

**FINAL**

# DATA GAPS CONSTRUCTION COMPLETION REPORT – 2021 WELL INSTALLATION

FORMER ATLAS “D” MISSILE SITE 4  
F.E. WARREN AIR FORCE BASE, WYOMING  
FUDS ID: B08WY0467



December 2022

United States Army Corps of Engineers  
Omaha District



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**5 DECEMBER 2022**

Prepared for:



United States Army Corps of Engineers  
Contract W912DY-16-D-0026, TO W9128F19F0192

Prepared by:



URS Group, Inc.  
12120 Shamrock Plaza  
Omaha, Nebraska 68154  
60613342

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## List of Acronyms and Abbreviations

µg/kg	micrograms per kilogram
µg/L	micrograms per liter
APP	accident prevention plan
ASTM	American Society of Testing and Materials
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylene
CSM	conceptual site model
CCR	construction completion report
COLOG	COLOG, Incorporated
DCE	dichloroethene
DGI	Data Gaps Investigation
GAC	Granular Activated Carbon
IDW	investigation derived waste
J	estimated
LSB	Launch and Service Building
LTM	Long-Term Monitoring
Na Ali'i	Na Ali'i Consulting and Sales, LLC
No.	Number
PVC	polyvinyl chloride
RSL	Regional Screening Level
Site 4	Former F.E. Warren Atlas "D" Missile Site 4
SOP	Standard Operating Procedure
TCE	trichloroethene
UFP-QAPP	Uniform Federal Policy-Quality Assurance Project Plan
URS	URS Group, Inc.
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
YJD	Yellow Jacket Drilling

## 1.1 LOCATION

The F.E. Warren Air Force Base Former Atlas “D” Missile Site 4 (Site 4) is located in Laramie County, Wyoming, approximately 2 miles south of Interstate 80 and approximately 18 miles west of the city of Cheyenne (**Figure 1-1**). The missile site covers approximately 700 acres owned by the city of Cheyenne and is a small portion of the Belvoir Ranch. Site 4 housed three Atlas “D” missiles in three Launch and Service Buildings (LSBs). The one-square-mile area around the former missile site is the source area of the trichloroethene (TCE) contamination, also known as Area A. Other areas downgradient of Area A have been investigated and identified as containing contamination. These areas include the Transition Area, a 12-square-mile area that extends eastward from Area A where the plume transitions from the White River Formation to the Ogallala Formation; Area B, a 30-square-mile area east of the Cow Camp well and including the Borie Well Field; and the Expanded Study Area, a 42-square-mile area east and southeast of Area B (**Figure 1-1**).

## 1.2 AUTHORITY

URS Group, Inc. (URS) has been contracted by the United States Army Corps of Engineers (USACE) Omaha District under Contract Number (No.) W912DY-16-D-0026, Task Order W9128F19F0192 to conduct a Feasibility Study, Data Gaps Investigation (DGI), and Long-Term Monitoring (LTM) at Site 4. These environmental restoration activities are conducted under the Comprehensive Environmental Response, Compensation, and Liability Act.

## 1.3 PURPOSE AND SCOPE

Additional monitoring wells were installed in 2021 to more accurately define the extent of TCE contamination at the site. This Data Gaps Construction Completion Report (CCR) – 2021 Well Installation documents the investigative activities and procedures completed for this task in 2021. The investigative efforts included the installation of new monitoring wells (in a nested fashion) at three locations and performance of downhole geophysical and hydrophysical logging at select monitoring well locations. The DGI field activities were performed between 23 June 2021 and 24 August 2021.

The 2021 data gaps monitoring wells were installed to address the following objectives:

- **MW105:** Confirm the southern extent of TCE concentrations in groundwater above 1,000 µg/L in Area A to estimate TCE source mass and design/evaluate alternatives in the Feasibility Study.
- **MW107:** Refine the plume core in Area B near TH6 (which has a 260-foot screen interval) and define the vertical interval(s) of contamination.

**MW54B:** Define TCE in groundwater in the 130 feet of saturated thickness above the shallowest screen at MW54. Sampling and field activities presented in this Data Gaps CCR were

completed in accordance with the Site-Wide Uniform Federal Policy-Quality Assurance Project Plan (UFP-QAPP) (URS 2020a) and the Data Gaps UFP-QAPP, Addendum 2 (URS 2020b). Safety guidelines and requirements were followed as established in the Accident Prevention Plan (APP) (URS 2020c); a Site Safety and Health Plan is included in the APP.

The following Standard Operating Procedures (SOPs) (URS 2020a) were used during the completion of the field activities as part of this DGI:

- SOP No. 1 Field Documentation
- SOP No. 2 Sample Handling, Documentation, and Tracking Procedures
- SOP No. 3 Instrument Calibration and Maintenance
- SOP No. 4 Equipment Decontamination
- SOP No. 5 Investigation-Derived Waste Handling
- SOP No. 6 Drilling and Soil Sample Collection
- SOP No. 7 Lithologic Description of Soil Cores
- SOP No. 9 Monitoring Well Design and Installation
- SOP No. 10 Monitoring Well Development Equipment and Procedures
- SOP No. 11 Groundwater Sample Collection from Monitoring Wells
- SOP No. 13 Aquifer Test Procedures
- SOP No. 17 Geophysical Logging
- SOP No. 18 Compensated Density Logging
- SOP No. 19 Dual Detector Neutron Logging
- SOP No. 20 Dual Induction Logging
- SOP No. 21 HPL for Aquifer Characterization

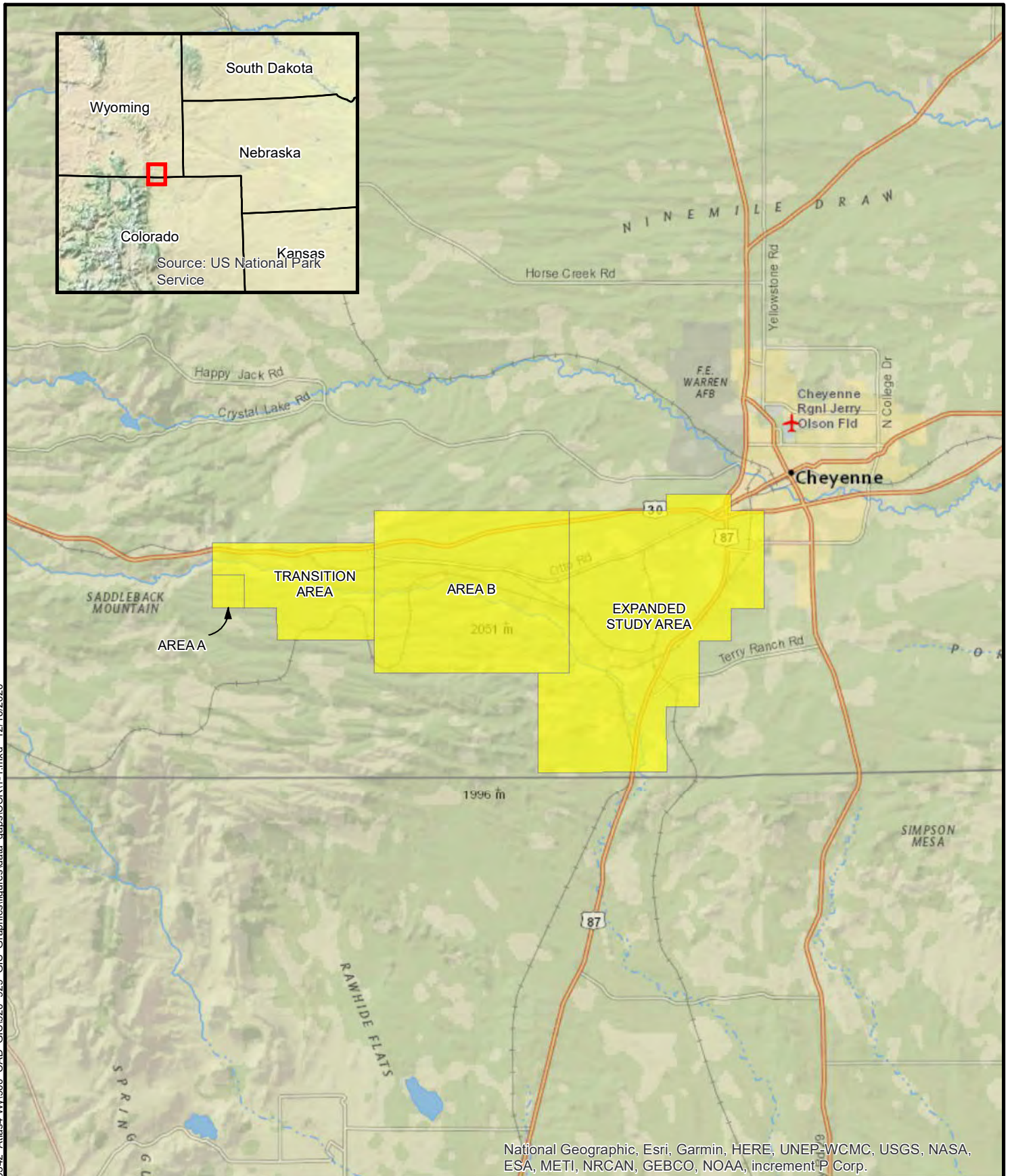
## 1.4 REPORT ORGANIZATION

This Data Gaps CCR for 2021 Well Installation is organized into the following sections:

- **Section 1 – Introduction** presents the location, authority, purpose and scope, and report organization for the monitoring well construction activities.
- **Section 2 – Construction Activities** discusses tasks including obtaining clearances and permits, borehole logging; geophysical and hydrophysical logging; temporary well installation, development, and sampling; permanent monitoring well installation, development, and sampling; well surveying; management and handling of investigation derived waste (IDW); and deviations from the Data Gaps UFP-QAPP Addendum 2 (URS 2020b).

- **Section 3 – References** lists the references cited in this Data Gaps CCR.

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National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.



4 2 0 4 Miles

### Site Location Map

Former Atlas "D" Missile Site 4  
F.E. Warren Air Force Base, WY

Drawn By: DPG	Date: 12/16/2020	Project No: 60613342	Figure 1-1
Checked By: RRM	Revision: 0		

The monitoring well construction and associated activities completed by members of URS, Na Ali'i Consulting and Sales, LLC (Na Ali'i), Yellow Jacket Drilling (YJD), and COLOG, Inc. (COLOG) at Site 4 included obtaining clearances and permits, borehole logging; geophysical and hydrophysical logging; temporary well installation, development, and sampling; permanent monitoring well installation, development, and sampling; surveying well locations and elevations; and management and handling of IDW. The following subsections describe these activities in detail including a description of deviations from the Data Gaps UFP-QAPP Addendum 2 (URS 2020b).

## 2.1 CLEARANCES AND PERMITS

### 2.1.1 Monitoring Well Permitting

The Wyoming State Engineer's Office does not require permits to be issued for the drilling and installation of monitoring wells that are used to measure water levels and/or collect water samples for analytical purposes (Tyrrell 2013).

### 2.1.2 Underground Utility Clearances

Utility clearances were obtained by contacting One Call of Wyoming. NextEra Energy, Inc. was also contacted to clear staked proposed well locations from underground transmission lines. There were no utilities identified at any of the monitoring well locations.

### 2.1.3 Cultural Resources Survey

Monitoring well locations with cultural resource surveys documenting clearance of their locations are found in **Appendix A**. The following lists each monitoring well and the cultural resource used for clearance:

- MW105: Class III Cultural Resources Investigation for the Focused Source Area Remedial Investigation Addendum, Atlas D Missile Site 4, Laramie County, Wyoming (Espinoza Cultural Services, LLC [ECS] 2017).
- MW107: Class II Archaeological Survey of the Belvoir Ranch, Laramie County, Wyoming (Roberson and LaBelle 2011).
- MW54B: Class II Archaeological Survey of the Belvoir Ranch, Laramie County, Wyoming (Roberson and LaBelle 2011).

## 2.2 DRILLING AND LOGGING

A total of eight monitoring wells were installed in nested groupings of two or three at three locations (MW105, MW107, MW54B). This included three nested well screens in MW105, three in MW107, and two in MW54B. Large diameter (8 inch) pilot boreholes were advanced at each location to allow for the eventual installation of the nested wells.

The general drilling setup used by YJD consisted of a sonic drill rig, support truck, water truck, forklift, mud mixer, IDW tanks, soil hopper, and down-hole tooling. After setting up the drill rig at the desired location, the support truck carrying all necessary drill equipment was backed up to the rig. The water truck, mud mixer, and IDW tanks were placed adjacent to the rig setup.

The pilot boreholes were drilled using a sonic drill rig by advancing a 7-inch inside diameter core barrel at 10 foot intervals. CETCO SUPER GEL-X extra high-yield drilling fluid was used to aid borehole drilling. Once the core barrel reached a desired depth an 8-inch inside diameter over-ride casing was advanced to the same depth as the core barrel. Once the over-ride casing was advanced to the bottom depth of the core barrel, the core barrel was removed from the borehole. A soil core was then dispensed from the core barrel into polyethylene bags. The soil core bags were staged a safe distance from the drill rig where they were examined by a field geologist. The field geologist examined the contents of the soil core bags to describe the lithology of each borehole.

Prior to permanent well screen installations temporary monitoring wells were installed in each borehole to facilitate borehole geophysical and hydrophysical logging. Following downhole logging, USACE was consulted to select permanent monitoring well screen intervals using boring log observations and the geophysical and hydrophysical logging results and the temporary monitoring wells were removed. Following screen interval selection, permanent nested monitoring wells were installed at the depths agreed upon by the project team. The well screen intervals were then developed, and sampled in accordance with the UFP-QAPP.

Results for the groundwater samples collected from each monitoring well were used to address the following data gaps in a conceptual site model (CSM) update report to be submitted at a later date:

- MW105: Confirm north-south extent of TCE concentrations above 1,000 micrograms per liter ( $\mu\text{g/L}$ ) in Area A for mass evaluation.
- MW107: Install three discrete screens to refine the vertical extent of the plume core in Area B near TH6 (which has a 260-foot screen interval).
- MW54B: Define extent of TCE concentrations in groundwater in the 130 feet of saturated thickness above the shallowest screen for nearby well MW54.

## 2.2.1 Boring Logs

As previously indicated soil cores were collected from each monitoring well borehole. The soil cores were visually examined by a field geologist. The field geologist documented the results of the field examination on boring logs. Each boring log includes lithology descriptions, headspace readings, soil sample depths, and recovery percentages for each soil core. As indicated above, boring logs were used in conjunction with geophysical and hydrophysical logs (Section 2.3.4) to determine monitoring well screen depths in consultation with USACE. Geotechnical soil samples were collected from within the intended screen interval depth for

analytical verification of boring log descriptions following screen selection. This is further discussed in **Section 2.4.2**. Boring logs are included in **Appendix B**.

## 2.2.2 Soil Sampling

Fifteen soil samples, including two duplicate samples were collected from the MW105 borehole on 8 and 9 July 2021. Samples were collected every ten feet of soil core from the water table to the total depth of the boring, starting at 69.0 feet below ground surface (bgs) with the final sample collected at 189.0 feet bgs. All samples collected were saturated. All samples were analyzed for volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method 8260C and for moisture content. A sample and analysis summary is provided in **Table 2-2**. Detected analytes in soil samples are included in **Table 2-3** and full lab results are provided in **Appendix E**. A data quality review of the soil samples is documented in Data Validation Reports provided in **Appendix F**.

Seven VOCs were detected: benzene, cis-1,2-dichloroethene (DCE), ethylbenzene, m,p-xylene, o-xylene, toluene, and TCE. Four compounds (benzene, cis-1,2-DCE, ethylbenzene, and TCE) were detected above their respective USEPA Soil to Groundwater Regional Screening Level (RSL) concentration. TCE was also detected above its Residential Soil RSL value of 940 micrograms per kilogram ( $\mu\text{g}/\text{kg}$ ) (USEPA 2021). Results are summarized as follows:

- TCE was detected in samples between the intervals of 89.0 and 159.0 feet bgs with a maximum concentration of 51,000  $\mu\text{g}/\text{kg}$  estimated (J) in sample FEW4-MW105-139.0. TCE was detected above its Soil to Groundwater RSL and Residential Soil RSL values of 0.18  $\mu\text{g}/\text{kg}$  and 940  $\mu\text{g}/\text{kg}$ , respectively in the following soil samples: FEW4-MW105-89.0 (16,000 J  $\mu\text{g}/\text{kg}$  [Duplicate result of 50,000J]), FEW4-MW105-129.0 (22,000 J  $\mu\text{g}/\text{kg}$ ), FEW4-MW105-139.0 (51,000 J  $\mu\text{g}/\text{kg}$ ), FEW4-MW105-159.0 (960 J  $\mu\text{g}/\text{kg}$ ).
- Cis-1,2-DCE was detected above its USEPA RSL Soil to Groundwater value of 11  $\mu\text{g}/\text{kg}$  but below its USEPA Residential Soil RSL value of 160,000  $\mu\text{g}/\text{kg}$  in the following soil samples: FEW4-MW105-89.0 (310 J  $\mu\text{g}/\text{kg}$  [duplicate result was non-detect) and FEW4-MW105-129.0 (190 J  $\mu\text{g}/\text{kg}$ ). Cis-1,2-DCE was not detected above its Residential Soil RSL of 160,000  $\mu\text{g}/\text{L}$ .
- Benzene was detected above its USEPA RSL Soil to Groundwater value of 0.23  $\mu\text{g}/\text{kg}$  but below its USEPA Residential Soil RSL value of 1,200  $\mu\text{g}/\text{kg}$  in the following samples: FEW4-MW105-89.0 (250 J  $\mu\text{g}/\text{kg}$ ) and FEW4-MW105-129.0 (140 J  $\mu\text{g}/\text{kg}$ ).
- Ethylbenzene was detected above its Soil to Groundwater RSL of 1.7  $\mu\text{g}/\text{kg}$  but below its USEPA Residential Soil RSL value of 5,800  $\mu\text{g}/\text{kg}$  in the following sample: FEW4-MW105-129.0 (26 J  $\mu\text{g}/\text{kg}$ ).

Benzene, toluene, ethylbenzene, and xylene (BTEX) detections were noted at 89 feet bgs, 129 feet bgs, and 139 feet bgs. At this depth there would be no exposure pathway for residents or industrial workers. Benzene was not detected in groundwater in the temp well for MW105 or in



any of the permanent monitoring well samples in Fall 2021. Therefore, if there is no exposure pathway these detections would not contribute to the overall site risk.

## 2.3 TEMPORARY MONITORING WELL INSTALLATION

### 2.3.1 Temporary Well Installation

A temporary well was installed at each of the three 2021 DGI locations (MW105-TEMP, MW107-TEMP, and MW54B-TEMP) prior to the installation of permanent wells. The boreholes were drilled by YJD with oversight by URS and Na Ali'i staff. Boreholes were drilled to a total depth of 194 feet bgs, 390 feet bgs, and 215 feet bgs at MW105, MW107, and MW54B, respectively. A temporary well was installed at each location as the 8-inch drill casing was removed to facilitate borehole geophysical and hydrophysical logging. Temporary monitoring wells were constructed of 4-inch diameter Schedule 40 polyvinyl chloride (PVC) casing and screen with slotted 0.010-inch well screens that extended from just above the estimated water table to the base of the borehole. Screened intervals were placed at 155 to 185 feet bgs, 355 to 390 feet bgs, and 155 to 205 feet bgs at MW105, MW107, and MW54B, respectively. U.S. Standard 10-20 sieve-size silica sand pack was installed around the screen between the temporary well and borehole annulus.

