97, Landfill 25 (LF-25)
5. NAME OF DRILLER	Adrian Lawler
6. MANUFACTURERS DESIGNATION OF DRILL	Stratex/ Air rotary casing hammer
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Gefco 50k 9 5/8 OD stratex top 85' ARCH 85-350
8. HOLE LOCATION (DESCRIPTION)	MW-Rb
9. SURFACE ELEVATION	TBD
10. DATE STARTED	10-2-2012
11. DATE COMPLETED	10-4-2012
12. OVERBURDEN THICKNESS	350 ft
15. DEPTH GROUNDWATER ENCOUNTERED	306 ft
13. DEPTH DRILLED INTO ROCK	N/A
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	312.65 ft @ 36 hr
14. TOTAL DEPTH OF HOLE	350 ft
17. OTHER WATER LEVEL MEASURMENTS (SPECIFY)	N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES:
None	N/A	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHERS (SPECIFY)	OTHERS (SPECIFY)	OTHERS (SPECIFY)	21. TOTAL CORE REC. %
None	None	None	None	None	None	N/A

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHERS (SPECIFY)	23. NAME AND SIGNATURE OF INSPECTOR
		X		Richard Buckmaster

LOCATION SKETCH/COMMENTS:



PROJECT #:	SITE:	SAMPLE LOCATION:
FA4890-04-D-0006-0001	Cannon AFB, NM	MW-Rb

HTRW DRILLING LOG	DISTRICT: Omaha	LOCATION: SWMU 97, LF-25
1. PROJECT # Tetra Tech Project 106-8094.02.NM	2. INSPECTOR Buckmaster	SHEET 2 OF 19

ELEV.	DEPTH (feet)	FIELD SCREEN RESULTS	USCS CLASS.	MATERIAL DESCRIPTION	COMMENTS
				Hand-augered to 5' bgs	
	5				
			SM	pinkish-tan Dry sand v. fine w/silt 30% gravel coarse ↳ caliche	
	10				
	15				
				same	
	20				

PROJECT #:	SITE:	SAMPLE LOCATION:
FA4890-04-D-0006-0001	Cannon AFB, NM	MW-Rb

HTRW DRILLING LOG

DISTRICT:	LOCATION:
Omaha	SWMU 97, LF-25

1. PROJECT #	2. INSPECTOR	SHEET 3 OF 19
Tetra Tech Project 106-8094.02.NM	Buckmaster	

ELEV.	DEPTH (feet)	FIELD SCREEN RESULTS	USCS CLASS.	MATERIAL DESCRIPTION	COMMENTS
	25				
				same	
	30				
	35				
			SM	pink-tan, fine<medium same, damp	
	40				

PROJECT #: FA4890-04-D-0006-0001	SITE: Cannon AFB, NM	SAMPLE LOCATION: MW-Rb
HTRW DRILLING LOG	DISTRICT: Omaha	LOCATION: SWMU 97, LF-25
1. PROJECT # Tetra Tech Project 106-8094.02.NM	2. INSPECTOR Buckmaster	SHEET 4 OF 19

ELEV.	DEPTH (feet)	FIELD SCREEN RESULTS	USCS CLASS.	MATERIAL DESCRIPTION	COMMENTS
				Same	
	45				
			SM	Same	Pink-tan sand 10% gravel caliche CLE 10/17/12
	50				
	55				
	60			Same	

PROJECT #: FA4890-04-D-0006-0001	SITE: Cannon AFB, NM	SAMPLE LOCATION: MW-Rb
HTRW DRILLING LOG	DISTRICT: Omaha	LOCATION: SWMU 97, LF-25
1. PROJECT # Tetra Tech Project 106-8094.02.NM	2. INSPECTOR Buckmaster	SHEET 5 OF 19

ELEV.	DEPTH (feet)	FIELD SCREEN RESULTS	USCS CLASS.	MATERIAL DESCRIPTION	COMMENTS
	65				
			~~SM-SP~~ SP-SM	pink-tan medium-fine sand CLR 10/17/12	
				Same 1% gravel caliche CLR 10/17/12	
	70				
	75				
				Same	
	80				

PROJECT #:	SITE:	SAMPLE LOCATION:
FA4890-04-D-0006-0001	Cannon AFB, NM	MW-Rb
HTRW DRILLING LOG	DISTRICT: Omaha	LOCATION: SWMU 97, LF-25
1. PROJECT # Tetra Tech Project 106-8094.02.NM	2. INSPECTOR Buckmaster	SHEET 6 OF 19

ELEV.	DEPTH (feet)	FIELD SCREEN RESULTS	USCS CLASS.	MATERIAL DESCRIPTION	COMMENTS
	85				
				same	
	90				
	95				
	100			same	

PROJECT #:	SITE:	SAMPLE LOCATION:
FA4890-04-D-0006-0001	Cannon AFB, NM	MW-Rb
HTRW DRILLING LOG	DISTRICT: Omaha	LOCATION: SWMU 97, LF-25
1. PROJECT # Tetra Tech Project 106-8094.02.NM	2. INSPECTOR Buckmaster	SHEET 7 OF 19

ELEV.	DEPTH (feet)	FIELD SCREEN RESULTS	USCS CLASS.	MATERIAL DESCRIPTION	COMMENTS
	105				
				same	
	110				
	115				
	120			same	

PROJECT #: FA4890-04-D-0006-0001	SITE: Cannon AFB, NM	SAMPLE LOCATION: MW-Rb
HTRW DRILLING LOG	DISTRICT: Omaha	LOCATION: SWMU 97, LF-25
1. PROJECT # Tetra Tech Project 106-8094.02.NM	2. INSPECTOR: Buckmaster	SHEET 8 OF 19

ELEV.	DEPTH (feet)	FIELD SCREEN RESULTS	USCS CLASS.	MATERIAL DESCRIPTION	COMMENTS
	125				
				same	
	130				
	135				
				same	
	140				

PROJECT #: FA4890-04-D-0006-0001	SITE: Cannon AFB, NM	SAMPLE LOCATION: MW-Rb
HTRW DRILLING LOG	DISTRICT: Omaha	LOCATION: SWMU 97, LF-25
1. PROJECT # Tetra Tech Project 106-8094.02.NM	2. INSPECTOR Buckmaster	SHEET 9 OF 19

ELEV.	DEPTH (feet)	FIELD SCREEN RESULTS	USCS CLASS.	MATERIAL DESCRIPTION	COMMENTS
	145				
	150		SP	pink-tan, damp well sorted fine-medium Sand with 1% gravel caliche	
	155				
	160			Same	

PROJECT #:	SITE:	SAMPLE LOCATION:
FA4890-04-D-0006-0001	Cannon AFB, NM	MW-Rb

HTRW DRILLING LOG	DISTRICT: Omaha	LOCATION: SWMU 97, LF-25
1. PROJECT # Tetra Tech Project 106-8094.02.NM	2. INSPECTOR Buckmaster	SHEET 10 OF 19

ELEV.	DEPTH (feet)	FIELD SCREEN RESULTS	USCS CLASS.	MATERIAL DESCRIPTION	COMMENTS
	165				
				Same	
	170				
	175				
				Same	
	180				

PROJECT #:	SITE:	SAMPLE LOCATION:
FA4890-04-D-0006-0001	Cannon AFB, NM	MW-Rb

HTRW DRILLING LOG	DISTRICT: Omaha	LOCATION: SWMU 97, LF-25
1. PROJECT # Tetra Tech Project 106-8094.02.NM	2. INSPECTOR Buckmaster	SHEET 11 OF 19

ELEV.	DEPTH (feet)	FIELD SCREEN RESULTS	USCS CLASS.	MATERIAL DESCRIPTION	COMMENTS
	185				
				Same	
	190				
	195				
				pink-tan	CLR 10/17/12
			SP	Same 10% gravel Caliche	
	200				

PROJECT #:	SITE:	SAMPLE LOCATION:
FA4890-04-D-0006-0001	Cannon AFB, NM	MW-Rb
HTRW DRILLING LOG	DISTRICT: Omaha	LOCATION: SWMU 97, LF-25
1. PROJECT # Tetra Tech Project 106-8094.02.NM	2. INSPECTOR Beckmaster	SHEET 12 OF 19

ELEV.	DEPTH (feet)	FIELD SCREEN RESULTS	USCS CLASS.	MATERIAL DESCRIPTION	COMMENTS
	205				
			SP	Same 1% gravel caliche	
	210				
	215				
				Same	
	220				

PROJECT #:	SITE:	SAMPLE LOCATION:
FA4890-04-D-0006-0001	Cannon AFB, NM	MW-Rb
HTRW DRILLING LOG	DISTRICT: Omaha	LOCATION: SWMU 97, LF-25
1. PROJECT # Tetra Tech Project 106-8094.02.NM	2. INSPECTOR Buckmaster	SHEET 13 OF 19

ELEV.	DEPTH (feet)	FIELD SCREEN RESULTS	USCS CLASS.	MATERIAL DESCRIPTION	COMMENTS
	225				
				Same	
	230				
	235				
				Same	
	240				

PROJECT #: FA4890-04-D-0006-0001	SITE: Cannon AFB, NM	SAMPLE LOCATION: MW-Rb
HTRW DRILLING LOG	DISTRICT: Omaha	LOCATION: SWMU 97, LF-25
1. PROJECT # Tetra Tech Project 106-8094.02.NM	2. INSPECTOR Buckmaster	SHEET 14 OF 19

ELEV.	DEPTH (feet)	FIELD SCREEN RESULTS	USCS CLASS.	MATERIAL DESCRIPTION	COMMENTS
	245				
				same	
	250			CLR 10/17/12	~~South to Tricon for ARCH~~
	255				
				same w/ lens of clay moist	
	260		SP		

PROJECT #: FA4890-04-D-0006-0001	SITE: Cannon AFB, NM	SAMPLE LOCATION: MW-Rb
HTRW DRILLING LOG	DISTRICT: Omaha	LOCATION: SWMU 97, LF-25
1. PROJECT # Tetra Tech Project 106-8094.02.NM	2. INSPECTOR Buckmaster	SHEET 15 OF 19

ELEV.	DEPTH (feet)	FIELD SCREEN RESULTS	USCS CLASS.	MATERIAL DESCRIPTION	COMMENTS
	265				
			SP-SC	Same pink-tan fine sand moist-damp 20% Clay nodules/gravel	small, perched zone?
	270				
			SP	Same, no clay moist	
	275				
			SP	Same med grain well sort	
	280				

PROJECT #:	SITE:	SAMPLE LOCATION:
FA4890-04-D-0006-0001	Cannon AFB, NM	MW-Rb
HTRW DRILLING LOG	DISTRICT: Omaha	LOCATION: SWMU 97, LF-25
1. PROJECT # Tetra Tech Project 106-8094.02.NM	2. INSPECTOR Buckmaster	SHEET 16 OF 19

ELEV.	DEPTH (feet)	FIELD SCREEN RESULTS	USCS CLASS.	MATERIAL DESCRIPTION	COMMENTS
	285				
				Same	
	290				
	295				
				Same	
	300				

PROJECT #:	SITE:	SAMPLE LOCATION:
FA4890-04-D-0006-0001	Cannon AFB, NM	MW-Rb
HTRW DRILLING LOG	DISTRICT: Omaha	LOCATION: SWMU 97, LF-25
1. PROJECT # Tetra Tech Project 106-8094.02.NM	2. INSPECTOR Buckmaster	SHEET 17 OF 19

ELEV.	DEPTH (feet)	FIELD SCREEN RESULTS	USCS CLASS.	MATERIAL DESCRIPTION	COMMENTS
	305		SP	same, coarse-med sand poor sort w/ gravel damp-wet	
	310		SP	same wet to saturated	
	315				
				same wet	
	320				

PROJECT #:	SITE:	SAMPLE LOCATION:
FA4890-04-D-0006-0001	Cannon AFB, NM	MW-Rb
HTRW DRILLING LOG	DISTRICT: Omaha	LOCATION: SWMU 97, LF-25
1. PROJECT # Tetra Tech Project 106-8094.02.NM	2. INSPECTOR Buckmaster	SHEET 18 OF 19

ELEV.	DEPTH (feet)	FIELD SCREEN RESULTS	USCS CLASS.	MATERIAL DESCRIPTION	COMMENTS
	325				
				same wet to sat	
	330		SP		trip out, check H_2O switch to tricone
	335			same saturated	
	340				

PROJECT #:	SITE:	SAMPLE LOCATION:
FA4890-04-D-0006-0001	Cannon AFB, NM	MW-Rb
HTRW DRILLING LOG	DISTRICT: Omaha	LOCATION: SWMU 97, LF-25
1. PROJECT # Tetra Tech Project 106-8094.02.NM	2. INSPECTOR Buckmaster	SHEET 19 OF 19

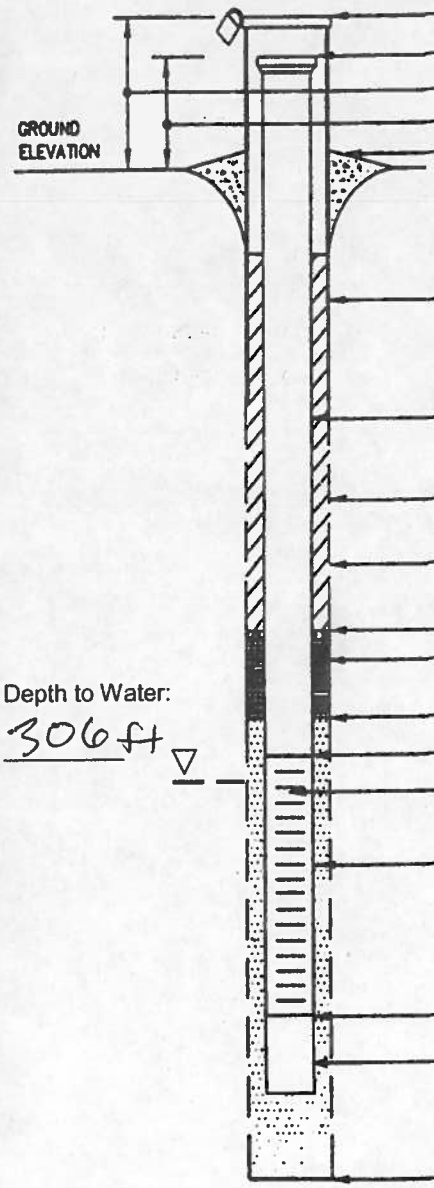
ELEV.	DEPTH (feet)	FIELD SCREEN RESULTS	USCS CLASS.	MATERIAL DESCRIPTION	COMMENTS
	345			Same saturated	
	350			TD 350 ft	
	355				
	360				

OVERBURDEN
MONITORING WELL CONSTRUCTION DIAGRAM

WELL NO. **MW-Rb**

PROJECT Monitoring Well Installation at LF-25
PROJECT NO. FA4890-04-D-0006-0001
DATE 10-4-2012 BORING NO.: MW-Rb
ELEVATION
FIELD GEOLOGIST R. Buckmaster