### 2.3.2 Temporary Well Development

Temporary monitoring wells were developed in accordance with SOP No. 10 (URS 2020a) from 9 July 2021 to 15 July 2021. Temporary monitoring wells were developed using a bailer and a submersible pump prior to geophysical and hydrophysical logging (**Section 2.3.4**). Temporary well development continued until a visible reduction of fine particles was observed after several successive pump-down cycles. All development water was contained and treated using a mobile granular activated charcoal (GAC) system to remove VOCs before it was discharged to the ground surface. Temporary well development logs are provided in **Appendix D**.

### 2.3.3 Temporary Well Groundwater Sampling

After well development, all three temporary wells were sampled for VOCs. Five VOCs were detected in the samples, including cis-1,2-DCE, m,p-xylene, o-xylene, toluene, and TCE. TCE was detected above its USEPA Maximum Contaminant Level value of 5 µg/L in MW105-TEMP (140 µg/L). A sample and analysis summary is provided in **Table 2-2**. Detected analytes in temporary monitoring wells are included in **Table 2-4** and full lab reports are provided in **Appendix E**. A data quality review of the temporary well groundwater results is documented in Data Validation Reports provided in **Appendix F**.

### 2.3.4 Geophysical/Hydrophysical Logs

Geophysical and hydrophysical logging was performed by COLOG after installation and development of temporary wells for MW105, MW107, and MW54B. Geophysical logging at

MW105, MW107, and MW54B was completed to obtain data regarding vertical variation of lithologic properties and included focused density, dual detection neutron, dual induction (conductivity), magnetic susceptibility, and natural gamma. Hydrophysical logging at MW105, MW107, and MW54B was completed to identify probable groundwater flow zones within the boring and to strategically select screen intervals for the nested monitoring wells. Geophysical and hydrophysical logging results are included in **Appendix C**.

## 2.4 PERMANENT MONITORING WELL INSTALLATION

### 2.4.1 Permanent Monitoring Well Installation

A total of eight monitoring wells were installed in nested groupings of two or three at three locations (MW105, MW107, MW54B). This included three nested well screens in MW105, three in MW107 and two in MW54B. Screen intervals for permanent monitoring wells were finalized during stakeholder calls with USACE, URS, Na Ali'i, and Wyoming Department of Environmental Quality on 14 July 2021 (MW107), 20 July 2021 (MW105) and 28 July 2021 (MW54B). Following completion of geophysical and hydrophysical logging, the temporary wells were removed by advancing 8-inch diameter casing around the 4-inch well. Permanent monitoring well installation began on 19 July 2021 and continued until 1 August 2021. Monitoring wells were installed in accordance with SOP No. 9 (URS 2020a). Permanent monitoring wells were constructed of 2-inch diameter Schedule 40 PVC casing and screen, with 10-foot long, slotted 0.010-inch sized screens separated by a minimum of 20 feet of bentonite seal. Three permanent monitoring well screens were installed at MW105 and MW107 and two permanent monitoring well screens were installed at MW54B. Well construction details are included in **Table 2-1**. The locations of newly installed monitoring wells are shown on **Figure 2-1** through **Figure 2-3**. Monitoring well construction details are included in **Appendix G**.

### 2.4.2 Geotechnical Soil Classification Samples

Ten geotechnical soil samples were collected (three from MW54B, four from MW105, and three from MW107) at the intended screen interval depth for analytical verification of field observations to confirm accurate borehole logging. Soil samples were submitted to Core Laboratories for analysis of grain size distribution (America Society for Testing and Materials [ASTM] D422/D4464M) and Atterberg Limits (ASTM D4318). Grain size distribution analysis determined the amount of coarse, medium, and fine-grained gravel; silt; and clay in the samples. Atterberg limit tests measure the moisture content of the samples to determine its Unified Soil Classification System classifications. Results from the monitoring well soil classification samples are included in **Appendix H**.

### 2.4.3 Permanent Monitoring Well Development

Permanent monitoring wells were developed in accordance with SOP No. 10 (URS 2020a) from 2 August 2021 to 9 August 2021. Wells were first developed 48 hours after grouting was

completed during well construction by surging and bailing to remove sediment from the well screens. Surging and bailing development was performed by YJD using a pump rig and attaching a surge block followed by a stainless-steel bailer. A submersible pump operated by the URS/Na Ali'i team was used for development once most of the gross sediment was removed from the well and the discharge water was observed to have lighter color and a visible reduction of fines. Well development continued with the submersible pump until water quality parameters stabilized. A turbidity goal of less than 50 nephelometric turbidity units was achieved at all permanent well locations, except MW54B-164 and MW107-310 because of the low yield and fine-grained formation materials present in the screened interval. Permanent monitoring well development logs are included in **Appendix G**.

#### 2.4.4 Permanent Monitoring Well Sampling

The newly installed permanent monitoring wells were sampled as part of the Fall 2021 LTM sample event. The results are presented in **Table 2-5**.

##### 2.4.4.1 MW105

TCE was detected in groundwater sampled from the shallow, intermediate, and deep well intervals (MW105-93, MW105-143, and MW105-188) at 190J µg/L, 150J µg/L, and 2.1 µg/L, respectively. The TCE concentrations reported at MW105-93 and MW105-143 exceeded the USEPA MCL of 5 µg/L. VOCs were below the MCL in the deep well MW105-188. The well placement objectives from the Data Gaps UFP-QAPP, Addendum 2 (URS 2020b) for MW105 were to confirm the southern extent of TCE concentrations in groundwater above 1,000 µg/L in Area A, south of MW59, to estimate TCE source mass.

TCE above 1,000 µg/L is not present in groundwater as far south as MW105.

##### 2.4.4.2 MW107

TCE was detected in groundwater sampled from the shallow and intermediate well intervals (MW107-249 and MW107-310) at 14 µg/L and 1.4 µg/L, respectively. The TCE concentrations reported at MW107-249 exceeded the USEPA MCL of 5 µg/L. VOCs were non-detect in the deep well MW107-355. The well placement objectives from the Data Gaps UFP-QAPP, Addendum 2 (URS 2020b) for MW107 were to refine the vertical extent of the plume core by installation of three nested well screens for discrete sampling north of TH6 (which was sampled with packers at intervals within a 260-foot screen interval).

Sampling of new discreet well screen intervals confirm historic TCE sample results from temporary well TH6 of around 10 µg/L.

### 2.4.4.3 MW54B

TCE was detected in groundwater sampled from the shallow well interval (MW54B-164) at 0.15J µg/L. VOCs were non-detect in well MW54B-199. The well placement objectives from the Data Gaps UFP-QAPP, Addendum 2 (URS 2020b) for MW54B were as follows:

- Refine the extent of TCE groundwater plume core through the Transition Area and WRF/Ogallala contact.
- Define TCE in groundwater in the 130 feet of saturated thickness above the shallowest screen interval at MW54.

TCE detected within well screens at MW54 and MW54B (all screens non-detect or below the MCL) suggest they are not within a preferential migration pathway between MW106 and the transect area. TCE in groundwater above MW54 well screens is non-detect or below the MCL.

## 2.5 SURVEY

Locations and elevations of the monitoring wells were surveyed on 9 August 2021. Surveying was performed by Steil Surveying Services, LLC of Cheyenne, Wyoming, a licensed surveyor in the state of Wyoming. Location coordinates are reported as northings and eastings referenced to the Wyoming State Plane East Coordinate System using the 1983 North American Datum. Elevations are referenced to the 1988 North American Vertical Datum. Survey data is included in **Table 2-1** and in **Appendix I**.

## 2.6 INVESTIGATION-DERIVED WASTE HANDLING

IDW was generated during drilling and installation of monitoring wells. IDW consisted of soil cores, soil cuttings, drill fluids, decontamination water, hydrophysical production water, and development water. IDW was handled and disposed of in accordance with SOP No. 5 (URS 2020a).

### 2.6.1 Soil Waste

Soil cores from monitoring well borings were collected and transferred to 10-millimeter plastic sheeting and staged adjacent to the borehole. Drill cuttings that were washed out into the soil hopper were staged on 10-millimeter plastic sheeting shored up to prevent runoff. Settled-out mud from the waste drilling fluid holding tank was staged onto a drying bed following completion of drilling and development activities.

Soil core and cutting samples from MW105, MW107, and MW54B were collected on 10 August 2021. Samples were collected from drying beds 2 (MW107) and 3 (MW105 and MW54B) on 19 September 2021. Results from soil cores, cuttings, and drying beds will be discussed in a subsequent Soil IDW Letters.

### 2.6.2 Water Waste

Waste drilling fluid was containerized in a 1,500-gallon tank on a trailer, which was periodically transported and transferred to a large holding/settling tank located at the LSB staging area. The clarified water was pumped off the settled mud periodically and treated using the mobile GAC treatment system. Aqueous IDW generated from well development was treated at each location using the mobile GAC system. The GAC system consisted of a primary 500-pound GAC vessel in series with a secondary 250-pound GAC vessel. GAC system performance samples were collected periodically during field activities and analyzed for VOCs to document effective removal of TCE from the wastewater, which was discharged to the ground following treatment. The GAC system performance sample results indicate the primary GAC vessel achieved removal of TCE from the wastewater to below detectable limits prior to discharging IDW water to the ground surface. Lab results for these aqueous IDW samples are included in **Appendix E**.

### 2.6.3 Solid Waste

A roll-off dumpster was maintained on site for the duration of the DGI activities. Items such as used personal protection equipment, waste packaging from borehole drilling, and general refuse were placed in plastic trash bags and put in the roll-off. The roll-off dumpster was removed following the conclusion of the DGI activities by Wyoming Disposal Systems.

## 2.7 DEVIATIONS FROM THE WORK PLAN

No deviations from the planned activities outlined in the Data Gaps UFP-QAPP (2020b) occurred during site activities completed as part of the DGI activities in summer 2021. Daily quality control reports for all activities completed are presented in **Appendix J**.

TABLE 2-1  
2021 DGI MONITORING WELL CONSTRUCTION DETAILS  
FORMER ATLAS "D" MISSILE SITE 4

Well Identification	Date Completed	Northing <sup>1</sup>	Easting <sup>1</sup>	Elevation (feet amsl) <sup>1</sup>		Well Details <sup>2,3</sup>									
				TOC	GS	Depth to A	Elev A	Depth to B	Elev B	Depth to C	Elev C	Depth to D	Elev D	Depth to E <sup>4</sup>	Elev E
MW54B-164	7/30/2021	209993.495	676453.830	6988.25	6985.70	153	6832.7	156.08	6829.62	166.08	6819.62	215	6770.7	152.32	6835.93
MW54B-199	7/30/2021	209993.495	676453.830	6988.12	6985.70	186	6799.7	191.42	6794.28	201.42	6784.28	215	6770.7	95.32	6892.80
MW105-93	8/1/2021	213680.563	661489.969	7274.93	7272.50	82	7190.5	85.69	7186.81	95.69	7176.81	99	7173.5	75.97	7198.96
MW105-143	8/1/2021	213680.563	661489.969	7274.87	7272.50	132	7140.5	135.38	7137.12	145.38	7127.12	149	7123.5	75.92	7198.95
MW105-188	8/1/2021	213680.563	661489.969	7274.79	7272.50	178	7094.5	180.93	7091.57	190.93	7081.57	194	7078.5	75.58	7199.21
MW107-249	7/19/2021	209559.025	698898.887	6686.48	6683.90	236	6447.9	241.63	6442.27	251.63	6432.27	257	6426.9	172.28	6514.20
MW107-310	7/19/2021	209559.025	698898.887	6686.38	6683.90	297	6386.9	302.19	6381.71	312.19	6371.71	317	6366.9	143.10	6543.28
MW107-355	7/19/2021	209559.025	698898.887	6686.35	6683.90	342	6341.9	347.07	6336.83	357.07	6326.83	390	6293.9	142.05	6544.30

Notes:

<sup>1</sup> Coordinates are referenced to the Wyoming State Plane East Coordinate System using NAD83, elevations are referenced to NAVD88.

<sup>2</sup> Well detail depths are in feet bgs.

<sup>3</sup> Well detail elevations are in feet amsl.

<sup>4</sup> Water levels were measured on 19 and 30 July 2021 and 1 August 2021.

amsl = above mean sea level

bgs = below ground surface

DGI = Data Gaps Investigation

Elev = elevation

GS = ground surface

NAD83 = 1983 North American Datum

NAVD88 = 1988 North American Vertical Datum

TOC = top of casing

WELL DETAIL LEGEND

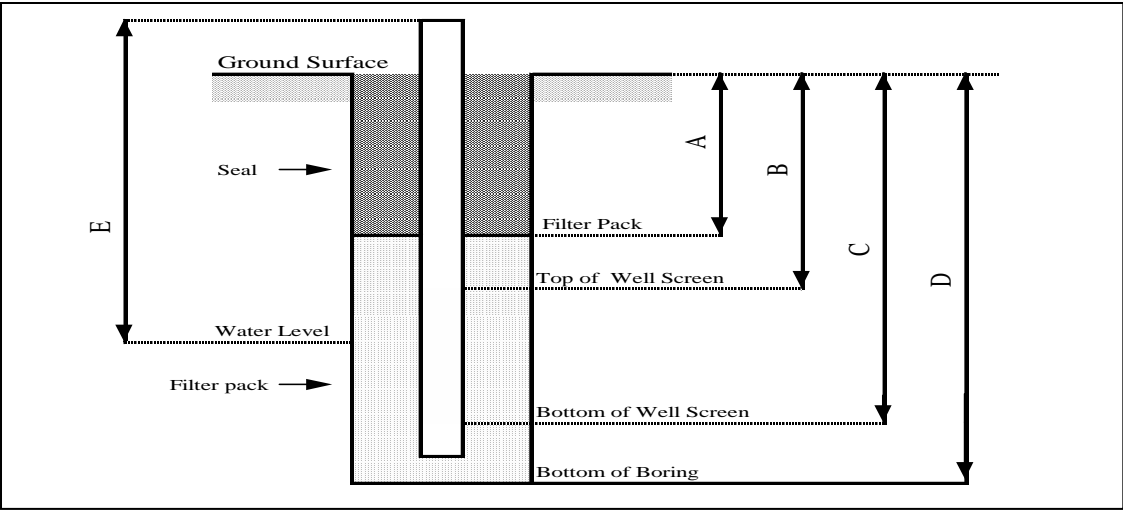


TABLE 2-2  
2021 DGI MONITORING WELL SAMPLE AND ANALYSIS SUMMARY  
FORMER ATLAS "D" MISSILE SITE 4

SDG	Sample ID	Laboratory	Sample Date	Sample Received	Matrix	Analysis
Groundwater Samples						
96795	FEW4-MW107-TEMP	APPL	7/10/2021	7/13/2021	Water	VOCs (EPA 8260C)
96848	FEW4-MW105-TEMP	APPL	7/13/2021	7/16/2021	Water	VOCs (EPA 8260C)
96848	FEW4-MW54B-TEMP	APPL	7/15/2021	7/16/2021	Water	VOCs (EPA 8260C)
98073	FEW4-MW105-93-18	APPL	10/30/2021	11/1/2021	Water	VOCs (EPA 8260C)
98073	FEW4-MW105-143-18	APPL	10/31/2021	11/1/2021	Water	VOCs (EPA 8260C)
98073	FEW4-MW105-188-18	APPL	10/30/2021	11/1/2021	Water	VOCs (EPA 8260C)
97750	FEW4-MW107-249-18	APPL	9/30/2021	10/1/2021	Water	VOCs (EPA 8260C)
97733	FEW4-MW107-310-18	APPL	9/29/2021	9/30/2021	Water	VOCs (EPA 8260C)
97750	FEW4-MW107-355-18	APPL	9/30/2021	10/1/2021	Water	VOCs (EPA 8260C)
97785	FEW4-MW54B-164-18	APPL	10/4/2021	10/6/2021	Water	VOCs (EPA 8260C)
97768	FEW4-MW54B-199-18	APPL	10/3/2021	10/4/2021	Water	VOCs (EPA 8260C)
Soil Samples						
96780	FEW4-MW105-69.0	APPL	7/8/2021	7/10/2021	Soil	VOCs (EPA 8260C), Moisture Content
96780	FEW4-MW105-79.0	APPL	7/8/2021	7/10/2021	Soil	VOCs (EPA 8260C), Moisture Content
96780	FEW4-MW105-89.0	APPL	7/8/2021	7/10/2021	Soil	VOCs (EPA 8260C), Moisture Content
96780	FEW4-MW105-89.0-FD	APPL	7/8/2021	7/10/2021	Soil	VOCs (EPA 8260C), Moisture Content
96780	FEW4-MW105-99.0	APPL	7/8/2021	7/10/2021	Soil	VOCs (EPA 8260C), Moisture Content
96780	FEW4-MW105-109.0	APPL	7/8/2021	7/10/2021	Soil	VOCs (EPA 8260C), Moisture Content, MS/MSD
96780	FEW4-MW105-119.0	APPL	7/8/2021	7/10/2021	Soil	VOCs (EPA 8260C), Moisture Content
96780	FEW4-MW105-129.0	APPL	7/9/2021	7/10/2021	Soil	VOCs (EPA 8260C), Moisture Content
96780	FEW4-MW105-139.0	APPL	7/9/2021	7/10/2021	Soil	VOCs (EPA 8260C), Moisture Content
96780	FEW4-MW105-149.0	APPL	7/9/2021	7/10/2021	Soil	VOCs (EPA 8260C), Moisture Content
96780	FEW4-MW105-159.0	APPL	7/9/2021	7/10/2021	Soil	VOCs (EPA 8260C), Moisture Content
96780	FEW4-MW105-169.0	APPL	7/9/2021	7/10/2021	Soil	VOCs (EPA 8260C), Moisture Content
96780	FEW4-MW105-169.0-FD	APPL	7/9/2021	7/10/2021	Soil	VOCs (EPA 8260C), Moisture Content
96780	FEW4-MW105-179.0	APPL	7/9/2021	7/10/2021	Soil	VOCs (EPA 8260C), Moisture Content
96780	FEW4-MW105-189.0	APPL	7/9/2021	7/10/2021	Soil	VOCs (EPA 8260C), Moisture Content

Notes:

<sup>1</sup> Field parameters measured included temperature, pH, specific conductivity, dissolved oxygen, oxidation-reduction potential, and turbidity.