DRILLER Abtional - Adrian
DRILLING METHOD Air rotary-casing hammer (ARCH)
DEVELOPMENT METHOD and Stratex
surge, bail, swab & pump



ELEVATION OF TOP OF SURFACE CASING: TBD
ELEVATION OF TOP OF RISER PIPE: TBD
STICK-UP TOP OF SURFACE CASING: 3
STICK-UP RISER PIPE: 2.5
TYPE OF SURFACE SEAL: cement/bentonite grout ~~3~~ CLR
Concrete ~~0~~ – 2 CLR

I.D. OF SURFACE CASING: 8"
TYPE OF SURFACE CASING: Steel pipe

RISER PIPE I.D. 4"
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 9 5/8"

TYPE OF BACKFILL: High solids bentonite grout
ELEVATION/DEPTH TOP OF SEAL: 280 ft
TYPE OF SEAL: bentonite chips 3/8
DEPTH TOP OF SAND PACK: 298 ft

ELEVATION/DEPTH TOP OF SCREEN: 301 ft
TYPE OF SCREEN: PVC
SLOT SIZE X LENGTH: 0.010 x 30 ft
TYPE OF SAND PACK: 10/20 Co sand silica

ELEVATION/DEPTH BOTTOM OF SCREEN: 331 ft
ELEVATION/DEPTH BOTTOM OF SAND PACK: 350 ft
TYPE OF BACKFILL BELOW OBSERVATION WELL: 10/20 filter sand
ELEVATION/DEPTH OF HOLE: 350 ft

NOT TO SCALE

DEPTHS DATUM:

Well Development Record and Water Quality Field Data Sheet

Project: Cannon AFB LF-35
Project No.: 186-8094
Date: 10/16/2012
Time Start: 0800
Time Finish: 1248

Well No: MW-Rb
Samplers: R. Buckmaster
Checked by: CLRieger

Well Information

Depth to Water: 312.65 ft. Casing Diameter: 4 in. = 0.33 ft. Casing Stickup: 2.5 ft.

Bottom of Screen: 333.80 ft. Borehole Diameter: 9 5/8 in. = 0.80 ft. Screened Interval: 301-331 ft.

Sample Depth: N/A ft. Saturated Screen Well Volume: 13.75 gallons

Drawdown Limit: N/A ft.

Note: All depths measured from top of casing.

Calculations:
Casing Volume (CV) = $\pi (cr^2) h (7.48)$
Filter Pack Volume (FPV) = $\pi (br^2 - cr^2)[BS-(TS \text{ or } H)] P (7.48)$
Saturated Screen Well Volume = CV + FPV

Calculation Notes:
cr = casing radius
br = borehole radius
H = depth to water
h = bottom of screen – depth of water in ft.
P = estimated porosity of filter pack (35%)
TS = top of screen
If TS>H use TS, if TS<H use H
BS = bottom of screen

Field Equipment

pH Meter: YSI 556 Serial No.: 18462
Water Level Meter: Solinst Serial No.: 30374
Conductivity Meter: YSI 556 Serial No.: 18462
Turbidity Meter: Hach 2100Q Serial No.: 020345
Temperature Meter: YSI 556 Serial No.: 18462
Bailer: Size:

Sample Equipment *(check one)*

[X] *Submersible Pump* — *Pump Type (circle one):* *Piston* *Bladder* *Impeller*

[ ] *Disposable Teflon Bailer* — *Pump Model:*

Serial No.:

Field Chemistry Equipment Cal'd by Pine Env.

pH = @ °C pH = @ °C pH = @ °C Time

Conductivity Standard: µmhos/cm @ 25°C Reading µmhos/cm @ °C Time

Turbidity Standard: N.T.U. @ 25°C Reading N.T.U. @ °C Time

* Information here pertains to well development only. No sampling conducted. CLR 10/17/12

Figure B1.4-1. Well Development Record and Water Quality Field Data Sheet (Concluded)

Well Development Record and Water Quality Field Data Sheet

Project:	Cannon AFB IF-25	Well No:	MW-R5
Project No.:			
Date:	10/6/2012	Samplers:	R Buckmaster
Time Start:	0800		
Time Finish:	1248	Checked by:	C Rieger

Field Chemistry (cont'd)

Time	Volume gallons	Temp. °C	pH	Conductivity µmhos/cm	Turbidity N.T.U.	Comments
1230	0	18.70	8.49	726	30.9	
1233	15	19.29	8.01	719	14.5	
1236	30	19.11	7.93	721	12.8	
1239	45	19.14	7.91	721	7.5	
1242	60	19.16	7.91	722	11.0	
1245	75	19.17	7.93	722	6.67	
1248	90	18.97	7.92	724	3.16	

Was well sampled after development? ___YES X NO

Sample Method: NA

Sample Name: NA

Analyses: NA

MONITORING WELL IDENTIFICATION REPORT

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS AND RADIOACTIVE MATERIALS BUREAU
525 CAMINO DE LOS MARQUEZ, SUITE 4
SANTA FE, NEW MEXICO 87502

FACILITY NAME Cannon Air Force Base

EPA I.D. NUMBER NM 7572124454

COUNTY Curry

WELL NUMBER S -- Landfill-5

WELL LOCATION (LONGITUDE) 103 ° 18 ' 10.58 "

WELL LOCATION (LATITUDE) 34 ° 21 ' 57.02 "

AQUIFER NAME Ogallala

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE 12 -02 to 06 -1998

DRILLING METHOD HYDRT (mud rotary)

INNER CASING DIAMETER 4 inches

BOREHOLE DIAMETER 12 inches

CASING MATERIAL PVC (Schedule-80)

METHOD OF DEVELOPMENT BAILD

ELEV BOTTOM OF BOREHOLE 3898.83 feet above MSL

ELEV BOTTOM OF WELL CASING 3898.83 feet above MSL

ELEV BOTTOM OF SCREENED INT 3939.81 feet above MSL

ELEV OF TOP OF SCREENED INT 3979.83 feet above MSL

SURVEYED ELEV OF CASING TOP 4263.83 feet above MSL

DATE OF REPORT 09-15-2003 SIGNATURE Fredrick E. Gebhardt

NAME (TYPED) Fredrick E. Gebhardt

MONITORING WELL IDENTIFICATION REPORT

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS AND RADIOACTIVE MATERIALS BUREAU
525 CAMINO DE LOS MARQUEZ, SUITE 4
SANTA FE, NEW MEXICO 87502

FACILITY NAME Cannon Air Force Base

EPA I.D. NUMBER NM 7572124454

COUNTY Curry

WELL NUMBER T -- Landfill-5

WELL LOCATION (LONGITUDE) 103 ° 18 ' 09.33 "

WELL LOCATION (LATITUDE) 34 ° 22 ' 00.10 "

AQUIFER NAME Ogallala

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE 12 -6 to 10 -1998

DRILLING METHOD HYDRT (mud rotary)

INNER CASING DIAMETER 4 inches

BOREHOLE DIAMETER 12 inches

CASING MATERIAL PVC (Schedule-80)

METHOD OF DEVELOPMENT BAILD

ELEV BOTTOM OF BOREHOLE 3898.69 feet above MSL

ELEV BOTTOM OF WELL CASING 3898.69 feet above MSL

ELEV BOTTOM OF SCREENED INT 3939.69 feet above MSL

ELEV OF TOP OF SCREENED INT 3979.69 feet above MSL

SURVEYED ELEV OF CASING TOP 4263.69 feet above MSL

DATE OF REPORT 09-15-2003 SIGNATURE Fredrick E. Gebhardt

NAME (TYPED) Fredrick E. Gebhardt

MONITORING WELL IDENTIFICATION REPORT

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS AND RADIOACTIVE MATERIALS BUREAU
525 CAMINO DE LOS MARQUEZ, SUITE 4
SANTA FE, NEW MEXICO 87502

FACILITY NAME Cannon Air Force Base

EPA I.D. NUMBER NM 7572124454

COUNTY Curry

WELL NUMBER U -- Landfill-5

WELL LOCATION (LONGITUDE) 103 ° 18 ' 09.84 "

WELL LOCATION (LATITUDE) 34 ° 22 ' 04.88 "

AQUIFER NAME Ogallala

AQUIFER CONFINED _____ UNCONFINED X

WELL INSTALLATION DATE 12 -10 to 13 -1998

DRILLING METHOD HYDRT (mud rotary)

INNER CASING DIAMETER 4 inches

BOREHOLE DIAMETER 12 inches

CASING MATERIAL PVC (Schedule-80)

METHOD OF DEVELOPMENT BAILD

ELEV BOTTOM OF BOREHOLE 3900.26 feet above MSL

ELEV BOTTOM OF WELL CASING 3900.26 feet above MSL

ELEV BOTTOM OF SCREENED INT 3941.26 feet above MSL

ELEV OF TOP OF SCREENED INT 3981.26 feet above MSL

SURVEYED ELEV OF CASING TOP 4265.26 feet above MSL

DATE OF REPORT 09-15-2003 SIGNATURE Fredrick E. Gebhardt

NAME (TYPED) Fredrick E. Gebhardt

MONITORING WELL IDENTIFICATION REPORT

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS AND RADIOACTIVE MATERIALS BUREAU
525 CAMINO DE LOS MARQUEZ, SUITE 4
SANTA FE, NEW MEXICO 87502

FACILITY NAME	Cannon Air Force Base
USGS SITE ID	342418103201201
COUNTY	Curry
WELL NUMBER	V
WELL LOCATION (LONGITUDE)	103° 20' 12.62"
WELL LOCATION (LATITUDE)	34° 24' 18"
AQUIFER NAME	Ogallala
AQUIFER CONFINED	_____ UNCONFINED X
WELL INSTALLATION DATE	08/08/2001
DRILLING METHOD	HYDRT (mud rotary)
INNER CASING DIAMETER	4 inches
BOREHOLE DIAMETER	8 inches
CASING MATERIAL	PVC (schedule 80)
METHOD OF DEVELOPMENT	BAILD
ELEV BOTTOM OF BOREHOLE	3,954.82 feet above NAVD88
ELEV BOTTOM OF WELL CASING	3,954.82 feet above NAVD88
ELEV BOTTOM OF SCREENED INT	3,959.82 feet above NAVD88
ELEV OF TOP OF SCREENED INT	4,019.82 feet above NAVD88
MEASURING POINT CORRECTION	1.59 feet
SURVEYED ELEV OF LAND SURFACE	4,324.82 feet above NAVD88

DATE OF REPORT 03-30-05 SIGNATURE Fredrick E. Gebhardt

NAME (TYPED) Fredrick E. Gebhardt

MONITORING WELL IDENTIFICATION REPORT

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS AND RADIOACTIVE MATERIALS BUREAU
525 CAMINO DE LOS MARQUEZ, SUITE 4
SANTA FE, NEW MEXICO 87502

FACILITY NAME	Cannon Air Force Base
USGS SITE ID	342348103175801
COUNTY	Curry
WELL NUMBER	W
WELL LOCATION (LONGITUDE)	103° 17' 57.65"
WELL LOCATION (LATITUDE)	34° 23' 48.64"
AQUIFER NAME	Ogallala
AQUIFER CONFINED	_____ UNCONFINED X
WELL INSTALLATION DATE	06/01/2002
DRILLING METHOD	HYDRT (mud rotary)
INNER CASING DIAMETER	4 inches
BOREHOLE DIAMETER	8 inches
CASING MATERIAL	PVC (schedule 80)
METHOD OF DEVELOPMENT	BAILD
ELEV BOTTOM OF BOREHOLE	3,915.45 feet above NAVD88
ELEV BOTTOM OF WELL CASING	3,931.95 feet above NAVD88
ELEV BOTTOM OF SCREENED INT	3,936.95 feet above NAVD88
ELEV OF TOP OF SCREENED INT	3,996.95 feet above NAVD88
MEASURING POINT CORRECTION	2.08 feet
SURVEYED ELEV OF LAND SURFACE	4,296.95 feet above NAVD88

DATE OF REPORT 03-30-05 SIGNATURE Fredrick E. Gebhardt

NAME (TYPED) Fredrick E. Gebhardt

MONITORING WELL IDENTIFICATION REPORT

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS AND RADIOACTIVE MATERIALS BUREAU
525 CAMINO DE LOS MARQUEZ, SUITE 4
SANTA FE, NEW MEXICO 87502

FACILITY NAME	Cannon Air Force Base
USGS SITE ID	342222103194301
COUNTY	Curry
WELL NUMBER	X
WELL LOCATION (LONGITUDE)	103° 19' 43.14"
WELL LOCATION (LATITUDE)	34° 22' 22.16"
AQUIFER NAME	Ogallala
AQUIFER CONFINED	_____ UNCONFINED X
WELL INSTALLATION DATE	02/26/2004
DRILLING METHOD	HYDRT (mud rotary)
INNER CASING DIAMETER	4 inches
BOREHOLE DIAMETER	8 inches
CASING MATERIAL	PVC (schedule 80)
METHOD OF DEVELOPMENT	BAILD
ELEV BOTTOM OF BOREHOLE	3,924.76 feet above NAVD88
ELEV BOTTOM OF WELL CASING	3,928.76 feet above NAVD88
ELEV BOTTOM OF SCREENED INT	3,933.76 feet above NAVD88
ELEV OF TOP OF SCREENED INT	3,973.76 feet above NAVD88
MEASURING POINT CORRECTION	1.24 feet
SURVEYED ELEV OF LAND SURFACE	4,264.76 feet above NAVD88

DATE OF REPORT 03-30-05 SIGNATURE Fredrick E. Gebhardt

NAME (TYPED) Fredrick E. Gebhardt

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List of Acronyms

µg/L	micrograms per liter
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
amsl	above mean sea level
BTOC	below top of casing
CoC	chain of custody
DQCR	Daily Quality Control Report
FPM	FPM Remediations, Inc.
IDW	Investigation-Derived Waste
J	estimated
LOQ	limit of quantification
MCL	Maximum Contaminant Level
mg/L	milligrams per liter
MS/MSD	matrix spike/matrix spike duplicate
NMED	New Mexico Environmental Department
NMGWQS	New Mexico Groundwater Quality Standards
No.	number
ORP	oxidation-reduction potential
PBR	Performance Based Remediation
TOC	top of casing
U	nondetect
URS	URS Group, Inc.
USEPA	United States Environmental Protection Agency
WPA	Work Plan Addendum

This document is a Biennial Groundwater Monitoring Well and Annual Landfill Inspection Report for six sites at Cannon Air Force Base (AFB), New Mexico.