APPL = Agriculture & Priority Pollutants Laboratories, Inc.

bgs = below ground surface

DGI = Data Gaps Investigation

EPA = Environmenal Protection Agency

ft = feet

ID = identification

LTM = long-term monitoring

MC = munitions constituent

MS/MSD = matrix spike/matrix spike duplicate

NA = not applicable

SDG = sample delivery group

VOC = volatile organic compound

TABLE 2-3  
SUMMARY OF DETECTED ANALYTES IN SOIL SAMPLES  
FORMER ATLAS "D" MISSILE SITE 4

LOCATION IDENTIFICATION					MW105						MW105						MW105						MW105					
FIELD IDENTIFICATION					FEW4-MW105-69.0						FEW4-MW105-79.0						FEW4-MW105-89.0						FEW4-MW105-89.0-FD					
DATE COLLECTED					08-Jul-21						08-Jul-21						08-Jul-21						08-Jul-21					
	Maximum	Frequency	USEPA RSL <sup>a</sup> Soil to Groundwater	USEPA RSL <sup>a</sup> Residential Soil	Result	Qual	MDL	LOD	LOQ	DF	Result	Qual	MDL	LOD	LOQ	DF	Result	Qual	MDL	LOD	LOQ	DF	Result	Qual	MDL	LOD	LOQ	DF
VOLATILE ORGANIC COMPOUNDS (µg/kg)																												
Benzene	760 J	3 / 15	0.23	1,200	2.60	U	0.83	2.60	6.6	1	2.80	U	0.90	2.80	7.1	1	250	J	0.79	2.50	6.3	1	760	J	0.83	2.60	6.6	1
<b>cis-1,2-Dichloroethene</b>	310 J	2 / 15	11	160,000	2.60	U	1.30	2.60	6.6	1	2.80	U	1.40	2.80	7.1	1	310	J	1.30	2.50	6.3	1	2.60	U	1.30	2.60	6.6	1
Ethylbenzene	26 J	1 / 15	1.7	5,800	2.60	U	1.30	2.60	6.6	1	2.80	U	1.40	2.80	7.1	1	2.50	U	1.30	2.50	6.3	1	2.60	UJ	1.30	2.60	6.6	1
m,p-Xylene	130 J	3 / 15	190	550,000	6.60	U	3.10	6.60	13.0	1	7.10	U	3.30	7.10	14.0	1	39	J	3.00	6.30	13.0	1	130	J	3.10	6.60	13.0	1
o-Xylene	58 J	4 / 15	190	650,000	3.30	U	1.60	3.30	6.6	1	3.60	U	1.80	3.60	7.1	1	19	J	1.60	3.10	6.3	1	58	J	1.70	3.30	6.6	1
Toluene	700 J	5 / 15	760	4.9E+06	2.60	U	1.30	2.60	6.6	1	2.80	U	1.40	2.80	7.1	1	220	J	1.30	2.50	6.3	1	700	J	1.30	2.60	6.6	1
<b>Trichloroethene (TCE)</b>	<i>51,000 J</i>	8 / 15	0.18	940	2.60	U	1.30	2.60	6.6	1	2.80	U	1.40	2.80	7.1	1	<i>16,000</i>	J	1.20	2.50	6.3	1	<i>50,000</i>	J	1.30	2.60	6.6	1

Notes:

Italic results exceed the RSL Residential Soil values.

Bold analytes are site chemicals of concern.

<sup>1</sup>Field Identification uses the following naming scheme: site identification-well identification-sample depth below ground surface.

<sup>a</sup> Based on USEPA RSLs (HQ=1.0), Nov 2019, Risk-Based Protection of Groundwater and Residential Soil Screening Levels

µg/L = micrograms per liter

DF = dilution factor

HQ = hazard quotient

J = estimated

LOD = limit of detection

LOQ = limit of quantitation

MDL = method detection limit

Qual = qualifier

RSL = regional screening level

TR = target cancer risk

U = nondetect

UJ = estimated nondetect

USEPA = United States Environmental Protection Agency



TABLE 2-3  
SUMMARY OF DETECTED ANALYTES IN SOIL SAMPLES  
FORMER ATLAS "D" MISSILE SITE 4

LOCATION IDENTIFICATION					MW105						MW105						MW105						MW105					
FIELD IDENTIFICATION					FEW4-MW105-99.0						FEW4-MW105-109.0						FEW4-MW105-119.0						FEW4-MW105-129.0					
DATE COLLECTED					08-Jul-21						08-Jul-21						08-Jul-21						09-Jul-21					
	Maximum	Frequency	USEPA RSL <sup>a</sup> Soil to Groundwater	USEPA RSL <sup>a</sup> Residential Soil	Result	Qual	MDL	LOD	LOQ	DF	Result	Qual	MDL	LOD	LOQ	DF	Result	Qual	MDL	LOD	LOQ	DF	Result	Qual	MDL	LOD	LOQ	DF
VOLATILE ORGANIC COMPOUNDS (µg/kg)																												
Benzene	760 J	3 / 15	0.23	1,200	2.90	U	0.93	2.90	7.4	1	2.90	U	0.90	2.90	7.2	1	2.70	U	0.86	2.70	6.8	1	140	J	0.87	2.70	6.9	1
cis-1,2-Dichloroethene	310 J	2 / 15	11	160,000	2.90	U	1.50	2.90	7.4	1	2.90	U	1.40	2.90	7.2	1	2.70	U	1.40	2.70	6.8	1	190	J	1.40	2.70	6.9	1
Ethylbenzene	26 J	1 / 15	1.7	5,800	2.90	U	1.50	2.90	7.4	1	2.90	U	1.40	2.90	7.2	1	2.70	U	1.40	2.70	6.8	1	26	J	1.40	2.70	6.9	1
m,p-Xylene	130 J	3 / 15	190	550,000	7.40	U	3.50	7.40	15.0	1	7.20	U	3.40	7.20	14.0	1	6.80	U	3.20	6.80	14.0	1	38	J	3.20	6.90	14.0	1
o-Xylene	58 J	4 / 15	190	650,000	3.70	U	1.80	3.70	7.4	1	3.60	U	1.80	3.60	7.2	1	3.40	U	1.70	3.40	6.8	1	17	J	1.70	3.40	6.9	1
Toluene	700 J	5 / 15	760	4.9E+06	2.90	U	1.50	2.90	7.4	1	2.90	U	1.40	2.90	7.2	1	2.70	U	1.40	2.70	6.8	1	130	J	1.40	2.70	6.9	1
Trichloroethene (TCE)	51,000 J	8 / 15	0.18	940	74		1.40	2.90	7.4	1	57	J	1.40	2.90	7.2	1	67	J	1.30	2.70	6.8	1	22,000	J	1.30	2.70	6.9	1

Notes:

Italic results exceed the RSL Residential Soil values.

Bold analytes are site chemicals of concern.

<sup>1</sup>Field Identification uses the following naming scheme: site identification-well identification-sample depth below ground surface.

<sup>a</sup> Based on USEPA RSLs (HQ=1.0), Nov 2019, Risk-Based Protection of Groundwater and Residential Soil Screening Levels

µg/L = micrograms per liter

DF = dilution factor

HQ = hazard quotient

J = estimated

LOD = limit of detection

LOQ = limit of quantitation

MDL = method detection limit

Qual = qualifier

RSL = regional screening level

TR = target cancer risk

U = nondetect

UJ = estimated nondetect

USEPA = United States Environmental Protection Agency

TABLE 2-3  
SUMMARY OF DETECTED ANALYTES IN SOIL SAMPLES  
FORMER ATLAS "D" MISSILE SITE 4

LOCATION IDENTIFICATION					MW105						MW105						MW105						MW105					
FIELD IDENTIFICATION					FEW4-MW105-139.0						FEW4-MW105-149.0						FEW4-MW105-159.0						FEW4-MW105-169.0					
DATE COLLECTED					09-Jul-21						09-Jul-21						09-Jul-21						09-Jul-21					
	Maximum	Frequency	USEPA RSL <sup>a</sup> Soil to Groundwater	USEPA RSL <sup>a</sup> Residential Soil	Result	Qual	MDL	LOD	LOQ	DF	Result	Qual	MDL	LOD	LOQ	DF	Result	Qual	MDL	LOD	LOQ	DF	Result	Qual	MDL	LOD	LOQ	DF
VOLATILE ORGANIC COMPOUNDS (µg/kg)																												
Benzene	760 J	3 / 15	0.23	1,200	2.70	UJ	0.86	2.70	6.9	1	3.00	UJ	0.95	3.00	7.5	1	2.50	UJ	0.78	2.50	6.2	1	3.00	U	0.93	3.00	7.4	1
<b>cis-1,2-Dichloroethene</b>	310 J	2 / 15	11	160,000	2.70	UJ	1.40	2.70	6.9	1	3.00	UJ	1.50	3.00	7.5	1	2.50	UJ	1.20	2.50	6.2	1	3.00	U	1.50	3.00	7.4	1
Ethylbenzene	26 J	1 / 15	1.7	5,800	2.70	UJ	1.40	2.70	6.9	1	3.00	UJ	1.50	3.00	7.5	1	2.50	UJ	1.20	2.50	6.2	1	3.00	U	1.50	3.00	7.4	1
m,p-Xylene	130 J	3 / 15	190	550,000	6.90	UJ	3.20	6.90	14.0	1	7.50	UJ	3.50	7.50	15.0	1	6.20	UJ	2.90	6.20	12.0	1	7.40	U	3.50	7.40	15.0	1
o-Xylene	58 J	4 / 15	190	650,000	56	J	1.70	3.40	6.9	1	3.80	UJ	1.90	3.80	7.5	1	3.10	UJ	1.50	3.10	6.2	1	3.70	U	1.80	3.70	7.4	1
Toluene	700 J	5 / 15	760	4.9E+06	410	J	1.40	2.70	6.9	1	3.00	UJ	1.50	3.00	7.5	1	120	J	1.20	2.50	6.2	1	3.00	U	1.50	3.00	7.4	1
<b>Trichloroethene (TCE)</b>	<i>51,000 J</i>	8 / 15	0.18	940	<i>51,000</i>	J	1.30	2.70	6.9	1	3.00	UJ	1.50	3.00	7.5	1	<i>960</i>	J	1.20	2.50	6.2	1	3.00	U	1.40	3.00	7.4	1

Notes:

Italic results exceed the RSL Residential Soil values.

Bold analytes are site chemicals of concern.

<sup>1</sup>Field Identification uses the following naming scheme: site identification-well identification-sample depth below ground surface.

<sup>a</sup> Based on USEPA RSLs (HQ=1.0), Nov 2019, Risk-Based Protection of Groundwater and Residential Soil Screening Levels

µg/L = micrograms per liter

DF = dilution factor

HQ = hazard quotient

J = estimated

LOD = limit of detection

LOQ = limit of quantitation

MDL = method detection limit

Qual = qualifier

RSL = regional screening level

TR = target cancer risk

U = nondetect

UJ = estimated nondetect

USEPA = United States Environmental Protection Agency

TABLE 2-3  
SUMMARY OF DETECTED ANALYTES IN SOIL SAMPLES  
FORMER ATLAS "D" MISSILE SITE 4

LOCATION IDENTIFICATION					MW105						MW105						MW105					
FIELD IDENTIFICATION					FEW4-MW105-169.0-FD						FEW4-MW105-179.0						FEW4-MW105-189.0					
DATE COLLECTED					09-Jul-21						09-Jul-21						09-Jul-21					
	Maximum	Frequency	USEPA RSL <sup>a</sup> Soil to Groundwater	USEPA RSL <sup>a</sup> Residential Soil	Result	Qual	MDL	LOD	LOQ	DF	Result	Qual	MDL	LOD	LOQ	DF	Result	Qual	MDL	LOD	LOQ	DF
VOLATILE ORGANIC COMPOUNDS (µg/kg)																						
Benzene	760 J	3 / 15	0.23	1,200	2.90	U	0.92	2.90	7.3	1	2.90	U	0.93	2.90	7.4	1	2.90	U	0.91	2.90	7.2	1
cis-1,2-Dichloroethene	310 J	2 / 15	11	160,000	2.90	U	1.50	2.90	7.3	1	2.90	U	1.50	2.90	7.4	1	2.90	U	1.40	2.90	7.2	1
Ethylbenzene	26 J	1 / 15	1.7	5,800	2.90	U	1.50	2.90	7.3	1	2.90	U	1.50	2.90	7.4	1	2.90	U	1.50	2.90	7.2	1
m,p-Xylene	130 J	3 / 15	190	550,000	7.30	U	3.40	7.30	15.0	1	7.40	U	3.50	7.40	15.0	1	7.20	U	3.40	7.20	14.0	1
o-Xylene	58 J	4 / 15	190	650,000	3.60	U	1.80	3.60	7.3	1	3.70	U	1.80	3.70	7.4	1	3.60	U	1.80	3.60	7.2	1
Toluene	700 J	5 / 15	760	4.9E+06	2.90	U	1.50	2.90	7.3	1	2.90	U	1.50	2.90	7.4	1	2.90	U	1.40	2.90	7.2	1
Trichloroethene (TCE)	51,000 J	8 / 15	0.18	940	2.90	U	1.40	2.90	7.3	1	2.90	U	1.40	2.90	7.4	1	2.90	U	1.40	2.90	7.2	1

Notes:

Italic results exceed the RSL Residential Soil values.

Bold analytes are site chemicals of concern.

<sup>1</sup>Field Identification uses the following naming scheme: site identification-well identification-sample depth below ground surface.

<sup>a</sup> Based on USEPA RSLs (HQ=1.0), Nov 2019, Risk-Based Protection of Groundwater and Residential Soil Screening Levels

µg/L = micrograms per liter

DF = dilution factor

HQ = hazard quotient

J = estimated

LOD = limit of detection

LOQ = limit of quantitation

MDL = method detection limit

Qual = qualifier

RSL = regional screening level

TR = target cancer risk

U = nondetect

UJ = estimated nondetect

USEPA = United States Environmental Protection Agency

TABLE 2-4  
SUMMARY OF DETECTED ANALYTES IN TEMPORARY MONITORING WELL GROUNDWATER  
FORMER ATLAS "D" MISSILE SITE 4

LOCATION IDENTIFICATION				MW107-TEMP						MW105-TEMP						MW54B-TEMP					
FIELD IDENTIFICATION				FEW4-MW107-TEMP						FEW4-MW105-TEMP						FEW4-MW54B-TEMP					
DATE COLLECTED				10-Jul-21						13-Jul-21						15-Jul-21					
	Maximum	Frequency	MCL <sup>a</sup>	Result	Qual	MDL	LOD	LOQ	DF	Result	Qual	MDL	LOD	LOQ	DF	Result	Qual	MDL	LOD	LOQ	DF
VOLATILE ORGANIC COMPOUNDS (µg/L)																					
cis-1,2-Dichloroethene	1.80	1 / 3	70	0.30	U	0.15	0.30	1.0	1	1.8		0.15	0.30	1.0	1	0.30	U	0.15	0.30	1.0	1
m,p-Xylene	1.20 J	1 / 3	10,000 <sup>b</sup>	0.30	U	0.15	0.30	2.0	1	0.30	U	0.15	0.30	2.0	1	1.20	J	0.15	0.30	2.0	1
o-Xylene	0.61 J	1 / 3	10,000 <sup>b</sup>	0.30	U	0.15	0.30	1.0	1	0.30	U	0.15	0.30	1.0	1	0.61	J	0.15	0.30	1.0	1
Toluene	2.10	2 / 3	1,000	1.10		0.15	0.30	1.0	1	2.10		0.15	0.30	1.0	1	0.30	U	0.15	0.30	1.0	1
Trichloroethene (TCE)	140	2 / 3	5	3.6		3.0	6.0	20.0	20	140		0.15	0.30	1.0	20	0.30	U	0.15	0.30	1.0	1

Notes:

Shaded results exceed the MCL.

Bold analytes are site chemicals of concern.

<sup>1</sup>Field Identification uses the following naming scheme: site identification-well identification-sample from temporary well.

<sup>a</sup> Based on USEPA MCLs (HQ =1.0) November 2019

<sup>b</sup> As total xylenes.

µg/L = micrograms per liter

DF = dilution factor

J = estimated

LOD = limit of detection

LOQ = limit of quantitation

MCL = Maximum Contaminant Level

MDL = method detection limit

Qual = qualifier

U = nondetect

USEPA = United States Environmental Protection Agency

TABLE 2-5  
SUMMARY OF DETECTED ANALYTES IN PERMANENT MONITORING WELL GROUNDWATER  
FORMER ATLAS "D" MISSILE SITE 4

LOCATION IDENTIFICATION				FEW4-MW105-93						FEW4-MW105-143						FEW4-MW105-188					
FIELD IDENTIFICATION				FEW4-MW105-93-18						FEW4-MW105-143-18						FEW4-MW105-188-18					
DATE COLLECTED				30-Oct-21						31-Oct-21						30-Oct-21					
	Maximum	Frequency	MCL <sup>a</sup>	Result	Qual	MDL	LOD	LOQ	DF	Result	Qual	MDL	LOD	LOQ	DF	Result	Qual	MDL	LOD	LOQ	DF
VOLATILE ORGANIC COMPOUNDS (µg/L)																					
cis-1,2-Dichloroethene	3.5	2 / 8	70	3.50		0.150	0.300	1.00	1	0.860	J	0.150	0.300	1.00	1	0.300	U	0.150	0.300	1.00	1
<b>Trichloroethene (TCE)</b>	190 J	6 / 8	5	190	J	3.00	6.00	20.0	20	150	J	0.300	0.600	2.00	2	2.10		0.150	0.300	1.00	1

Notes:

Shaded results exceed the MCL.

Bold analytes are site chemicals of concern.

<sup>1</sup>Field Identification uses the following naming scheme: site identification-well identification-sample event.

<sup>a</sup> Based on USEPA MCLs (HQ =1.0) November 2019

µg/L = micrograms per liter

DF = dilution factor

J = estimated

LOD = limit of detection

LOQ = limit of quantitation

MCL = Maximum Contaminant Level

MDL = method detection limit

Qual = qualifier

U = nondetect

USEPA = United States Environmental Protection Agency

TABLE 2-5  
SUMMARY OF DETECTED ANALYTES IN PERMANENT MONITORING WELL GROUNDWATER  
FORMER ATLAS "D" MISSILE SITE 4

LOCATION IDENTIFICATION				FEW4-MW107-249						FEW4-MW107-310						FEW4-MW107-355					
FIELD IDENTIFICATION				FEW4-MW107-249-18						FEW4-MW107-310-18						FEW4-MW107-355-18					
DATE COLLECTED				30-Sep-21						29-Sep-21						30-Sep-21					
	Maximum	Frequency	MCL <sup>a</sup>	Result	Qual	MDL	LOD	LOQ	DF	Result	Qual	MDL	LOD	LOQ	DF	Result	Qual	MDL	LOD	LOQ	DF
VOLATILE ORGANIC COMPOUNDS (µg/L)																					
cis-1,2-Dichloroethene	3.5	2 / 8	70	0.300	U	0.150	0.300	1.00	1	0.300	U	0.150	0.300	1.00	1	0.300	U	0.150	0.300	1.00	1
<b>Trichloroethene (TCE)</b>	190 J	6 / 8	5	14.0		0.150	0.300	1.00	1	1.40		0.150	0.300	1.00	1	0.300	U	0.150	0.300	1.00	1

Notes:

Shaded results exceed the MCL.

Bold analytes are site chemicals of concern.

<sup>1</sup>Field Identification uses the following naming scheme: site identification-well identification

<sup>a</sup> Based on USEPA MCLs (HQ =1.0) November 2019

µg/L = micrograms per liter

DF = dilution factor

J = estimated

LOD = limit of detection

LOQ = limit of quantitation

MCL = Maximum Contaminant Level

MDL = method detection limit

Qual = qualifier

U = nondetect

USEPA = United States Environmental Protection Agency

TABLE 2-5  
SUMMARY OF DETECTED ANALYTES IN PERMANENT MONITORING WELL GROUNDWATER  
FORMER ATLAS "D" MISSILE SITE 4

LOCATION IDENTIFICATION				FEW4-MW54B-164						FEW4-MW54B-199					
FIELD IDENTIFICATION				FEW4-MW54B-164-18						FEW4-MW54B-199-18					
DATE COLLECTED				04-Oct-21						03-Oct-21					
	Maximum	Frequency	MCL <sup>a</sup>	Result	Qual	MDL	LOD	LOQ	DF	Result	Qual	MDL	LOD	LOQ	DF
VOLATILE ORGANIC COMPOUNDS (µg/L)															
cis-1,2-Dichloroethene	3.5	2 / 8	70	0.300	U	0.150	0.300	1.00	1	0.300	U	0.150	0.300	1.00	1
Trichloroethene (TCE)	190 J	6 / 8	5	0.150	J	0.150	0.300	1.00	1	0.300	U	0.150	0.300	1.00	1

Notes:

Shaded results exceed the MCL.

Bold analytes are site chemicals of concern.

<sup>1</sup>Field Identification uses the following naming scheme: site identification-well identification

<sup>a</sup> Based on USEPA MCLs (HQ =1.0) November 2019

µg/L = micrograms per liter

DF = dilution factor

J = estimated

LOD = limit of detection

LOQ = limit of quantitation

MCL = Maximum Contaminant Level

MDL = method detection limit

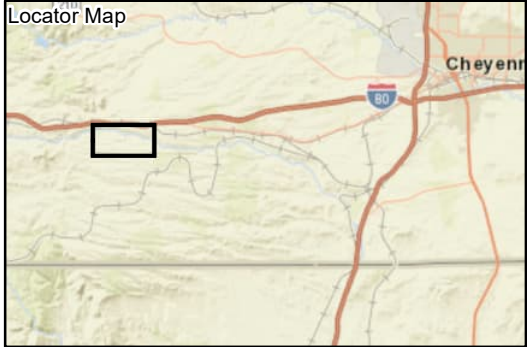
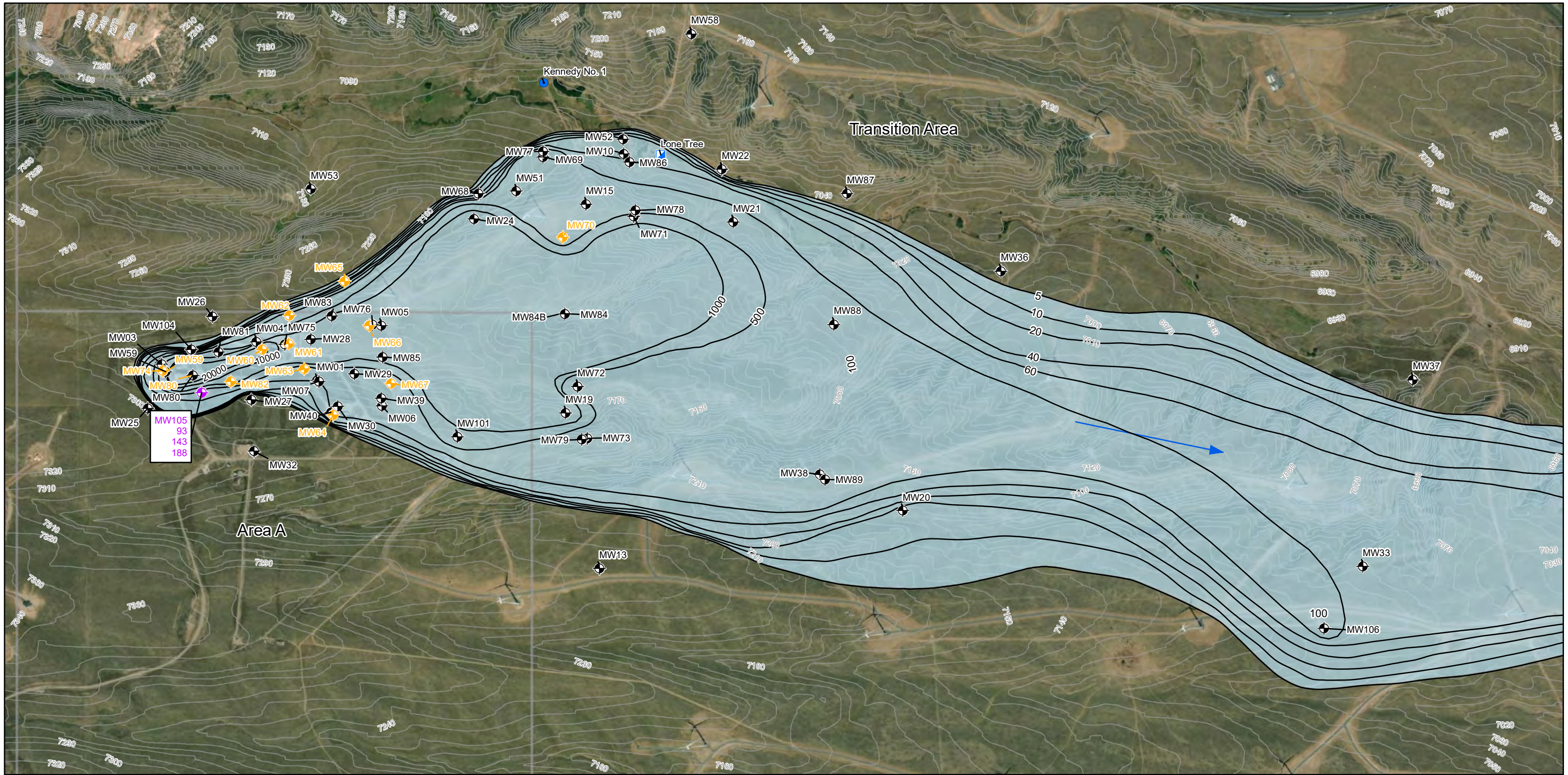
Qual = qualifier

U = nondetect

USEPA = United States Environmental Protection Agency



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**Legend**

- Monitoring Well
- Monitoring Well with Vapor Port(s)
- Data Gap Monitoring Well (Depths to Middle of Screen in Feet Below Top of Casing)
- Stock Well
- Surface Water Sample
- Groundwater Flow
- Ground Surface Elevation Contour (feet above mean sea level)
- TCE >5 µg/L

DGI = Data Gap Investigation  
LTM = Long-Term Monitoring  
MW = monitoring well  
TCE = trichloroethene  
µg/L = micrograms per liter

Notes:  
Isoconcentration lines are based on vertical and horizontal interpretations of the Fall 2021 LTM or performance monitoring event results.

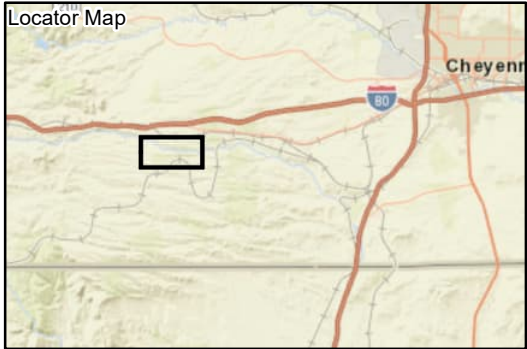
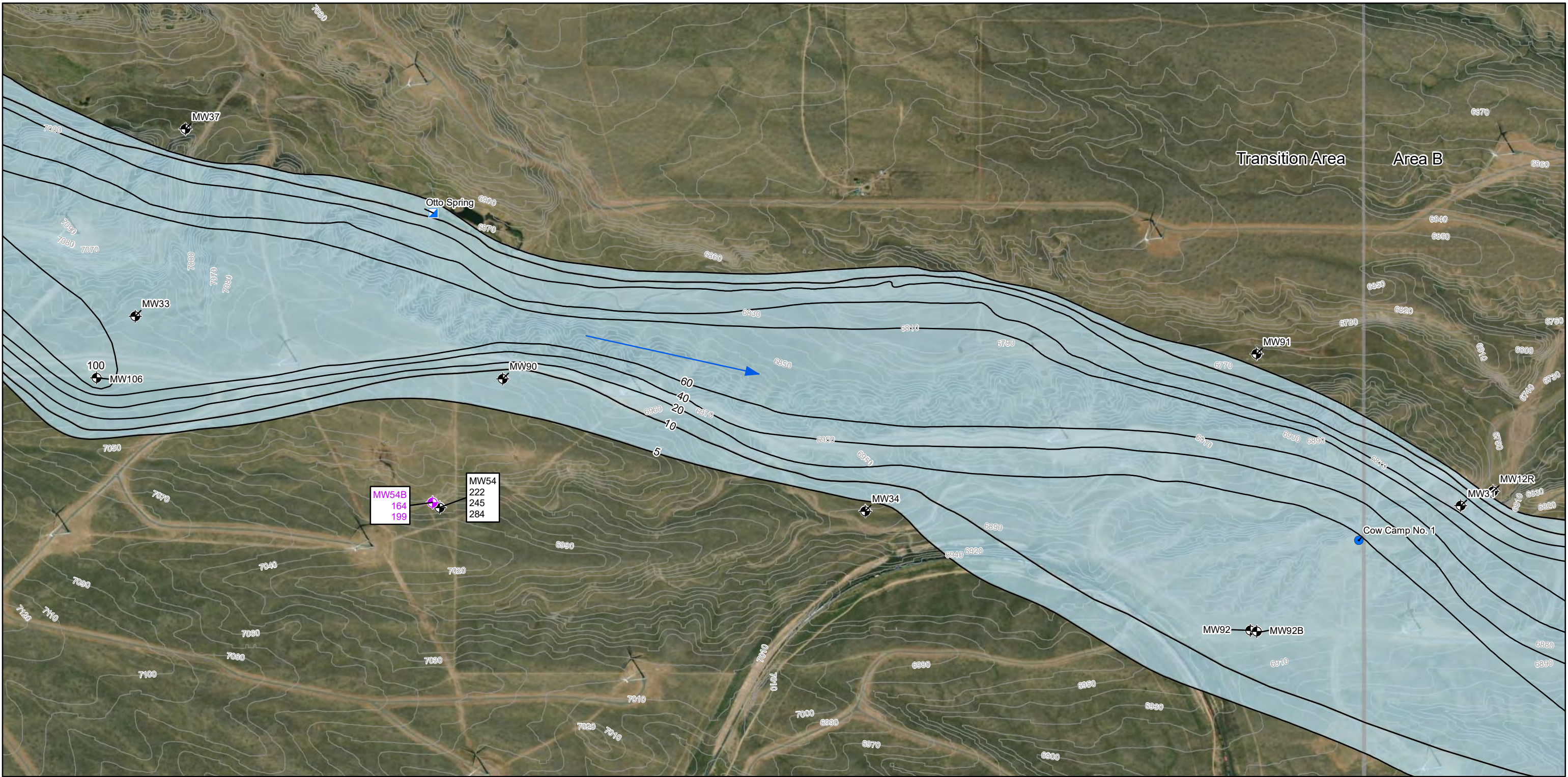


**DGI Monitoring Well Locations Area A and Transition Area Summer 2021**  
Former Atlas "D" Missile Site 4  
F.E. Warren Air Force Base, WY

Drawn By:	DPG	Date:	6/16/2022	Project No:	60613342	Figure 2-1
Checked By:	DRS	Revision:	0			



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**Legend**

- Data Gap Monitoring Well (Depths to Middle of Screen in Feet Below Top of Casing)
- Monitoring Well
- Stock Well
- Surface Water Sample
- Groundwater Flow
- Ground Surface Elevation Contour (feet above mean sea level)

- TCE Plume Contour with Concentration (µg/L)
- TCE >5 µg/L

DGI = Data Gap Investigation  
LTM = Long-Term Monitoring  
MW = monitoring well  
TCE = trichloroethene  
µg/L = micrograms per liter

Notes:  
Isoconcentration lines are based on vertical and horizontal interpretations of the Fall 2021 LTM or performance monitoring event results.

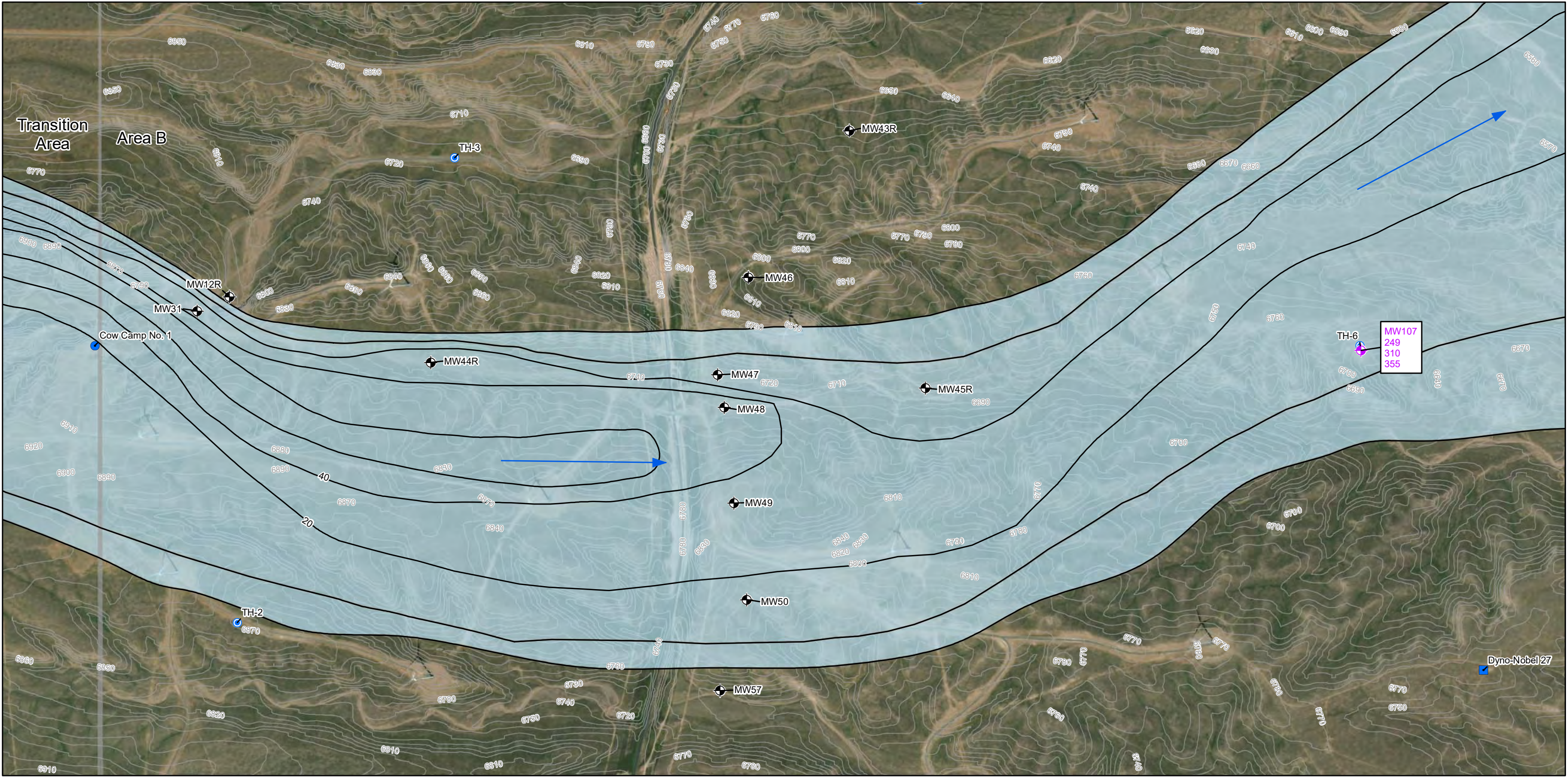


**DGI Monitoring Well Locations  
Transition Area Summer 2021  
Former Atlas "D" Missile Site 4  
F.E. Warren Air Force Base, WY**

Drawn By: DPG	Date: 6/16/2022	Project No: 60613342	Figure 2-2
Checked By: DRS	Revision: 0		



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**Legend**

- Data Gap Monitoring Well (Depths to Middle of Screen in Feet Below Top of Casing)
- Monitoring Well
- Industrial
- Stock
- Test Hole
- Groundwater Flow

- Ground Surface Elevation Contour (feet above mean sea level)
- TCE Plume Contour with Concentration (µg/L)
- TCE >5 µg/L

DGI = Data Gap Investigation  
LTM = Long-Term Motoring  
MW = Monitoring Well  
TCE = trichloroethene  
µg/L = micrograms per liter

Notes:  
Isoconcentration lines are based on vertical and horizontal interpretations of the Fall 2021 LTM or performance monitoring event results.



**DGI Monitoring Well Locations Area B and Expanded Study Area Summer 2021**  
Former Atlas "D" Missile Site 4  
F.E. Warren Air Force Base, WY

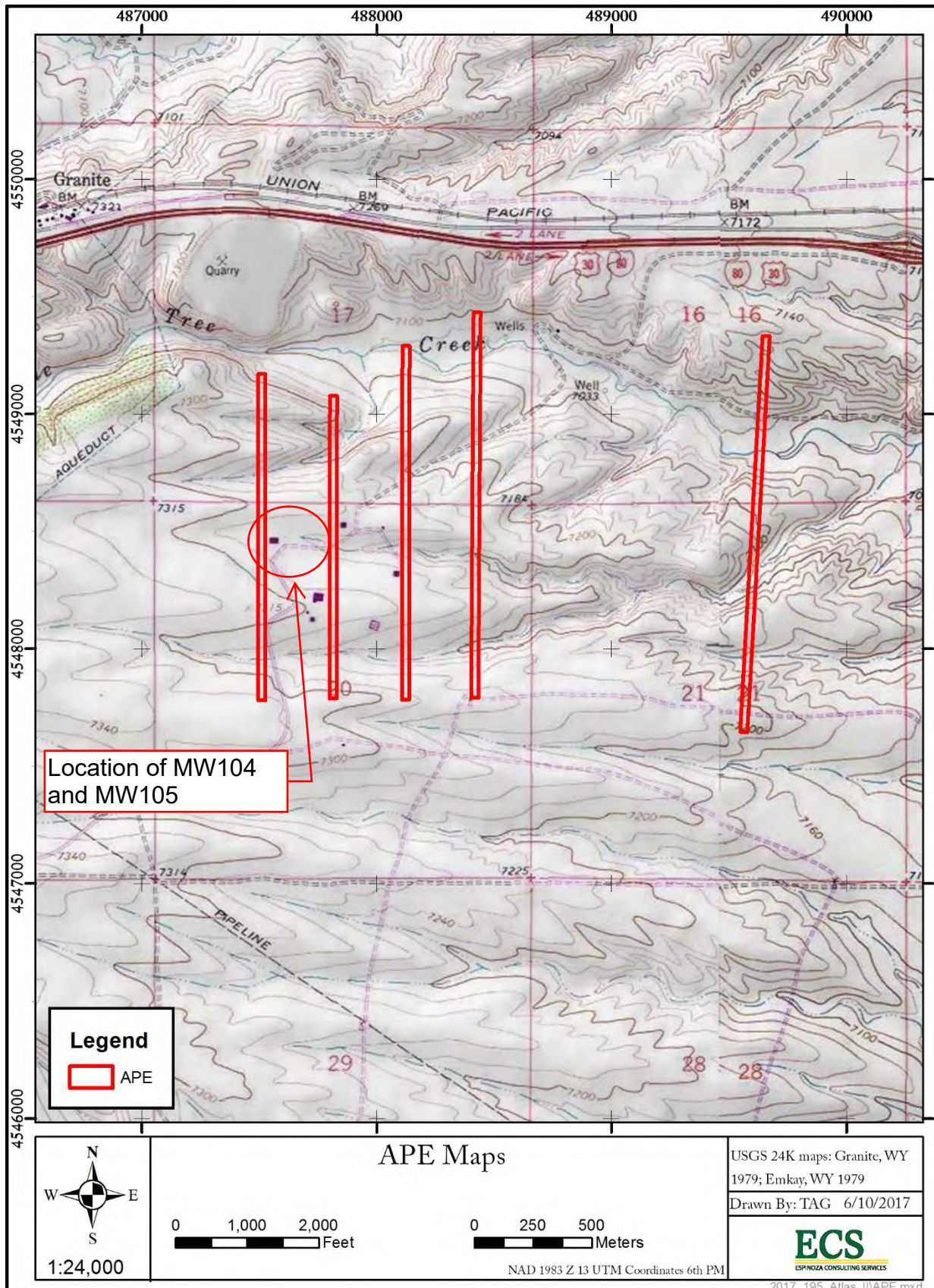
Drawn By: DPG	Date: 6/16/2022	Project No: 60613342	Figure 2-3
Checked By: DRS	Revision: 0		