1.1 LOCATION

Cannon AFB is in Curry County, New Mexico, approximately 7 miles west of the City of Clovis. Cannon AFB occupies 4,320 acres, consisting primarily of the airfield and associated operations, maintenance, and support facilities that are located northwest of the airfield. Housing facilities are located in the northwestern portion of the Base, west of New Mexico Highway 311 and north of U.S. Highway 60. Additional Cannon AFB support facilities, such as the munitions storage area and current fire department training area, are located south and east of the airfield (**Figure 1-1**).

1.2 AUTHORITY

FPM Remediations, Inc. (FPM) has been awarded a Performance Based Remediation (PBR) contract by the Air Force Civil Engineer Center (AFCEC) under Contract Number (No.) FA8903-13-C-0008 to complete remediation activities at Cannon AFB. URS Group, Inc. (URS), as a subcontractor to FPM, has completed this Biennial Groundwater Monitoring Well and Annual Landfill Inspection Report under the Environmental Restoration Program at Cannon AFB. The sites identified in this report are subject to corrective action requirements under the Cannon AFB Hazardous Waste Facility Permit No. NM7572124454.

1.3 PURPOSE AND SCOPE

This report has been prepared to document field activities completed during June and July 2014 in accordance with the Work Plan Addendum (WPA) at Cannon AFB, New Mexico (FPM/URS 2014a). The WPA includes groundwater monitoring at 18 monitoring wells (MW-A, MW-B, MW-C, MW-D, MW-E, MW-F, MW-G, MW-H, MW-Na, MW-Oa, MW-Pa, MW-Rb, MW-S, MW-T, MW-U, MW-V, MW-W, and MW-X) and inspections at six landfills (LF002, LF003, LF004, LF005, LF025, and SI101), all of which are located on Cannon AFB.

1.4 REPORT ORGANIZATION

This report is organized as follows:

Section 1 describes the authority, purpose and scope, and report organization.

Section 2 summarizes landfill inspection and maintenance activities completed at LF002, LF003, LF004, LF005, LF025, and SI101.

Section 3 summarizes monitoring well maintenance and surveying activities.

Section 4 presents groundwater monitoring procedures, hydrogeology, and groundwater sampling analytical results.

Section 5 describes the laboratory chemical data quality review and analytical result qualification conclusions.

Section 6 presents the conclusions and recommendations of this report.

Section 7 lists the references used to develop this report.

This section presents details regarding the inspections and maintenance activities completed at the landfill sites.

2.1 LANDFILL INSPECTIONS

Landfill inspections were completed at six landfills (LF002, LF003, LF004, LF005, LF025, and SI101) at Cannon AFB. The 2013 inspections were completed between December 17, 2013 and December 18, 2013. The 2014 inspections were completed between June 16, 2014 and June 18, 2014. Observations regarding the condition of the landfills were consistent between the 2013 and 2014 inspection events. Daily activities are documented in Daily Quality Control Reports (DQCRs) included in **Appendix A**. Landfill Inspection Sheets presenting the observations during the 2013 and 2014 inspection event are provided in **Appendix B**. **Figure 2-1** provides the location of each landfill, along with monitoring well locations.

A summary of major issues for each landfill is provided below:

- LF003: A 10-foot by 5-foot by approximately 3-foot deep sinkhole was observed within the landfill; likely due to subsidence.
- LF004: Washouts observed on the south side of the landfill were subsequently repaired by Cannon AFB.
- LF005: Multiple areas of fence are in need of repair. Additionally, various debris items were observed within the approximately 30-acre portion of LF005 that is fenced with barbed wire. Debris observed included concrete, telephone pole, scrap metal, and other materials. Several small trees were observed within this fenced portion. The east gate to Cell No. 3 of LF005 did not close properly and a chain and lock were missing from this access gate. An undetermined number of tumble weeds were observed within the larger fenced portion of LF005.
- LF025: The barbed wire perimeter fence surrounding LF0025 was observed to be in need of repairs at some locations. Additionally, a sign at the entrance that identified the site was missing at the time of the inspections. Numerous small to large trees, both dead and living, are present across the site with many located just inside the perimeter fence.
- SI101: Portions of the barbed wire perimeter fence were observed to be in need of repair. Several small trees and shrubs were identified along the west side of the site. Tumble weeds were observed within the landfill.

2.2 LANDFILL MAINTENANCE

Landfill maintenance activities were completed during site visits to Cannon AFB in June, July, and October 2014. Maintenance activities were completed at LF005, LF025, and SI101, and included:

- Fallen trees and tree limbs were removed from along the fence line at LF005 and LF025 on June 18, 2014.

- Barbed wire fence repairs were completed at LF025 and SI101 on June 19, 2014.
- Four trees were cut down within the LF005 boundary on July 19, 2014.
- New padlocks were placed at the south and northeast entry gate to LF005 and the entry gate at SI101 on July 19, 2014.
- An estimate of the amount of fencing at LF005 in need of repair as well as dimensions for a sign for the entrance to LF005 were measured for replacement purposes on July 19, 2014.
- All remaining trees and bushes were removed from within the boundaries at SI101 and LF005 on October 28 and 29, 2014.
- The east access gate of Cell No. 3, within LF005 was straightened, and a padlock and chain was added to the gate. Additionally, a chain and padlock was added to the north access gate of Cell 3 on October 31, 2014.

The sinkhole previously identified at LF003 was filled in with soil prior to the October 2014 field activities. The sinkhole was reportedly filled by Cannon AFB personnel. The debris observed at LF005 is known to Cannon AFB but is not within the scope of this task order. A request for bids to complete tree removal at LF025 was issued and bids were received. The bids were provided to Cannon AFB and AFCEC to decide a path forward.

This section presents monitoring well maintenance and surveying activities.

3.1 MONITORING WELL MAINTENANCE ACTIVITIES

Initial monitoring well maintenance activities were completed on June 18 and 19, 2014, and again on October 31, 2014. As part of the well maintenance activities, field personnel:

- Removed all existing dedicated tubing from each monitoring well and dedicated pumps from two wells, MW-Oa and MW-Pa. These pumps were shipped to the manufacturer for refurbishing and reinstalled on October 31, 2014. The dedicated pump and tubing could not be removed from MW-Na.
- Repainted all steel protective well casing and bollards Cannon Brown/Interface Tan.
- Installed new concrete pads at MW-A and MW-B.
- Sealed cracks in concrete pads with concrete crack seal at wells MW-C, MW-D, and MW-F.

Well maintenance activities were also completed on July 18 and 19, 2014. Field personnel:

- Located the correct key to access MW-Rb, and completed an inspection of the well.
- Cut the well riser at four wells such that the riser pipe would fit inside the protective steel casing of each well. Approximately four, nine, one, and six inches of well riser were removed at MW-E, MW-F, MW-G, and MW-H, respectively.
- Installed new locking lids on the steel protective casings at MW-E, MW-F, MW-G, and MW-H, which will allow the wells to be secured with a lock.
- Placed new keyed alike padlocks at all 18 monitoring wells and the access gates to LF005 and SI101. All 18 monitoring wells and the access gates to LF005 and SI101 can be accessed with the same key.
- Installed 4-inch j-plug type well caps at MW-A, MW-E, MW-F, MW-G, MW-H, MW-Oa, and MW-Pa. Currently all 18 wells are sealed with a j-plug.

The maintenance work performed is documented on the DQCRs in **Appendix A**. A summary of monitoring well construction details and comments regarding observed conditions is presented in Table 2 of the Annual Land Use Control Inspections Report (FPM/URS 2014b).