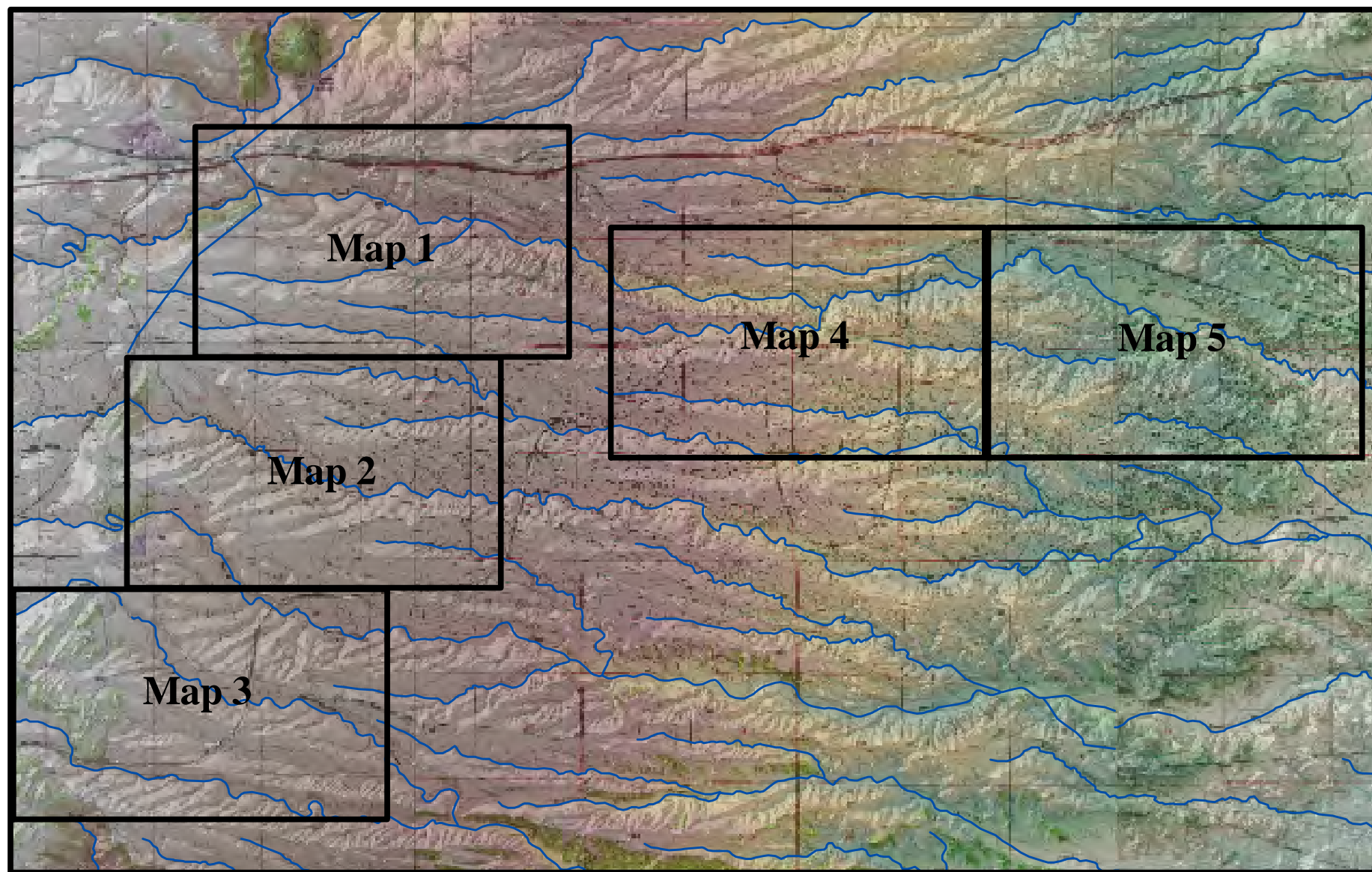
- Espinoza Cultural Services, LLC. 2017a. Class III Cultural Resources Investigation for the Atlas “D” Missile Site 4 Interim Monitoring and RI Support Activities: Phase I, Laramie County, Wyoming. June.
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- USEPA. 2018. 2018 Edition of the Drinking Water Standards and Health Advisories Table. EPA 822-F-18-001. March.
- USEPA. 2021. Regional Screening Level (RSL) Summary Table (TR=1E-6, HQ=1). May.



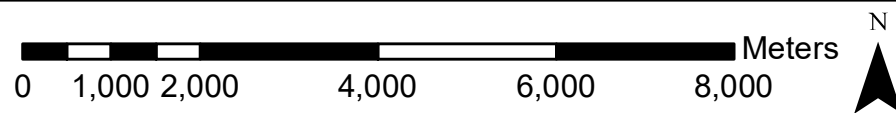
Figure 2: Area of Potential (Direct) Effects Map (1 of 2).