3.2 MONITORING WELL SURVEY

Lydick Engineering of Clovis, New Mexico (licensed surveyor in New Mexico) surveyed the locations and elevations of both the concrete pad and top of casing (TOC) for all 18 monitoring wells. Surveying was completed on September 11, 2014. The survey results are summarized in **Table 3-1**. Horizontal coordinates are reported in New Mexico East State Plan Coordinates, which are referenced to the North American Datum of 1983 to an accuracy of 0.1 feet. Elevations are referenced to the North American Vertical Datum 1988. The surveyor's data submission is included in **Appendix D**.

No major variances were noted between the September 2014 survey data survey and the data reported in the 2012 Biennial Groundwater Monitoring and Annual Landfill Inspection Report (Bhate 2013), with four exceptions; the TOC elevations for MW-E, MW-F, MW-G, and MW-H, which were altered during the monitoring well maintenance activities completed in July.

The location of MW-B, which has been historically placed directly adjacent to MW-T, was inaccurate. The September 2014 survey data indicated the location of MW-B is between MW-T and MW-U. Based on observation by field personnel, this is the correct location for MW-B. Figures in this report and future reports will show the location of all monitoring wells based on September 2014 survey data.

The total depth of each monitoring well was measured during the collection of the groundwater samples. The purpose of the measurement was to collect data to be utilized in conjunction with the 2014 monitoring well survey data to form a baseline of information that would be utilized for all future groundwater monitoring reports at Cannon AFB. The total depth of the well was calculated using the survey data and information from historical boring logs. This revised information is included in **Table 4-1** of this report.

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Available monitoring well construction information for all monitoring wells located at Cannon AFB is included in **Appendix F** of this report. Should additional historical information become available for the remaining monitoring wells, this information will be included in the subsequent biennial reports.

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This section presents the groundwater monitoring activities including water level measurements, potentiometric surface mapping, monitoring well sampling, and analytical results.

4.1 WATER LEVEL MEASUREMENTS

Water levels were measured by URS during two separate events. The first event was completed on June 17 and 18, 2014 and the second event was completed on July 14 through the 21, 2014, when the wells were sampled. Water level measurements were not collected by URS during the 2013 landfill inspections. However, water level measurements were collected by the USGS in July 2013 and are included in **Table 4-1**. Well locations are shown on **Figure 2-1.**

Monitoring wells MW-B and MW-D were not sampled in 2012 due to excessive silt accumulation in the bottom of the wells. It was recommended that those wells be redeveloped and a determination made regarding their integrity and viability as groundwater quality sampling points. This work was to be performed in advance of the October 2014 sampling event. No evidence of siltation was observed by URS at the time the field work was completed. Water levels and groundwater samples were collected without issues during the 2014 sampling event. Water levels measured during the completion of field work are provided in **Table 4-1**.

Water levels were measured at 16 of 18 monitoring wells during the June event. The water level at MW-Na could not be measured because the dedicated pump installed in the well could not be removed and due to an undetermined obstruction at 238 feet below top of casing (BTOC). A water level at MW-Rb was not measured because the key to access the well could not be located.

Water levels were measured at all 18 wells during the July event. At MW-Na, a tubing extension provided by Cannon AFB allowed the dedicated pump in the well to be lowered into the water column such that a water level measurement could be taken. The key for MW-Rb, provided by Cannon AFB, allowed access to the well for a water level measurement. Water level measurements for both events, along with historic TOC elevations for the monitoring wells are provided in **Table 4-1**. Water level measurement activities are documented on the DQCRs in **Appendix A**.

Water levels measured in June ranged from 286.60 to 349.31 feet BTOC, while June groundwater elevations ranged from 3,931.90 feet above mean seal level (amsl) at MW-T to 3,982.60 feet amsl at MW-X. Water levels measured in July ranged from 287.04 to 349.79 feet BTOC, with groundwater elevations ranging from 3,930.12 amsl to 3,982.19 amsl. Water levels dropped between the two events, with a geometric mean decline of 0.83 feet. Historical reports for this area report that local groundwater levels have dropped an average of two to three feet per year due to groundwater extraction for agricultural (primarily irrigation), municipal, and domestic use.

~~The potentiometric surface for June is presented in **Figure 4-1**. Groundwater elevations for **Figure 4-1** were calculated using the June water level data and monitoring well TOC elevations from the 2012 Biennial Groundwater report (Bhate 2013). Future groundwater elevations will be calculated using the September 2014 survey data. The September 2014 survey data are also~~

~~provided in **Table 4-1.**~~Potentiometric surface maps were generated from the July 2013 (**Figure 4-1**), June 2014 (**Figure 4-2**), and July 2014 (**Figure 4-3**) field measurements. Groundwater elevations for **Figure 4-1** were based on field data obtained from the USGS for the July 2013 field event and calculated using the monitoring well TOC elevations from the 2012 Biennial Groundwater report (Bhate 2013). Groundwater elevations for **Figures 4-2** and **4-3** were based on field data collected during the June 2014 sampling event and the July 2014 field event. Groundwater elevations for these figures were calculated based on the September 2014 survey data for the monitoring wells."

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As shown on **Figure 4-1**, the direction of groundwater flow is to the east in the western part of the Base, near MW-V. In the vicinity of MW-E, groundwater flow changes direction, resulting in a southeast trend towards MW-S. Interpreted groundwater elevations near MW-Oa, MW-Na, and MW-Pa depict a distinct change in groundwater flow to due south.

Figure 1-1 shows the distinct circular patterns associated with center pivot irrigation systems that are abundant around Cannon AFB, with the greatest density of center pivot systems southeast of the Base. This concentration of center pivot systems likely explains the sharp southern turn of groundwater flow direction in the vicinity of MW-Oa.

4.2 GROUNDWATER SAMPLING

In accordance with the WPA (FPM/URS 2014a), groundwater samples were collected at 18 monitoring wells from July 14 to 21, 2014. All 18 groundwater samples were collected from the middle of the screened interval of each well. Additionally, one duplicate sample and one matrix spike/matrix spike duplicate (MS/MSD) sample were collected at MW-Oa and MW-F, respectively. The monitoring well locations are shown on **Figure 2-1**. The DQCRs describing the work completed during the sampling event are provided in **Appendix A.**

4.2.1 Groundwater Sampling Procedures

Well purging and sampling were completed using low flow sampling procedures. Purging and sampling were completed using a Geotech bladder pump at a discharge rate of less than 500 milliliters per minute. Compressed nitrogen supplied in K cylinders was used to operate the bladder pumps. Purging and sampling of well MW-Na were completed using the dedicated bladder pump and tubing that were present in the well.

During purging, groundwater quality parameters were monitored to determine the presence of formation water in the well casing. Monitored groundwater quality parameters included pH, specific conductance, dissolved oxygen, oxidation-reduction potential (ORP), and temperature, and were measured using a YSI-556 multi-parameter probe and flow-through cell. Turbidity was measured using a LaMotte 2020e portable turbidity meter. Purging continued until three stabilized water quality parameters readings were recorded. Once purging was completed, the discharge line was disconnected from the flow through cell and samples were collected from the discharge line.

After purging and sampling activities were complete, the pump and tubing were removed from the well and the tubing was reinstalled for future use. The pump was decontaminated before moving to the next well.

A summary of sample identifications, sampling dates, and laboratory analytical parameters are presented in **Table 4-2.** Groundwater Sample Collection Field Sheets, which document field water quality parameter measurements, sampling dates and time, sample identification, associated Quality Control/Quality Assurance sampling, sample container types and preservatives, and sampling equipment, are presented in **Appendix C**.

4.2.2 Field Documentation

Observations and data acquired in the field were documented to provide information on the acquisition of the samples and provide a permanent record of field activities. The observations and data were recorded with waterproof ink in a permanently bound, weatherproof field logbook with consecutively numbered pages.

Field water quality measurements, including temperature, pH, specific conductance, dissolved oxygen, ORP, and turbidity were recorded on Sample Collection Field Sheets which are included in **Appendix C**.

Samples were tracked from the time they were collected until the samples reached the analytical laboratory. Information on the dates of sampling, sample types, required analysis, handling, custody transfer and shipping of samples to the laboratory was recorded on the chain of custody (CoC) form.

4.2.3 Sample Handling

Samples were collected in laboratory-supplied containers with required preservatives. An identification label was attached to each sample container and completed using waterproof, permanent ink with the following information: sampler's initials, sample identification number, date and time of sample collection, preservative type, and analysis required. During daily sampling activities and for shipment, sample containers were placed into laboratory-cleaned coolers and packed on ice.

A copy of the CoC for the samples was included in each cooler for laboratory use upon receipt. Sample coolers were sealed with tape and custody seals to ensure security during shipping. A copy of the CoC form was maintained to document sample handling between the field and laboratory. Sample coolers were generally shipped daily via overnight courier service to the contracted laboratory.

4.2.4 Decontamination

A temporary decontamination area was set up at each sampling location. Sampling equipment was decontaminated between use in a five-gallon bucket containing Liquinox soap and potable water by scrubbing with a bristle brush. Equipment was then rinsed with potable water in an

additional bucket followed by a deionized water rinse. Rinse and detergent water were replaced with new solutions between sampling locations. Investigation-Derived Waste (IDW) handling procedures are described below.

4.2.5 Investigation-Derived Waste

IDW included monitoring well purge water and decontamination water. All IDW collected during groundwater sampling was temporarily stored in five-gallon buckets then transferred to bulk liquid storage tanks located adjacent to each monitoring well. If a bulk liquid storage tank was not present at the monitoring well, the IDW was transferred to the closest available storage tank.

Some investigative groundwater samples associated with the IDW exceeded the screening criteria (United States Environmental Protection Agency [USEPA] Maximum Contaminant Levels [MCL], New Mexico Groundwater Quality Standards [NMGWQS] or New Mexico Tap Water) as presented in **Table 4-3**. As a result, all IDW associated with the exceedances will be consolidated into drums. These drums will be sampled and the samples analyzed for the compounds that exceeded their respective screening criteria. The results will be compared to the Toxicity Characteristic Leaching Procedure Regulatory Limits (40 CFR 261.24). New Mexico Environmental Department (NMED) will be contacted with the IDW characterization results to determine disposal options.

4.3 ANALYTICAL RESULTS

The groundwater sampling analytical results were compared to current USEPA MCLs, and NMGWQS (20 New Mexico Administrative Code 6.2). If no screening criteria are listed for an analyte in the USEPA MCLs or the NMGWQS, the results were compared to the criteria specified in the NMED Risk Assessment Guidance (NMED 2012). Reported detections and comparisons to MCLs, NMGWQSs, or the NMED Risk Assessment Guidance, are provided in **Table 4-3**. Detections exceeding applicable screening levels are depicted on **Figure 4-4**.

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Groundwater analytical results from three previous groundwater sampling events in 2008 (Tetra Tech 2008), 2010 (Trinity 2010), and 2012 (Bhate 2013) are provided in **Table 4-4**, **Table 4-5**, and **Table 4-6**, respectively. The current screening criteria (USEPA MCLs, NMGWQS, and NMED Tap Water) are also listed on these historical results tables for comparison.

Volatile Organic Compounds, Target Analyte List metals, perchlorate, chloride, sulfate, nitrite, and ammonia were not detected above screening criteria. Nitrite was reported as nondetect for all samples. Reported concentrations for hexavalent chromium and nitrate were detected above at least one screening criteria. Reported total organic carbon concentrations ranged from 0.2 micrograms per liter (µg/L) to 1.4 µg/L.

Hexavalent chromium was detected in 16 of 17 groundwater samples with reported concentrations ranging from 0.20 µg/L to 1.20 µg/L. The sample from well MW-V was rejected due to exceedance of the holding time. No MCL or NMGWQS has been established for

hexavalent chromium. Hexavalent chromium exceeded its New Mexico Tap Water screening level of 0.431 µg/L in 14 of 17 wells (**Table 4-3**). The distribution of reported concentrations does not indicate any distinct trends or patterns indicating a point source or a release. Additionally, two of the exceedances were in background wells (MW-X and MW-W) indicating the hexavalent chromium is naturally occurring. Publications from the State of California have identified hexavalent chromium as naturally occurring in groundwater in California, Nevada, New Mexico, and Arizona.

Hexavalent chromium concentrations in 2010 ranged from 4.1 µg/L to 19.0 µg/L in MW-F, MW-G, and MW-H and exceeded the hexavalent chromium New Mexico Tap Water screening level of 0.431 µg/L. Analytical results from 2008 and 2012 resulted in no groundwater samples exceeding the New Mexico Tap Water screening level for hexavalent chromium. A review of the analytical results from previous reports (**Table 4-4**, **Table 4-5**, and **Table 4-6**) indicated analytical reporting limits for hexavalent chromium were 20 µg/L in 2008 and 2010, and 4 µg/L in 2012. The limit of quantification (LOQ), for the June 2014 sampling round was 0.5 µg/L. The reduced LOQ would account for the detection of hexavalent chromium in 2014 that was not identified by previous sampling events.

The 2012 report (Bhate 2013) recommended future hexavalent chromium samples should be analyzed via EPA method 218.6. However, this method is not a Department of Defense approved method. Discussions with the laboratory determined that USEPA Method 7199 is equivalent to EPA Method 218.6 when preservatives are added to the samples. Therefore, the laboratory agreed to a modification of the method to allow preservatives to be added to 7199 to extend the hold time equivalent to EPA Method 218.6. Preservatives were intended to be added to the laboratory samples during the collection of the field work. No preservatives were included in the first nine samples collected during the field work (MW-B, MW-C, MW-D, MW-Na, MW-S, MW-T, MW-U, MW-V, and MW-X) due to an oversight by field sampling personnel. The preservative was included in the remaining nine samples collected by the field crew. The hexavalent chromium results for eight of the nine affected samples were analyzed within two times the holding time criteria and therefore were qualified estimated (J). Sample MW-V was the only hexavalent chromium result that was rejected due to analysis at more than two times the holding time.

The 2014 groundwater sampling data indicates the range of hexavalent chromium concentrations present in the preserved samples (0.21 µg/L to 1.1 µg/L) is comparable to the unpreserved samples (0.2 µg/L to 1.2 µg/L). This includes exceedances in background wells MW-W (0.75 µg/L) and MW-X (0.66 µg/L). Based on a review of the data, the exceedance of the holding time does not appear to have impacted the data. As discussed previously in this section of the report, there is no indication of a point source or a release of hexavalent chromium and two of the exceedances were in background wells (MW-X and MW-W) indicating the hexavalent chromium is naturally occurring. Based on the detections of hexavalent chromium at the site, the exceedance of the holding time does not alter the conclusions regarding hexavalent chromium in this report.

Nitrate was detected above at least one screening criterion in MW-Oa, which is located south of the former sewage lagoon overflow pond (SWMU 103). Nitrate has been reported in this well in previous rounds of sampling. An upward trend in nitrate concentrations at MW-Oa is apparent when reviewing historical and current data.