# Class II Archaeological Survey of the Belvoir Ranch, Laramie County, Wyoming 2011

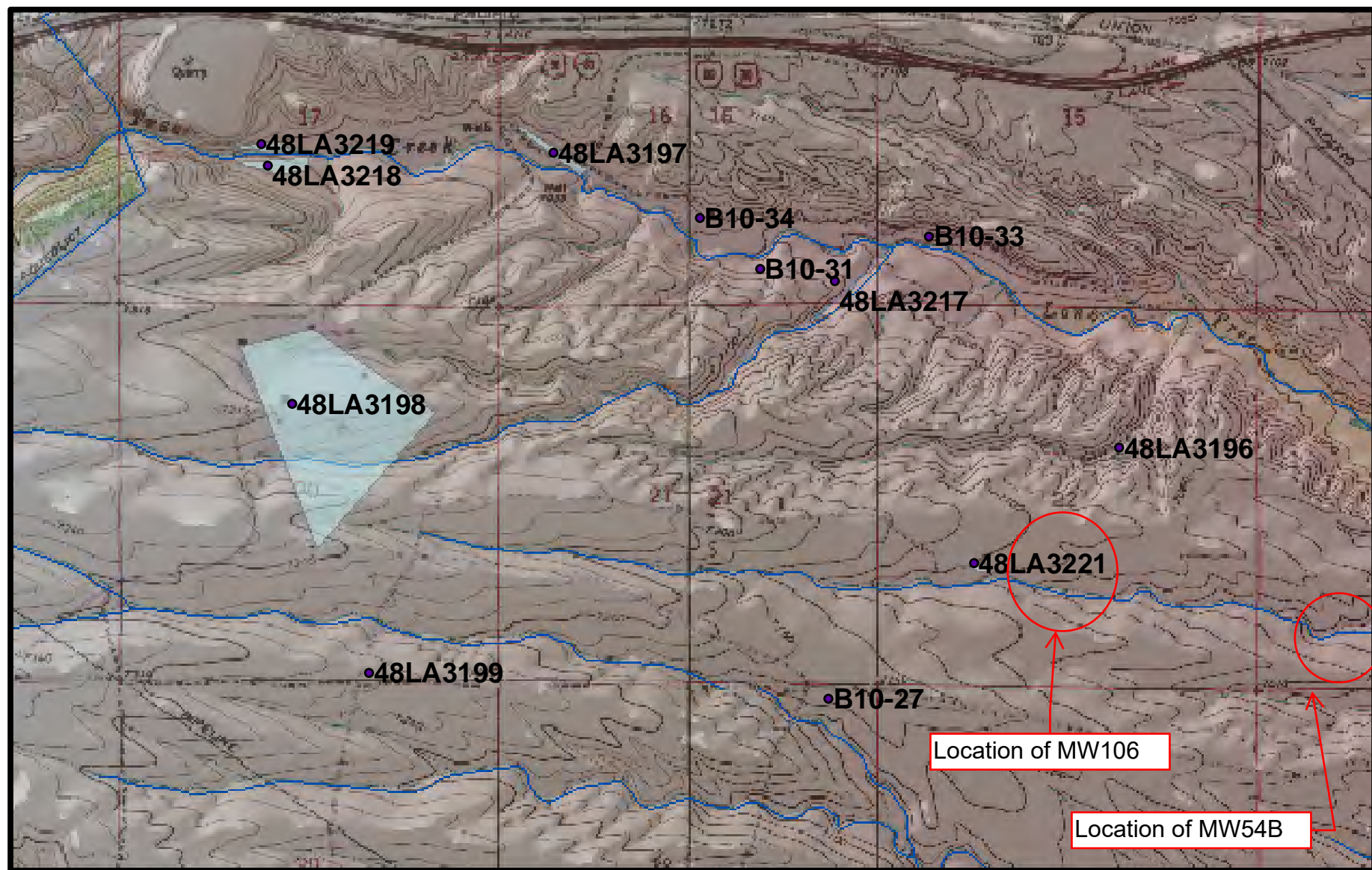


The Center for Mountain and Plains Archaeology  
Map Key





# Class II Archaeological Survey of the Belvoir Ranch, Laramie County, Wyoming 2011

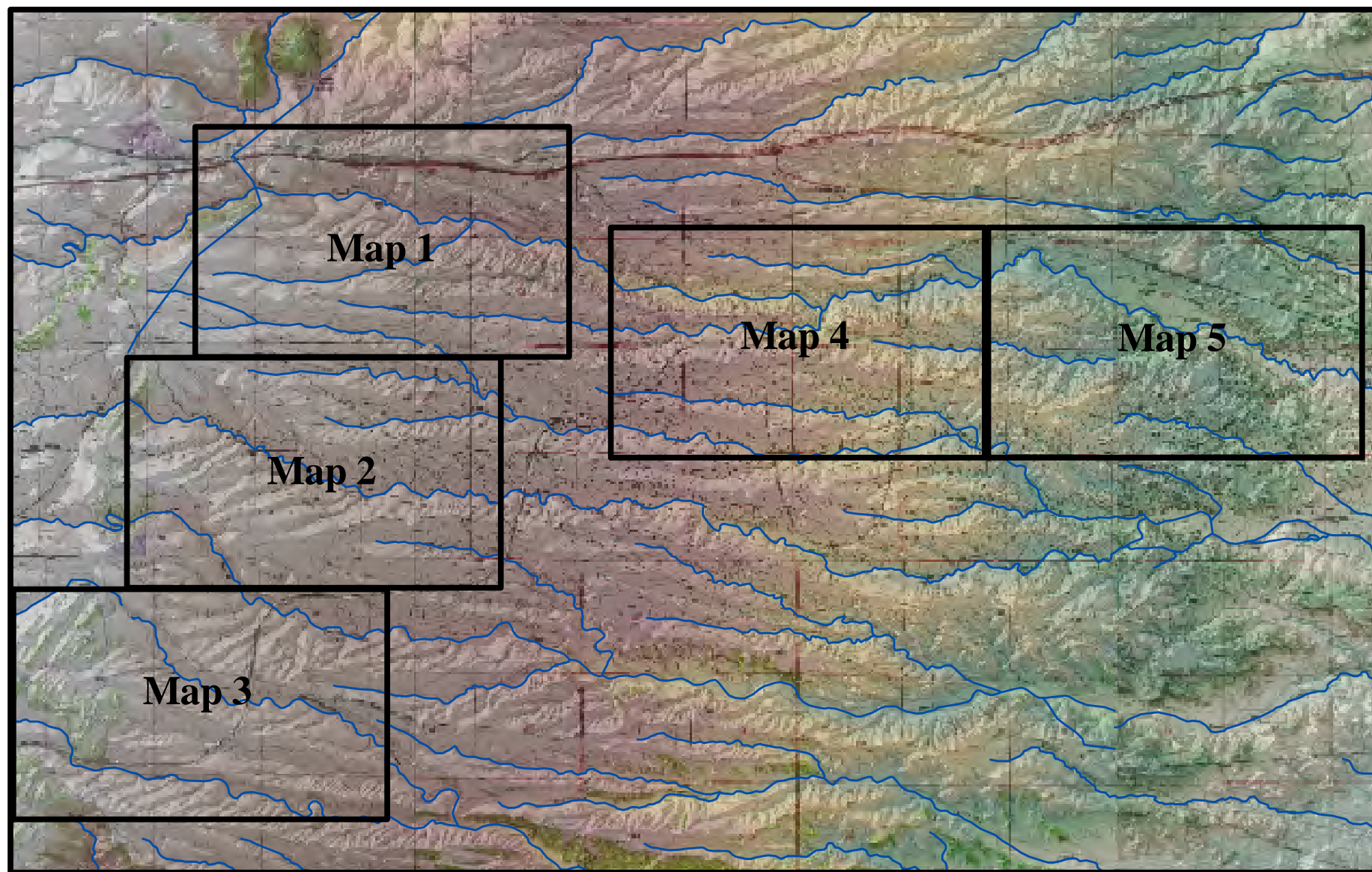


The Center for Mountain and Plains Archaeology  
Map 1 of 5

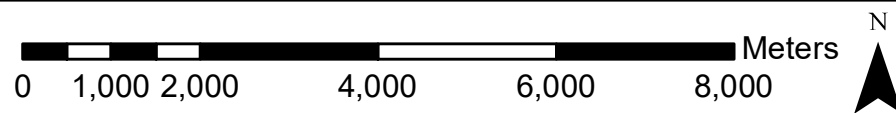
0 250 500 1,000 1,500 2,000 Meters



# Class II Archaeological Survey of the Belvoir Ranch, Laramie County, Wyoming 2011

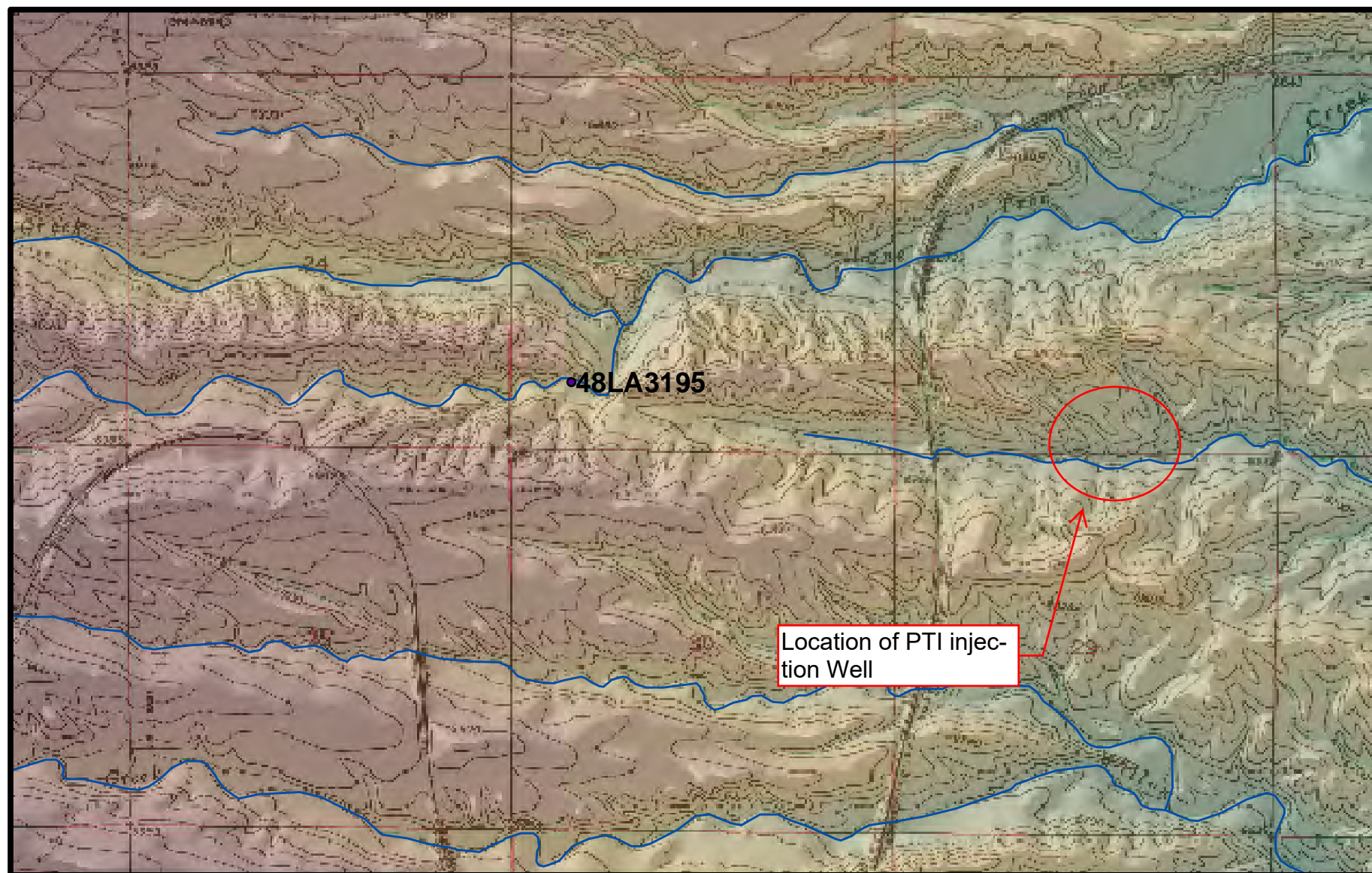


The Center for Mountain and Plains Archaeology  
Map Key





# Class II Archaeological Survey of the Belvoir Ranch, Laramie County, Wyoming 2011

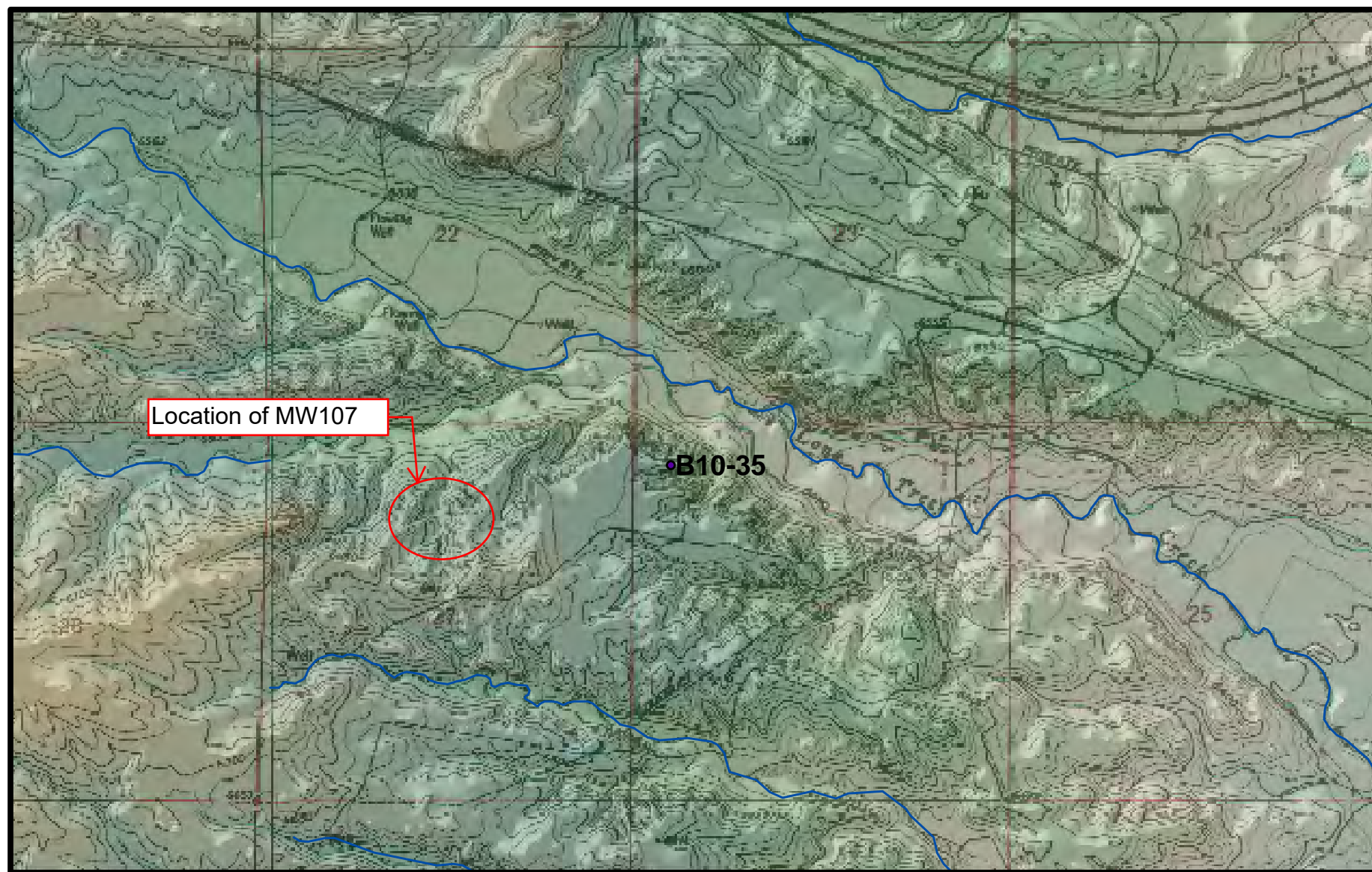


The Center for Mountain and Plains Archaeology  
Map 4 of 5

0 250 500 1,000 1,500 2,000 Meters



## Class II Archaeological Survey of the Belvoir Ranch, Laramie County, Wyoming 2011



The Center for Mountain and Plains Archaeology  
Map 5 of 5

0 250 500 1,000 1,500 2,000 Meters





HTRW DRILLING LOG		DISTRICT USACE - Omaha District		HOLE NUMBER <b>MW54B</b>	
1. COMPANY NAME URS Group, Inc.		2. DRILLING SUBCONTRACTOR Yellow Jacket Drilling Services, Inc.		SHEET 1 OF SHEETS 23	
3. PROJECT Atlas "D" Missile Site 4		4. LOCATION Laramie County, WY			
5. NAME OF DRILLER <b>CHRIS HILL</b>		6. MANUFACTURER'S DESIGNATION OF DRILL TSI 150T Sonic Rig			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT Sonic Drill Rig		8. HOLE LOCATION <b>~ 100 ft. WNW of MW54</b>			
7-in. inner diameter (I.D.) core barrel (20-ft)		9. SURFACE ELEVATION <b>6980</b>			
8-in. I.D. drill casing		10. DATE STARTED <b>7-11-21</b>		11. DATE COMPLETED <b>7-12-21</b>	
12. OVERBURDEN THICKNESS ( <b>OGALLALA</b> ): <b>156.5 ft. bgs</b>		15. DEPTH GROUNDWATER ENCOUNTERED <b>158.5 ft. bgs</b>			
13. DEPTH DRILLED INTO <del>ROCK</del> <b>WHITE RIVER FORMATION</b> : <b>58.5 ft. bgs</b>		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <b>157.78 bTOC (155.28' bgs) 7-14-21</b>			
14. TOTAL DEPTH OF HOLE <b>215' bgs</b>		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <b>~122' bgs (7-16-21) post development</b>			
18. GEOTECHNICAL SAMPLES <b>YES</b>		DISTURBED <b>X</b>		UNDISTURBED	
20. SAMPLES FOR CHEMICAL ANALYSIS <b>NA</b>		VOC		METALS	
22. DISPOSITION OF HOLE		BACKFILLED		MONITORING WELL	
		<b>X Nested</b>		OTHER (SPECIFY)	
				19. TOTAL NUMBER OF CORE BOXES <b>NA</b>	
				21. TOTAL CORE RECOVERY <b>96 %</b>	
				23. SIGNATURE OF INSPECTOR <b>Jon Kinkade J-KK</b>	
LOCATION SKETCH/COMMENTS					
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="flex-grow: 1;"> </div> <div style="text-align: right;"> <p>SCALE:</p> <p>1,000 500 0 1,000 Feet</p> </div> </div>					
PROJECT Atlas "D" Missile Site 4					HOLE <b>MW54B</b>

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW546

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

2

SHEETS

OF 23

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEO TECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
0		Top Soil (04/04) - loose, dry, brown (7.5YR 4/3), 20-25% gravel (mostly f, some m, few c) subrounded-subangular, roots present 0-2ft. no reaction to 10% HCl					TIME(T)=0940 Recovery/RUN (Rec/RUN)= 5'/5'
1		sand increases 10%					
2		WELL GRADED SAND with SILT and GRAVEL (SW-SM) - loose, dry, brown (10YR 4/3), f-C (mostly m+c), subrounded-subangular 10-15% silt, 20-25% gravel (mostly f, some m, subrounded-subangular) no reaction to 10% HCl					
3		silt decreases WELL GRADED SAND with GRAVEL (SW)					
4							
5		silt increases ——— 10% WELL GRADED SAND with SILT and GRAVEL (SW-SM) - loose, dry, yellowish brown (10YR 5/6), f-C (mostly f), 10-15% silt, 20-25% gravel (f-m) weak reaction to 10% HCl					T=0845 Rec/RUN=10'/10
6		15%					
7							
8		with GRAVEL CLAYEY SAND (SC) - soft, dry, yellowish brown (10YR 5/6) with white (7.5YR 9/1) mottling, f-C (mostly f+m), subangular-subrounded, 20-25% clay (low plasticity), 15% gravel (f-m) strong reaction to 10% HCl					
9							
10		clay decreases - < 5%	HS=2.7				

PROJECT

Atlas "D" Missile Site 4

HOLE NO.

MW546



## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE MW546

PROJECT

INSPECTOR

SHEET

SHEETS

Atlas "D" Missile Site 4

J. KINKADE

3

OF 23

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
	10	SILTY SAND with GRAVEL (SM) - soft/loose, dry, yellowish brown (10YR 9/6), f-C (mostly m+C), subrounded - subangular, 15-20% silt, 10-15% gravel (f-m, subrounded - angular), some strongly cemented, clasts (2-3"), f gravels, matrix supported, moderate reaction to 10% HCl					
	11	Silt increases strong reaction to 10% HCl					
	12						
	13						
	14	↓ becomes light yellowish brown (10YR 6/4) 30% SILTY SAND (SM) - gravel decreases to 5-10%, becomes f. few C gravels moderate reaction to 10% HCl					
	15	WELL GRADED SAND with SILT and GRAVEL (SW-SM) - loose, dry, light olive brown (2.5Y 5/3), f-C (mostly f), subangular - subrounded, 5-15% silt, 15-20% gravel (mostly f, some m-C, subrounded - subangular), ~5% clay (low-med plasticity), strong reaction to 10% HCl					T=0854 Rec/Run = 10'/10'
	16						
	17	1 4.5" strongly cemented conglomerate cobble/clast, f gravel/C sand, matrix supported silt 15% some weakly cemented (easily broken by hand)					
	18						
	19	SILTY SAND with GRAVEL (SM) - loose/weakly cemented, dry, brown (10YR 5/3), f-C (mostly f), subrounded - subangular, 20-30% silt, 15-20% gravel (mostly f, little m+C), subrounded - angular, strong-moderate reaction to 10% HCl					HS=2.9
	20						

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW546

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW546

PROJECT

INSPECTOR

SHEET

SHEETS

Atlas "D" Missile Site 4

J. KINKADE

4

OF

23

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
20		S.A.A. <del>mod Jwk</del>					
21							
22							
23		becomes light yellowish brown (2.5y 6/3) moderate - strong reaction to 10% HCl					
24							
25							
26		one 4" cobble becomes light gray (10YR 7/2), ~ 5% clay (low plasticity) gravel decreases to 5-10% weak reaction to 10% HCl					T = 0.115 Rec/Run = 10'/10'
27		becomes yellowish brown (10YR 5/4), < 5% clay gravel increased to 15-20% <del>moderate strong Jwk</del> weak reaction to 10% HCl					
28		becomes weakly cemented (easily broken by hand) strong reaction to 10% HCl					
29							
30			HS=2.6				

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW546

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE MW 546

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

5

SHEETS

OF 23

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
30		S.A.A.					
31							
32		SANDY SILT (ML) - weakly cemented, dry, brown (10YR 5/2), 30-35% sand (f-c subrounded - subangular), ~10% gravel (f, subrounded - angular) weak - moderate reaction to 10% HCl gravel increases 15%					
33							
34		↓ 20% SILTY SAND/SANDY SILT with GRAVEL (SM/ML) - weakly cemented, dry, yellowish brown (10YR 5/4), f-c subangular - subrounded, 40-60% silt, 15-20% gravel (f, subrounded - subangular) weak - moderate reaction to 10% HCl					
35							
36		1 strongly cemented conglomerate clast (matrix supported, f gravel/c sand) 36-37 5-10% clay (low-mud plasticity)					T=0930 Rec/Run=10/10'
37		WELL GRADED SAND with SILT and GRAVEL (SW-SM) - weakly cemented, dry, yellowish brown (10YR 5/4), f-c (mostly m-c), subrounded- subangular, 10-15% silt, 15%-20% gravel (mostly f, some m) moderate - strong reaction to 10% HCl (subround - angular)					
38							
39		SANDY SILT with GRAVEL (ML) - weakly cemented, dry, light olive brown (2.5Y 5/3) 30-35% sand (f-c, subrounded - angular), 15% gravel (f-m, subrounded - subangular) moderate - strong reaction to 10% HCl HS=3.6					
40							

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW546

(Proponent: CECW-EG)



## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE MW546

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET 6 OF 23 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.
	40	SAA.					
	41						
	42						
	43						
	44	Sand increases ↓					
	45	SILTY SAND with GRAVEL (SM) - loose, dry, sand increases ↓ weak - moderate reaction to 10% HCl					T=0945 Reg/Run = 10'/10'
	46	WELL GRADED SAND with SILT and GRAVEL (SW-SM) - loose, dry, yellowish brown (10YR 5/6), mostly f, some m+c, subrounded- subangular, 5-10% silt, 15-20% gravel f-m, few C gravels, subrounded-subangular moderate - strong reaction to 10% HCl					
	47						
	48						
	49	slightly moist					
	50	dry, silt increases to 15%	Head Space (HS) 5.2				

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW546

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE  
MW546  
SHEET  
7 OF 23PROJECT  
Atlas "D" Missile Site 4INSPECTOR  
J. KINKADE

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.
50		S.A.A.					
51							
52		silt increased to 20-30% SILTY SAND (SM)					
53		1 5-6" cobble weak					
53.5-54		SILTY SAND with coarse Grains					
54		SILTY CLAY with GRAVEL (CL) - soft, slightly moist, very pale brown (10YR 7/3), med-high plasticity, 20-25% gravel (mostly m, some f, subangular- angular) ~5-10% f sand moderate- <del>strong</del> reaction to 10% HCl					
55							
56		WELL GRADED SAND with CLAY and GRAVEL (SW-SC) - weakly cemented, slightly moist-dry, yellowish brown (10YR 5/4), f-C, subangular- subrounded, 5-10% clay (low plasticity), 5-10% silt, 15-20% gravel (f-C, mostly m, rounded-angular) very weak reaction to 10% HCl 1 4-5" cobble					T=1000 Rec/Rev=10'/10'
57							
58		dry					
59		Silt increases, clay decreases WELL GRADED SAND with SILT and GRAVEL (SW-SM) - loose, dry, yellowish brown (10YR 5/6), f-C, subrounded-subangular, 5-10% silt ~15% gravel (mostly f, few m, subround-subangular) very weak reaction to 10% HCl HS=7.2					
60							

PROJECT  
Atlas "D" Missile Site 4

HOLE NO. MW546

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW546

PROJECT

INSPECTOR

SHEET

SHEETS

Atlas "D" Missile Site 4

J. KINKADE

8

OF

23

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
60		SAA.					
61		silt increases to 10-15% moderate reaction to 10% HCl					
62		gravel increases to 15-25% (mostly f, some 3-4" cobbles) moderate-strong reaction to 10% HCl					
63							
64		core through 6-7" cobble/boulder					
65		few strongly cemented conglomerate, <del>stiff</del> <sup>stiff</sup> grain supported, c sand / f gravel					T=1016 Rec/run=10/10
66		gravel increases to 25-30% (f-m) very weak reaction to 10% HCl					
67							
68		with GRAVEL SANDY SILT (ML) - loose, dry, grayish brown (2.54 5/2), 30-40% sand (f-c, subrounded-angular) 10-15% gravel (subrounded-angular) moderate reaction to 10% HCl					
69							
70			HS=11.5				

PROJECT

Atlas "D" Missile Site 4

HOLE NO.

MW546

ENG FORM 5056-R, AUG 94

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW546

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

9

OF

SHEETS

23

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
70		S.A.A.					
71		SILTY SAND (SM) - loose, dry, yellowish brown (10YR 5/6), f-c (mostly f-m), subrounded - subangular, 30-40% silt 5-10% f gravel (subrounded - angular) no - very weak reaction to 10% HCl					
72							
73							
74							
75							T = 1045 Rec/Run = 18.5/20
76		gravel increases to 15%					
77							
78		moderate reaction to 10% HCl					
79		gravel increases to 15-20% (f-m) strong reaction to 10% HCl					
80			HS = 5.2				

PROJECT

Atlas "D" Missile Site 4

HOLE NO.

MW546

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW54b

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

10

SHEETS

OF

23

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.
80		SAA					Run = 75'-95'
81		few 3-4" cobbles					
82		becomes reddish brown (5YR 5/4) mica flecks present no reaction to 10% HCl					
83							
84		weakly cemented parts					
85							
86							
87		becomes dark yellowish brown (10YR 4/4) gravel increases to 25%					
88							
89		moderate reaction to 10% HCl					
90			HS = 5.7				

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW54b

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW546

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

SHEETS

11 OF 23

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
90		WELL GRADED SAND with GRAVEL (SW) - loose, f-c, subrounded-subangular, 30-40% gravel (f, subrounded-subangular) <5% silt no reaction to 10% HCl		moist, reddish brown (5YR 5/4)			
91		SANDY SILT (ML) - loose, dry, brown (10YR 5/3), 30% sand (f-c) very weak reaction to 10% HCl					
92		WELL GRADED SAND (SW)					
93		WELL GRADED SAND with GRAVEL (SW) - loose, slightly moist, reddish brown (5YR 5/4), f-c, subangular-subrounded 30-40% gravel (f, some m, subrounded-angular) <5% silt very weak reaction to 10% HCl					
94							
95		SAA ~ 58-10% silt no reaction to 10% HCl					T = 1110 Rec/run = 20'/20'
96							
97							
98		gravel decreases to ~15% (f) no reaction to 10% HCl					
99							
100			HS = 5.2				

PROJECT

Atlas "D" Missile Site 4

HOLE NO.

MW546



## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE MW546

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET 12 OF SHEETS 23

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	SAA					Run = 95'-115'
	101						
	102	101.5-102 SALT with SAND and GRAVEL (ML) - loose, dry, brown (10YR 5/3) 10-15% sand (f-c), 10-15% gravel (f) very weak reaction to 10% HCl					
	103	slightly moist					
	104						
	105						
	106	dry					
	107	(silt increases to 10-15% WELL GRADED SAND with SILT and GRAVEL (SW-SM)) - 106.5 - 108 SAA no reaction to 10% HCl					
	108	WELL GRADED SANDS with GRAVEL (SW) - loose, dry, brown (7.5YR 5/4) f-c, subrounded-subangular, 15% gravel (f, subangular-subrounded) no reaction to 10% HCl 1 3-4" cobble					
	109						
	110	gravel increases to f-c (15-20%) HS=3.9					

PROJECT

Atlas "D" Missile Site 4

HOLE NO.

MW546

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW546

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

13

SHEETS

OF 23

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
110		SAA					
111							
112		becomes yellowish Red (5YR 5/6) slightly moist, 5-10% silt (SW-SM) no reaction to 10% HCl					
113							
114							
115		115-117.5 30-40% silt					T = 1250 Rec/Run = 20'/20'
116							
117		~5% silt					
118							
119							
120			HS = 2.8				

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW546

(Proponent: CECW-EG)



## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW546

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

SHEETS

14 OF 23

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
120		SAA					Run = 115'-135'
		120.5 - 121.5 SILTY CLAY with GRAVEL (CL) - soft-firm, slightly moist, brown (7.5YR 5/4), low-med plasticity, 15% gravel (f-m)					
		NO reaction to 10% HCl					
121							
		122 - 123.5 silt increases to 15-20% (SW-SM)					
		NO reaction to 10% HCl					
123							
124							
125							
126		~5% silt, weakly cemented					
		silt increases					
127							
128		SILTY SAND with GRAVEL (SW-SM) - loose/weakly cemented, yellowish brown (10YR 5/4)					
		dry, f-c, subrounded-subangular, 15-20% silt, 15-20% gravel (mostly f, some m, few c, subrounded-angular)					
129		NO reaction to 10% HCl					
130							
				HS=33			

PROJECT

Atlas "D" Missile Site 4

HOLE NO.

MW546

ENG FORM 5056-R, AUG 94

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW546

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

SHEETS

15 OF 23

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.
	130	SAA. weak reaction to 10% HCl					
	131						
	132						
	133						
	134						
	135	silt increases to 30-35% very weak reaction to 10% HCl					T = 1340 Res/psf = 15'/15'
	136						
	137						
	138	136- 138-139 SANDY SILT (ML) - loose, dry, brown (7.5 YR 5/4) 30% sand (f-c) very weak reaction to 10% HCl					
	139						
	140	SILTY SAND WITH GRAVEL (SM) - loose, moist, yellowish brown (10YR 5/4), f-c, subangular-subangular, 15-25% silt, 15-25% gravel (f-m), no reaction to 10% HCl, HS = 2.2 some C					

PROJECT

Atlas "D" Missile Site 4

HOLE NO.

MW546

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW546

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

SHEETS

16

OF

23

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEO TECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
	140						Run = 135' - 150'
	141	5" cobble					
	142						
	143	becomes brown (10YR 5/3) some moderately cemented conglomerate clasts, fine gravel, matrix supported					
	144	silt increases to 30-40% no reaction to 10% HCl					
	145						
	146	with gravel SANDY SILT (ML) - loose, dry, brown (10YR 5/3), ~30% sand (f-m-c, rounded-subangular), 15-20% gravel (f-m, mostly fine, few 3" cobbles, subrounded-subangular) weak reaction to 10% HCl					
	147						
	148						
	149						
	150	5" cobble, several 3-4" cobbles	HS=1.1				

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW546

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

17

SHEETS

OF

23

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
150							T=1420 Rec/Run = 11/15' <sup>WK</sup>
151							
152							
153							
154							
155		gravel, wet (drill fluid), all fines probably washed out some weakly cemented clasts, f gravel, matrix supported clay					
156							
157		SILT (ML) - hard, weakly cemented, moist, brown (7.5YR 5/4), trace sand weak-moderate reaction to 10% HCl					possible transition to White River Formation
158		~58 sand					
159		SILTY SAND with GRAVEL (SM) - loose, wet, brown (10YR 5/3), f-c (mostly coarse, subrounded) 15-20% silt 20-25% gravel (f-in some c, subrounded-subangular) very weak reaction to 10% HCl <sup>WK</sup>					possible water table
160		LEAN CLAY (CL) - hard-firm, very moist, brown (7.5YR 5/2), low-med plasticity, 5-10% gravel (subrounded), no-very weak reaction f-c, HS=1.5 to 10% HCl					

PROJECT

Atlas "D" Missile Site 4

HOLE NO.

MW546

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE MW546

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET 18 OF SHEETS 23

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
160		SAA.					
161		gravel increases to ~158 (f-m) moist					
162							
163							
164		very wet, sand & gravel, fines possibly washed out. m. C sand + f gravel					
165		/CLAYEY SILTY SAND WITH GRAVEL (SM) - firm-soft, wet brown (7.5YR 5/4), f-C, 30% clay/silt, med plasticity, 10-15% gravel (f) very weak reaction to 10% HCl					T=1640 Rec/Run=10.5'/12'
166		166.5-167.5 SANDY SILT (ML) - hard, slightly moist, yellowish brown (10YR 5/4), sand is mostly f strong reaction to 10% HCl					
167							
168							
169							
170			HS=1.0				

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW546

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW546

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

SHEETS

19 OF 23

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
170		SILTY <del>CLAY</del> CLAY/CLAYEY SILT (CL/ML) - hard, dry - slightly moist, yellowish brown (10YR 5/4), no-low plasticity, 5-15% sand, f-c, 15% f gravel					
171		moderate - strong reaction to 10% HCl					
172							
173							
174							
175							
176		becomes moist 4" cobble					End of drilling for 7-11-21
177		CLAYEY SAND WITH GRAVEL (SC) - weakly cemented, wet, dark grayish brown (2.5Y 4/2), f-c (mostly m + c), subangular, 15-20% clay (low-med plasticity), 15-20% gravel (f-c, subrounded-subangular), moderate reaction to 10% HCl					7-12-21 T = 0855 Rec/Run = 8'/8'
178							
179		SILTY CLAY (CL) - hard, dry - moist, yellowish brown (10YR 5/4), non-very low plasticity, magnesium oxide present no reaction to 10% HCl					
		trace f gravel/c sand					
180			HS=3.1				

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW546

(Proponent: CECW-EG)



## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE  
MW546

## PROJECT

Atlas "D" Missile Site 4

## INSPECTOR

J. KINKADE

SHEET  
20 OF 23

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
180		SAA 5% f-m gravel, subrounded					
181		gravel increases to 10% few C gravels					
182		gravel increases to 10-15% (mostly f) ~5% sand (c, subangular - subrounded) moderate reaction to 10% HCl					
183							
184		SILTY CLAY with GRAVEL (CL) - hard, weakly cemented, dry, light yellowish brown (10YR 6/4), 15-25% gravel (f-m, subrounded - angular) ~5% sand (m-c, subrounded - angular) moderate - strong reaction to 10% HCl becomes yellowish brown (10YR 5/4) becomes wet, sand increases to 10% gravel is mostly f, increases to 30-35%					
185		POORLY GRADED GRAVEL with SILT (GP-GM) - loose, wet, brown (10YR 5/3), mostly f, some m, rounded - subrounded 5-10% silt, ~5% sand m-c very weak reaction to 10% HCl					T = 0940 Rec/pen = 14' / 14'
186							
187							
188		SILTY CLAY (CL) - firm-hard, wet with some dry pockets/layers, mottled very hard very pale brown (10YR 7/4) with firm-hard yellowish brown (10YR 5/4), low-med plasticity, bedded layers (~1") of very hard SILTSTONE/CLAYSTONE (dry)					
189							
190		Gravel is ~5% (f-m)	HS = 2.2				

## PROJECT

Atlas "D" Missile Site 4

## HOLE NO.

MW546



## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW546

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

21

SHEETS

OF 23

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
190	190-190.5	POORLY GRADED SAND (SP) - soft, wet, pale brown (10YR 6/3) f, few m or c rounded, subrounded, some mica specks weak-moderate					
191		WELL GRADED GRAVEL with CLAY (GW-GC) - loose, wet, grayish brown (10YR 5/2), f-m, subrounded - subangular 5-10% clay (low plasticity), 5-10% sand (m-c) subrounded - subangular weak-moderate reaction to 10% HCl					
192							
193		LEAN CLAY (CL) - soft-firm, moist, yellowish brown (10YR 5/4), low-med. plasticity, 5-15% f gravel (subrounded-subangular) weak reaction to 10% HCl					
194		becomes firm-hard					
195							
196		CLAYEY SAND (SC) - firm, weakly cemented, wet, brown (10YR 5/3), f-c (mostly m + c) subrounded-subangular, 20-30% clay (low-med plasticity), 10-15% gravel (f-m, few c, subrounded angular) weak reaction to 10% HCl					
197							
198		weak-moderate reaction to 10% HCl					
199							
200							

T = 1345  
 Rec/Run = 10' / 11'

NR

HS = 1.7

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW546

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW546

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

22

SHEETS

OF

23

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
	200	SILTY CLAY (CL) - hard, moist, yellowish brown (10YR 5/4), non-low plasticity, 5-10% sand (f-c, mostly m, subangular) trace f-m gravel NO reaction to 10% HCl	some soft parts, wet				Run 197'-210' 215'
	201						
	202	trace sand					
	203	203-204 GRAVELLY SILTY CLAY (CL) - hard, moist, yellowish brown (10YR 5/4), non-low plasticity, ~30% gravel (f-m, subrounded-angular) NO reaction to 10% HCl					
	204	back to SILTY CLAY (CL) - trace sand & gravel, moist, NO reaction to 10% HCl					
	205						
	206						
	207						
	208	becomes wet very weak reaction to 10% HCl					
	209	CLAYEY GRAVEL (GC) - loose, wet, grayish brown (10YR 5/2), poorly graded, f-m (mostly f, rounded-subangular) - 15% clay (low-med plasticity) 10-15% sand (m-c, rounded-subangular), very weak reaction to 10% HCl HS=8.3					JWK
	210						

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

BOTTOM OF BORING @ 210 ft. bgs

JWK

HOLE NO.

MW546

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW54B

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

SHEET

SHEETS

23 OF 23

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
210		SAA very weak reaction to 10% HCl					Run = 199' - 215'
211							
212		amount of m gravel increases (well graded)					
213							
214		clay increases to 30-40% very weak reaction to 10% HCl					
215		BOTTOM OF BORING @ 215 ft. logs					
216							
217							
218							
219							
220							

PROJECT

Atlas "D" Missile Site 4

HOLE NO.

MW54B



<b>HTRW DRILLING LOG</b>		DISTRICT USACE - Omaha District		HOLE NUMBER <b>MW105</b>	
1. COMPANY NAME URS Group, Inc.		2. DRILLING SUBCONTRACTOR Yellow Jacket Drilling Services, Inc.		SHEET 1 OF 21 SHEETS	
3. PROJECT Atlas "D" Missile Site 4		4. LOCATION Laramie County, WY			
5. NAME OF DRILLER <b>CHRIS HILL</b>		6. MANUFACTURER'S DESIGNATION OF DRILL TSI 150T Sonic Rig			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT Sonic Drill Rig		8. HOLE LOCATION <b>~150ft. SE of Building 1</b>			
7-in. inner diameter (I.D.) core barrel (20-ft)		9. SURFACE ELEVATION <b>7270 ft.</b>			
8-in. I.D. drill casing		10. DATE STARTED <b>7-8-21</b>		11. DATE COMPLETED <b>7-9-21</b>	
12. OVERBURDEN THICKNESS (Ogallala): <b>62' bgs</b>		15. DEPTH GROUNDWATER ENCOUNTERED <b>~67.5 ft. bgs</b>			
13. DEPTH DRILLED INTO <del>ROCK</del> <b>WHITE RIVER FORMATIONS:</b> <b>132' vgs</b>		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <b>75.97 (7-13-21) bTOC (Temp well)</b>			
14. TOTAL DEPTH OF HOLE <b>194' bgs</b>		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <b>NA</b>			
18. GEOTECHNICAL SAMPLES <b>YES</b>		DISTURBED <b>X</b>		UNDISTURBED	
19. TOTAL NUMBER OF CORE BOXES <b>NA</b>		20. SAMPLES FOR CHEMICAL ANALYSIS		21. TOTAL CORE RECOVERY <b>98%</b>	
		VOC <b>8260C</b> <b>13</b>		METALS <b>NA</b>	
		OTHER (SPECIFY) <b>13 (MC)</b>		OTHER (SPECIFY)	
22. DISPOSITION OF HOLE		BACKFILLED		MONITORING WELL <b>X NESTED</b>	
		OTHER (SPECIFY)		23. SIGNATURE OF INSPECTOR <b>Jon Kinkade</b>	

LOCATION SKETCH/COMMENTS
 

SCALE: 1,000 500 0 1,000 Feet

PROJECT Atlas "D" Missile Site 4	HOLE <b>MW105</b>
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## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE  
MW105

PROJECT Atlas "D" Missile Site 4			INSPECTOR J. KINKADE				SHEET 2	SHEETS OF 21
ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEO TECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.	
	0	TOP SOIL (OH/OL) - loose, dry, dark brown (10YR 3.5/4), roots present (0-1 ft.), 1 6-7" cobble 5-10% gravel (f-c, subangular-angular) NO reaction to 10% HCl					TIME = 0930 Recovery/Run (Rec/Run) = 5'/5'	
	1	becomes brown (10YR 4/3)						
	2	SILTY SAND (SM) - loose, dry, yellowish brown (10YR 5/4), f-m, subrounded-subangular, 15-20% silt, 5-10% gravel (f-m, subangular-angular) weak reaction to 10% HCl						
	3	becomes light yellowish brown (10YR 6/4) silt increases to 30%, gravel is 5%						
	4	with GRAVEL SILTY SAND (SM) - med loose, dry, dark yellowish brown (10YR 4/4), f-c, subrounded-subangular, 20-30% silt, 15% gravel (f-c, mostly f, subrounded-subangular), ~5% clay (low plasticity) weak-moderate reaction to 10% HCl						
	5	gravel increases to 15-20% few 3" cobbles					T = 0935 Rec/Run = 10'/10'	
	6							
	7	no reaction to 10% HCl						
	8	clay increases to 5-10%						
	9	weak reaction to 10% HCl						
	10		Headspace (HS) = 7.1					

PROJECT  
Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO. MW105

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE  
MW105

PROJECT

INSPECTOR

SHEET

SHEETS

Atlas "D" Missile Site 4

J. KINKADE

3 OF 21

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
	10	few pale yellow (5Y 8/2) SANDY CLAY pockets, med plasticity, 20-30% sand, f-m, subrounded-subangular					
	11						
	12	with GRAVEL SILTY/CLAYEY SAND (SM/SC) - med. loose, dry, light olive brown (2.5Y 5/4), f-c, subangular-subrounded, mottled pale yellow, 1 4-5" cobble, 25-35% silt/clay (low plasticity), 15-20% gravel (mostly f, some c, subrounded-subangular) weak reaction to 10% HCl					
	13						
	14	few weakly cemented conglomerates (1-3"), matrix supported f gravels clay decreases to <5%					
	15						T=0950 Rec/Run=10'/10'
	16	15.5-16.5 - CLAYEY SAND - med. loose, dry, light gray (2.5Y 7/2), mostly f some c, subangular-subrounded, 30% clay (non-low plasticity) moderate reaction to 10% HCl					
	17	SILTY SAND with GRAVEL (SM) - loose-firm, dry, olive brown (2.5Y 4/3), f-c, subangular-subrounded, 30% silt, 15-20% gravel (f-c, subangular, some 4-5" cobbles), pyrite present weak to moderate reaction to 10% HCl					
	18	becomes loose, more c gravel  no reaction to 10% HCl					
	19						
	20		HS=6.7				

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW105

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE MW105

PROJECT			INSPECTOR				SHEET		SHEETS	
Atlas "D" Missile Site 4			J. KINKADE				4		OF 21	
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS			
a.	b.	c.	d.	e.	f.	g.	h.			
20		core through 1 7" cobble/boulder								
21		silt decreases to 15%								
22										
23		gravel increases to 25-30% (mostly f) becomes dark olive brown (2.5Y 3/3) very weak reaction to 10% HCl								
24		vsb clay, low plasticity								
25										
26		gravel decreases to 5-10% f-c					T=1000 Rec/run= 10'/10'			
27		26.5-28.5 core through 5 6-7" cobbles/boulders some 3" cobbles becomes dark grayish brown (2.5Y 7/2)								
28		becomes olive brown (2.5Y 4/3)								
29										
30		LEAN CLAY with SAND (CL) - soft, slightly moist very pale brown (10YR 8/3), very low plasticity, 15% sand (f-c, subangular-subrounded) weak reaction to 10% HCl					H <sub>s</sub> =2.1			

PROJECT  
Atlas "D" Missile Site 4

HOLE NO. MW105

NG FORM 5056-R, AUG 94

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW105

PROJECT			INSPECTOR				SHEET		SHEETS	
Atlas "D" Missile Site 4			J. KINKADE				5		OF 21	
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEO TECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS			
a.	b.	c.	d.	e.	f.	g.	h.			
30		SAA gravel increases to 5-10% (m-c, subrounded-subangular), 1 4-5" cobble								
31										
32		SILTY SAND with GRAVEL (SM) - loose - slightly firm (crumbles easily in hand), dry, very pale brown (10YR 7/3), f-c, subrounded-subangular, ~30% silt, 15% gravel (f-c, subangular-angular), pyrite present								
33		moderate reaction to 10% HCl gravel increases to 20-25%, slightly firm								
34										
35										
36		6" layer SILT with SAND (ML) - loose, dry, dark olive gray (5Y 3/2), 15-25% sand (mostly f some c, rounded-subangular) very weak reaction to 10% HCl					T = 1018 Rec/Run = 10'/10'			
37		WELL GRADED SAND with GRAVEL (SW) - loose, dry, brown (10YR 5/3), f-c (mostly m), subrounded-angular, lots of mica/pyrite specs, 45% gravel (f-m, angular-subangular), 45% silt, most small (f) gravel is feldspar moderate reaction to 10% HCl few 3-5" cobbles								
38		gravel increases to m-c, few 3-5" cobbles silt increases to 5-10%								
39										
40		with GRAVEL SILTY SAND (SM) - SAA silt increases to 30-35% moderate reaction to 10% HCl					HS = 3.6			

PROJECT

Atlas "D" Missile Site 4

HOLE NO.

MW105

ENG FORM 5056-R, AUG 94

(Proponent: CECW-EG)



## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW105

PROJECT

INSPECTOR

SHEET

SHEETS

Atlas "D" Missile Site 4

J. KINKADE

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OF

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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.
40		6.7" cobble					
41		with sand					
41.5-42.5		SILT (ML) - loose, dry, olive gray (5Y 5/2), 15-25% sand (f-c (mostly coarse), subangular- angular) 5-10% gravel (f-m-c, subangular) weak reaction to 10% HCl					
42							
43		LEAN CLAY (CL) - weak, soft, dry, very pale brown (10YR 8/2) low-med. plasticity, ~5% sand (f-m, subrounded- subangular) weak-moderate reaction to 10% HCl					
44							
44.5		4" layer mottled with dark gray (2.5Y 4/1)					
45							T = 1038 Rec/Run = 10'/10'
46		SILTY SAND with GRAVEL (SM) - loose, dry, light yellowish brown (10YR 6/4) f-c, subrounded-angular, ~30% silt, 15-20% gravel (f-c, mostly f, subrounded-subangular), small caliche nodules present weak reaction to 10% HCl					
47							
48		Silt decreases to 15-25%					
49							
50			HS = 6.9				

PROJECT

Atlas "D" Missile Site 4

HOLE NO.

MW105

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW105

PROJECT		INSPECTOR					SHEET	SHEETS
Atlas "D" Missile Site 4		J. KINKADE					7	21
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS	
a.	b.	c.	d.	e.	f.	g.	h.	
	50	SAA.						
	51	transitions to SANDY SILT (ML) - very weak reaction to 10% HCl						
	52							
	53	gravel becomes f-m yellowish brown (10% HCl) no reaction to 10% HCl						
	54							
	55							
	56	WELL GRADED SAND with SILT and GRAVEL (SW-SM) - loose, yellowish brown (10% HCl) moist (probably drill fluid), f-C, subrounded - subangular, 5-15% silt, ~15-20% gravel (mostly f some C, 3-5" cobbles, subrounded - angular), pyrite/mica specs present no reaction to 10% HCl					T = 1100 Rec/Run = 10'/10'	
	57	silt increases						
	58	SILTY SAND with GRAVEL (SM) - loose, dry, yellowish brown (10% HCl) f-C, subrounded - subangular, 20-30% silt, 15-25% gravel (mostly f some m + C, subrounded - angular weak reaction to 10% HCl						
	59							
	60		HS = 4.9					

PROJECT

Atlas "D" Missile Site 4

HOLE NO.

MW105

ENG FORM 5056-R, AUG 94

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW105

PROJECT		INSPECTOR					SHEET	SHEETS
Atlas "D" Missile Site 4		J. KINKADE					8	21
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS	
a.	b.	c.	d.	e.	f.	g.	h.	
60		SAA.						
		4" layer of silty gravel (f-c)						
61								
62		SILTY CLAY/CLAYEY SILT (CL-ML) - very soft, slightly moist, yellowish brown (10YR 5/6), non-very low plasticity, 40-60% silt no reaction to 10% HCl					probable contact with White River Formation @ 62'	
63								
		becomes firm						
64								
		becomes hard, modulus of v. hard						
65								
		silt increases					T=1115	
66		ver weak reaction to 10% HCl					Re/Run = 10'/10'	
67		6" layer of very hard SILTSTONE, dry, light yellowish brown (2.5Y 6/4) moderate reaction to 10% HCl						
		becomes wet, soft, sand increases to 5-10% (f-c, subrounded)					possible water table @ 67.5	
68		some <sup>W.F.</sup> nodules of v. hard sandy SILTSTONE med plasticity						
		sand increases						
69		SILTY/CLAYEY SAND (SM/SC) - soft with v. hard pockets, moist, yellowish brown (10YR 5/4) f-m, rounded - subrounded, <sup>W.F.</sup> 30-40% 20-30% silt/clay no reaction to 10% HCl						
70			HS=6.2		FEW4-MW105-(69.0)			

PROJECT  
Atlas "D" Missile Site 4

HOLE NO.

MW105

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW105

PROJECT Atlas "D" Missile Site 4			INSPECTOR J. KINKADE				SHEET 9 OF 21	
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.	
	70	S.A.A. 1-2" clasts of SANDY SILTSTONE						
	71							
	72	becomes wet, ~30% silt						
	73	6" layer v. hard						
	74	~30-35% silt						
	75						T=1300 Rec/Run = 6/10'	
	76							
	77							
	78							
	79							
	80							

NO RECOVERY (NR)

HS=3.5

FEW4-MW105-(79.0)

91547 1071652 MW105 119 1020  
9201 611 0501 2591 L01 L651 b



## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW105

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

SHEETS

10 OF 21

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
80		GRAVELLY SILTY CLAY/CLAYEY SILT (CL/ML) - soft with v. hard nodules, wet 30-35% gravel (f-C, subrounded Angular)					
81		weak-moderate reaction to 10% HCl					
82		SILTY/CLAYEY SAND <del>with</del> GRAVEL (SM/SC) - firm-very hard, moist-wet, yellowish brown (10YR 5/4) mostly f some m + c, subrounded-subangular, ~25-35% silt/clay, f-m <del>silt</del> gravel sized siltstone/sandstone (~15-20%), magnesium oxide present weak-moderate reaction to 10% HCl					
83							
84							
85							
86		S.A.A. ~5% gravel (f) increasing (subrounded-subangular)					T=1520 Rec/run = 10'/10'
87							
88		10-15% f-m gravel					
89		trace gravel, very hard SILTSTONE clasts moderate-strong reaction to 10% HCl			FEW4-MW105-(89.0) FEW4-MW105-(89.0)-FO		
90			HS=2.6				

PROJECT

Atlas "D" Missile Site 4

HOLE NO.