Perchlorate was detected in 13 of 18 wells, with reported concentrations ranging from nondetect to 2.0 µg/L. All reported concentrations for perchlorate were an order of magnitude below the NMED Tap Water screening criteria of 25.6 µg/L (see **Table 4-3**). The laboratory analyzed for perchlorate using USEPA Method 314.0 rather than SW-846 Method 6860 as requested. Method 6860 will be used for future sampling events.

As shown in **Tables 4-4 through 4-6**, some exceedances of current screening levels are apparent when screened against historical groundwater analytical results. However, nitrates in MW-Oa are the only consistent detections above screening criteria. Sporadic reported detections of lead, arsenic, and vanadium in previous sampling events may be related to turbidity issues or laboratory errors.

5.1 DATA REVIEW PROCESS

Analytical data were reviewed and verified by URS in accordance with the Work Plan Addendum for Landfill and Institutional Control inspections Report (FPM/URS 2014a). The data review process included evaluations of the following elements and verification of raw data by a URS chemist:

- Laboratory case narrative/cooler receipt form
- Sample documentation
- Sample preservation and holding time compliance
- Instrument performance check (tuning)
- Initial calibration
- Initial calibration verification second source
- Continuing calibration verification
- Blank samples
- Laboratory control samples
- Surrogate compounds
- Internal standards
- MS/MSD
- Dilution tests
- Post digestion spikes
- Interference check solutions
- Laboratory duplicates
- Field duplicates
- Sensitivity
- Additional qualifications (professional judgment)

5.2 COMPLETENESS AND ANALYTICAL RESULTS VERIFICATION

The laboratory data reports and URS data verification reports are provided in **Appendix E**. **Table 5-1** presents all qualifications in tabular format. Qualifications applied to the analytical results based on the data review findings are summarized as follows.

- For results less than two times the limit of quantitation, professional judgment was used to qualify the common laboratory contaminants acetone in one sample and methylene chloride in three samples as nondetect (**U**).

- The total organic carbon results for the parent sample / field duplicate pair MWOA-7-14 / MWOA-7-14-A were qualified as estimated (**J**) due to field duplicate relative percent difference above evaluation criteria.
- The hexavalent chromium result for sample MWV-7-14 was rejected due to analysis 72 hours outside the 24 hour holding time criteria.
- The hexavalent chromium results for four samples were qualified as **J** due to analysis less than 24 hours outside the 24 hour holding time criteria.
- The 2-chloroethyl vinyl ether results for three samples, the hexavalent chromium result for one sample, the calcium result for one sample, and the magnesium result for one sample were qualified as **J** due to MS/MSD recoveries below evaluation criteria.

5.3 CONCLUSIONS OF DATA QUALITY REVIEW

The analytical data were found to be acceptable for their intended use based on the data reviews. Completeness, defined to be the percentage of analytical results judged to be valid, including estimated (**J/U**) data, was 98.9 percent for the July 2014 groundwater samples from Cannon AFB.

6.1 CONCLUSIONS

The nitrate/nitrite concentrations have historically exceeded the MCL of 10 milligrams per liter (mg/L) at MW-Oa, according to the 2010 (Trinity 2010) and the 2012 (Bhate 2013) Biennial Groundwater Monitoring and Annual Landfill Inspection Report. Nitrate/nitrite analytical results from MW-Oa in July 2014 indicated an increase in concentration from 11.8 mg/L in 2012 to 15.0 mg/L in 2014. Groundwater depicts an interpreted groundwater flow direction to the south in the vicinity of MW-Oa. This is likely due to groundwater being pulled south from beneath the Playa Lake by irrigation and residual nitrate contamination related to sanitary waste treatment practices associated with the Playa Lake.

Hexavalent chromium concentrations from July 2014 were above the NMED Risk Assessment Guidance screening criteria of 0.431 µg/L in 14 monitoring wells. Historically, the detection of hexavalent chromium above screening criteria was limited to MW-F, MW-G, and MW-H. The increase in detections could be the result of using USEPA hexavalent chromium method 7196A and a high historical reporting limit of 20.0 µg/L in 2008 (Tetra Tech 2008) and in 2010 (Trinity 2010). The 2012 Biennial Groundwater Monitoring and Annual Landfill Inspection Report (Bhate 2013) also utilized USEPA hexavalent chromium method 7196A and a reporting limit of 4.0 µg/L for analysis. Hexavalent chromium has been shown to be naturally occurring in some areas and these low levels, including in background wells, indicate that hexavalent chromium in groundwater is not related to activities at Cannon AFB.

Low levels of perchlorate below screening criteria and in background wells indicates the low levels of perchlorate reported in groundwater samples is naturally occurring and is not related to site activities. Also, previous reports used higher reporting limits which likely explains why it was not detected in previous sampling events.

Groundwater sampling analytical results from July 2014 indicated that there are no new contaminant releases to groundwater. Furthermore, proposed new or current Base activities do not pose a threat to groundwater.

6.2 RECOMMENDATIONS

Water levels will be collected in conjunction with the annual landfill and institutional controls inspection to meet NMED requirements. Biennial groundwater sampling will continue in accordance with the WPA (FPM/URS 2014a).

Monitoring well identification tags will be installed for all 18 wells and a sign identifying LF025 with be installed during the 2015 annual inspections. Corrected issues will be documented in future Biennial Groundwater Monitoring Well and Annual Landfill Inspection Reports.

Bhate. 2013. 2012 Biennial Groundwater Monitoring Report and Annual Landfill Inspection Report, Landfills LF-03, LF-04, LF-05, LF-25, and Former Sewage Lagoons. Cannon Air Force Base, New Mexico. April.

Department of Defense (DoD). 2007. The Department of Defense Environmental Data Quality Workgroup. Perchlorate Handbook, Rev 1. August.

FPM Remediations, Inc./URS Group, Inc. (FPM/URS). 2014a. Work Plan Addendum for Landfill and Institutional Control Inspection Sites. Cannon Air Force Base, New Mexico. June.

FPM/URS. 2014b. Annual Land Use Control Inspections Report. Cannon Air Force Base, New Mexico. June.

New Mexico Environmental Department (NMED). 2012. Risk Assessment Guidance for Site Investigations and Remediation, Volume 2. New Mexico Environmental Department, Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program. June.

Tetra Tech EC, Inc. and Brown, Burdine, & Associates, LLC (Tetra Tech). 2008. 2008 Biennial Groundwater Monitoring and Annual Landfill Inspection Report Landfill No. 3 (LF-03/SWMU 105), Landfill No. 4 (LF-04/SWMU 104), and Landfill No. 25 (LF-25/SWMU 97). Cannon Air Force Base, New Mexico. Final. December.

Tetra Tech EC, Inc. and Trinity Analysis & Development Corp. (Trinity) 2010. 2010 Biennial Groundwater Monitoring and Annual Landfill Inspection Report Landfill No. 3 (LF-03/SWMU 105), Landfill No. 4 (LF-04/SWMU 104), Landfill No. 25 (LF-25/SWMU 97), and Sewage Lagoons (SWMU 101). Cannon Air Force Base, New Mexico. Final. December.

APPENDIX A

Daily Quality Control Reports

APPENDIX B

Landfill Inspection Sheets

APPENDIX C Groundwater Sample Collection Field Sheets

APPENDIX D

Survey Data

E.1 Summary of Analytical Results (Dump Table)

E.2 Laboratory Sample Delivery Groups

The raw data packages were submitted to AFCEC, including Cannon AFB. Electronic copies are available upon request.

E.3 URS Data Verifications

APPENDIX~~E~~F ~~Analytical Data Reports~~Monitoring Well Construction Information