MW105

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW105

PROJECT

INSPECTOR

SHEET

SHEETS

Atlas "D" Missile Site 4

J. KINKADE

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OF

21

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
90							
91		SANDY LEAN CLAY (CL) - firm - hard with v. hard SILTSTONE/CLAYSTONE clasts, wet, pale brown (10YR 6/3), med plasticity, ~30% sand (f-m, subrounded-subangular) weak-moderate reaction to 10% HCl					
92		sand increases to ~50% ~25% gravel (f) becomes light olive brown (2.5Y 5/3)					
93		increasing sand & gravel					
93-94.5		CLAYEY GRAVEL with SAND (GC) - loose, wet, yellowish brown (10YR 5/6), mostly f and m, some c, subangular-subrounded, ~15% clay (low-med plasticity), 20-30% sand (mostly c, some m and f, rounded-subangular), moderate reaction to 10% HCl					
94		Some strongly cemented conglomerate clasts (f gravel, matrix supported)					
		SANDY LEAN CLAY (CL) - S.A.A. @ 91'					
95		sand decreases					
		SILTY CLAY (CL) - firm-hard, wet-moist, yellowish brown (10YR 5/4) low plasticity, easily broken apart by hand some SILTSTONE/CLAYSTONE clasts (very hard), ~5% sand (fine, subrounded) no reaction to 10% HCl					T = 1555 Rec/Run = 25'/25'
96		2 1" lenses of very hard SILTSTONE					
97							
98							
99							
100							
			HS = 11.3		FEW4-MW105-(99.0)		

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW105

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW105

PROJECT		INSPECTOR					SHEET		SHEETS	
Atlas "D" Missile Site 4		J. KINKADE					12		OF 21	
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS			
a.	b.	c.	d.	e.	f.	g.	h.			
	100	SAA					Run = 95' - 120'			
	101									
		trace sand								
	102									
	103									
	104	becomes wet Very weak reaction to 10% HCl								
	105									
	106	~ 5% sand (f, subrounded - rounded)								
	107	trace sand magnesium oxide present moderate reaction to 10% HCl								
	108									
	109	becomes hard NO reaction to 10% HCl					FEW4-MW105-(109.0) FEW4-MW105-(109.0)-MS FEW4-MW105-(109.0)-MSD			
	110		HS = 11.8							

PROJECT  
Atlas "D" Missile Site 4

HOLE NO.

MW105

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW105

PROJECT			INSPECTOR				SHEET		SHEETS	
Atlas "D" Missile Site 4			J. KINKADE				13		OF 21	
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS			
a.	b.	c.	d.	e.	f.	g.	h.			
110		S.A.A. , moist					Run = 95' - 120'			
111		med. plasticity								
112										
113		1" lens of very hard siltstone								
114										
115										
116										
117		117-117.5 gravel 10%, mostly f with few C, subrounded - angular sand is 5-10%, f - C, subrounded - subangular moderate - strong reaction to 10% HCl no gravel sand increases								
118		SANDY LEAN CLAY (CL) - firm, wet, yellowish brown (10% 5/6), low plasticity, ~30% sand (f - C, mostly ms, subangular - angular) no reaction to 10% HCl								
119		sand decreases					FEW4-MW105-(119.0)			
120		158	HS = 9.1				End of drilling for 7-8-21			



## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW105

PROJECT		INSPECTOR				SHEET	SHEETS
Atlas "D" Missile Site 4		J. KINKADE				14	OF 21
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
120		SAA. sand decreasing ↓					7-9-21 T=0805 Rec/Ron=25'/25'
121		SILTY CLAY (CL) - firm, very moist, yellowish brown (10xR 5H), low-med plasticity, ~5% sand (f-m) very weak reaction to 10% HCl					
122		1" layer of v. hard siltstone					
123		123-123.5 5-10% gravel (f-m, subround-subangular) 5% sand (m-c, subangular-angular) moderate-strong reaction to 10% HCl					
124							
125							
126		becomes wet <del>5-10%</del> <sup>5-10%</sup> sand					
127		magnesium oxide present NO reaction to 10% HCl					
128		2" lens of SILTSTONE  no sand very moist					
129					FEW4-MW105-(129.0)		
130			HS=5.6				

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW105

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW105

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

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SHEETS

OF 21

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
	130	S.A.A. magnesium oxide present					Rm = 120'-145'
	131						
	132	SANDY LEAN CLAY (CL) - firm-hard, moist-very moist, light olive brown (2.5Y 5/3), low plasticity, 30-35% sand (m-c, subrounded-subangular), <5% f gravel strong reaction to 10% HCl					
	133	some very hard SANDY SILTSTONE/CLAYSTONE LENSES, strongly cemented, matrix supported, m-c sand					
	134						
	135	2" SILTSTONE LENS					
	136						
	137	SAND decreases					
	138	SILTY CLAY (CL) - soft-firm with very hard nodules, moist-very moist, light olive brown (2.5Y 5/2), low-med plasticity, very weak reaction to 10% HCl					
	139				FEW4- MW105- (139.0)		
	140		HS=10.7				

PROJECT

Atlas "D" Missile Site 4

HOLE NO.

MW105

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW105

PROJECT			INSPECTOR				SHEET		SHEETS	
Atlas "D" Missile Site 4			J. KINKADE				16		OF 21	
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS			
a.	b.	c.	d.	e.	f.	g.	h.			
140		S.A.A.  becomes wet					Run=120-145'			
141										
142		3" Very hard SILTSTONE/CLAYSTONE LAYER 142-142.5 20-30% gravel (f-m, subangular-subrounded), 15% m-c sand magnesium oxide present, moderate-strong reaction to 10% HCl 1 4-5" cobble								
143		142.5- SANDY SILTY CLAY (CL) - soft-firm, moist, low plasticity, brown (10YR 5/3), 30-35% sand (m-c, subround-angular) 45% gravel (f), some v. hard SANDY CLAY clasts weak reaction to 10% HCl								
144		1" SILTSTONE/CLAYSTONE LAYER 144-144.5 5-10% gravel (f-m, subrounded-subangular), weak reaction to 10% HCl SILTY CLAY (CL) - firm-hard, moist, light olive brown (2.5Y 5/3) low plasticity, magnesium oxide present weak reaction to 10% HCl								
145							T=0835 Rec/Run=15'/15'			
146		146-146.5 5-10% f-m gravel (subrounded)								
147		becomes wet								
148										
149							FEW4-MW105- (149.0)			
150			HS=2.9							

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW105

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE MW105

PROJECT Atlas "D" Missile Site 4				INSPECTOR J. KINKADE			SHEET 17	SHEETS OF 21
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.	
150		S.A.A.					Run = 145'-160'	
		150.5 V. hard SILTY CLAY LENS (several hammer blows to break)						
151								
152								
153		2" V. hard SILTSTONE/CLAYSTONE, <sup>silt</sup> strong reaction to 10% HCl 153-153.5 10-15% f-c gravel, subrounded sand increases to 5% (m-c, subround-sub angular)						
154		154.5-155 5-10% f-c gravel, subround-subangular very weak reaction to 10% HCl						
155								
156		POORLY GRADED SAND WITH SILT (SP-SM) - soft, wet, yellowish brown (10% R 5/6), m-c, subround-rounded, 10-15% silt; magnesium oxide present NO reaction to 10% HCl some V. hard nodules						
157								
158								
159		V. hard SILTSTONE clasts weak reaction to 10% HCl silt is 15%						
160			HS = 3.7		FEW4- MW105- (159.0)			



## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW105

PROJECT Atlas "D" Missile Site 4			INSPECTOR J. KINKADE				SHEET 18 OF 21	
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.	
160		S.A.A.					T=0905 REG/Run=29/20	
161		2.5" SILTSTONE/CLAYSTONE layer						
162		some very hard SANDY SILTSTONE clasts						
163		possible fracture in 4" SILTSTONE layer						
164		2" SILTSTONE/CLAYSTONE layer						
165		SILTY CLAY (CL) - soft-firm, moist, olive (5Y 5/3), low-med plasticity, vs sand (f-c, subrounded) moderate-strong reaction to 10% HCl						
166		becomes yellowish brown (10YR 5/6)						
167		3 1" CLAYSTONE/SILTSTONE layers with 1/2" SILTY CLAY between (moderate - strong reaction to 10% HCl)						
168								
169							FEW4-MW105-(169.0) FEW4-MW105-(169.0)-FD	
170			HS=6.2					

(CONTINUATION SHEET)

HOLE  
MW105

PROJECT	INSPECTOR	SHEET	SHEETS
Atlas "D" Missile Site 4	J. KINKADE	19	21

ELEV.	DEPTH		DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
	a.	b.						
	170		S.A.A. becomes light yellowish brown (10yr 6/4) very weak - no reaction to 10% HCl					Run = 160' - 180'
	171		moist - wet					
	172		becomes firm - hard no reaction to 10% HCl					
	173		wet					
	174		moist					
	175		some very hard parts					
	176		wet					
	177		some v. hard SILTSTONE/CLAYSTONE clasts					
	178							
			1" v. hard SILTSTONE/CLAYSTONE layer					
	179		5" very hard SILTSTONE/CLAYSTONE layer					
						FEW4-MW105- (179.0)		
	180		WS = 5.0					

PROJECT  
Atlas "D" Missile Site 4  
ENG FORM 5056-R, AUG 94

HOLE NO. MW105  
(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE  
MW105  
SHEET 20 OF 21 SHEETS

PROJECT		INSPECTOR					HOLE	
Atlas "D" Missile Site 4		J. KINKADE					MW105	
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS	
a.	b.	c.	d.	e.	f.	g.	h.	
190		S.A.A. becomes very wet mostly soft-firm, some v. hard nodules/clasts moderate reaction to 10% HCl					T=0955 Rec/Run=14/14	
181								
182								
183								
184		weak-moderate reaction to 10% HCl						
185		no reaction to 10% HCl						
186								
187		becomes moist no reaction to 10% HCl						
188								
189								
190			HS=5.8		FEW4-MW105- (189.0)			

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE  
MW105

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET  
21 OF 21 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.
	190	SAA. no reaction to 10% HCl					Run = 180'-194'
	191	becomes wet no reaction to 10% HCl					
	192						
	193						
	194	BOTTOM OF BORING @ 194' bgs					
	195						
	196						
	197						
	198						
	199						
	200						

PROJECT

Atlas "D" Missile Site 4

HOLE NO.

MW105

ENG FORM 5056-R, AUG 94

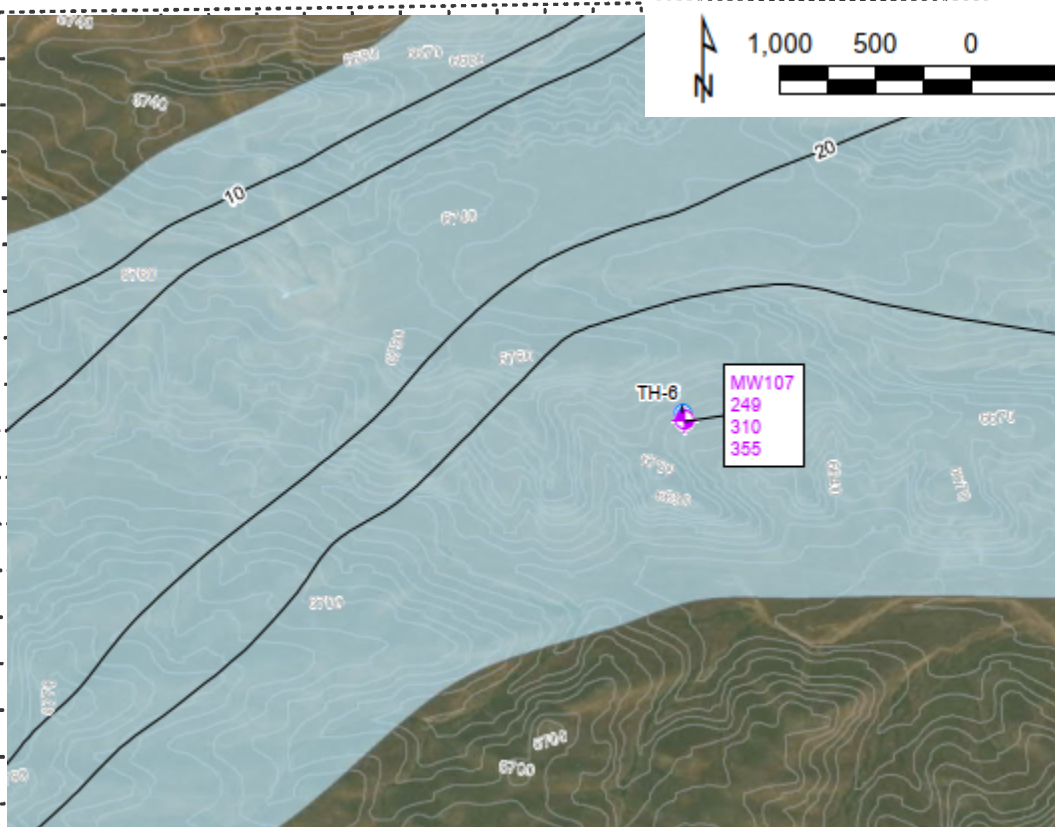
(Proponent: CECW-EG)



<b>HTRW DRILLING LOG</b>		DISTRICT USACE - Omaha District		HOLE NUMBER <b>MW107</b>	
1. COMPANY NAME URS Group, Inc.		2. DRILLING SUBCONTRACTOR Yellow Jacket Drilling Services, Inc.		SHEET 1 OF 40 SHEETS	
3. PROJECT Atlas "D" Missile Site 4			4. LOCATION Laramie County, WY		
5. NAME OF DRILLER <b>CHRIS HILL</b>			6. MANUFACTURER'S DESIGNATION OF DRILL TSI 150T Sonic Rig		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT		Sonic Drill Rig		8. HOLE LOCATION <b>~ 40 ft. SSE of TH6</b>	
7-in. inner diameter (I.D.) core barrel (20-ft) <b>148'-390' bgs</b>		9. SURFACE ELEVATION <b>6700</b>			
8-in. I.D. drill casing					
<b>8-in. I.D. CORE BARREL (20-ft) 0-148' bgs</b>		10. DATE STARTED <b>6-23-21</b>		11. DATE COMPLETED <b>6-29-21</b>	
12. OVERBURDEN THICKNESS ( <b>Ogallala</b> ) <b>357'</b>		15. DEPTH GROUNDWATER ENCOUNTERED <b>152.5 ft. bgs</b>			
13. DEPTH DRILLED INTO <del>ROCK</del> <b>WHITE RIVER FORMATION:</b> <b>33'</b>		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <b>NA</b>			
14. TOTAL DEPTH OF HOLE <b>390 ft. bgs</b>		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <b>NA</b>			
18. GEOTECHNICAL SAMPLES		DISTURBED <b>NA</b> <b>YES</b> <b>NA</b>		UNDISTURBED <b>NA</b>	
19. TOTAL NUMBER OF CORE BOXES <b>NA</b>					
20. SAMPLES FOR CHEMICAL ANALYSIS <b>NA</b>		VOC		METALS	
		OTHER (SPECIFY)		OTHER (SPECIFY)	
22. DISPOSITION OF HOLE		BACKFILLED		MONITORING WELL	
		<b>NESTED</b>			
		23. SIGNATURE OF INSPECTOR <b>JON KINKADE</b> <i>[Signature]</i>		21. TOTAL CORE RECOVERY <b>65%</b>	

LOCATION SKETCH/COMMENTS

SCALE:



PROJECT

Atlas "D" Missile Site 4

HOLE

**MW107**

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT			INSPECTOR				SHEET	SHEETS
Atlas "D" Missile Site 4			J. KINKADE				2	OF 40
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS	
a.	b.	c.	d.	e.	f.	g.	h.	
	0	WELL-GRADED SAND (SW) - loose, dry, yellowish brown (10YR 5/6), f-c, rounded-subangular <5% silt, 5% gravel (f-c) subangular-subrounded moderate reaction to 10% HCl					TIME(T) = 1015 RECOVERY/RUN (REC/RUN) = 5'/5'	
	1						DRILLING WITH 8" CORE BARREL	
	2							
	3	few 3" cobbles strong reaction to 10% HCl						
	4	same as above (SAA) SAA. Gravel increases to 10-15% (f-m)						
	5	5-6.5 WELL-GRADED SAND WITH CLAY (SW-SC) (SW-SC) slightly moist, yellowish brown (10YR 5/6), sand is vf-c (sub rounded-sub angular) 10-15% clay (low plasticity), 5% gravel (f-m) strong reaction to 10% HCl					T = 1020 Rec/RUN = 10'/10'	
	6	WELL-GRADED SAND WITH GRAVEL (SW) - loose, dry, light yellowish brown (10YR 6/4), f-vc, rounded-subangular, 15% gravel (f-m, rounded-subrounded)						
	7	no reaction to 10% HCl						
	8							
	9							
	10							

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT			INSPECTOR				SHEET		SHEETS	
Atlas "D" Missile Site 4			J. KINKADE				3		OF 40	
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS			
a.	b.	c.	d.	e.	f.	g.	h.			
	10	SAA.								
	11									
	12									
	13	WELL GRADED SAND (SW) - loose, dry, yellowish brown (10YR 5/6), f-VC, subrounded-subangular, 5% gravel (f, subrounded)								
	14									
	15	SAA sand is vf-VC, gravel increases to 10% (f-m)					T = 1030			
	16	moderate reaction to 10% HCl					Rec/Run = 10/10'			
	17									
	18									
	19	few 3" cobbles								
	20	gravel increases to 20%								

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE  
MW107

PROJECT Atlas "D" Missile Site 4				INSPECTOR J. KINKADE			SHEET 4 OF 40	
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.	
	20							
	21	SANDY SILT (ML) - med. dense, dry, yellowish brown (10YR 5/4), 30% sand (vt-m, subrounded)						
	22	moderate reaction to 10% HCl						
	23	weak reaction to 10% HCl						
	24	(24-25') few caliche pockets						
	25	25-26 becomes very pale brown (10YR 8/2), few siltstone clasts (several hammer blows to break) & hard						T = 1045 Rec/run = 10'/10'
	26	weak reaction to 10% HCl						
	27	no reaction to 10% HCl						
	28							
	29							
	30	increasing sand ~ 50%						



## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE MW107

PROJECT		INSPECTOR				SHEET		SHEETS	
Atlas "D" Missile Site 4		J. KINKADE				5		OF 40	
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS		
a.	b.	c.	d.	e.	f.	g.	h.		
30									
31									
32		SILTY SAND (SM) - med dense, dry, yellowish brown (10YR 5/6), v-f-f, rounded-subrounded, 30-45% silt (31.5-33') increased clay 10%, low plasticity no reaction to 10% HCl							
33									
34									
35		SAA 30% silt 10% clay, low plasticity trace gravel (f-m) subrounded weak-moderate reaction to 10% HCl					T = 1105 Rec/Run = 10'/10'		
36									
37		some v. hard siltstone/sandstone clasts							
38									
39									
40									

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT			INSPECTOR				SHEET		SHEETS	
Atlas "D" Missile Site 4			J. KINKADE				6		OF 40	
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS			
a.	b.	c.	d.	e.	f.	g.	h.			
40										
	40.5	one large conglomerate clast (7"+) cored through								
41		weak - moderate reaction to 10% HCl								
42										
43										
44		WELL-GRADED SAND with SILT (SW-SM) - low-density/loose, dry, yellowish brown (10YR 5/6) v-f-VC, subrounded-subangular, 5% gravel (f, subrounded) silt 15-20%								
45							T=1130 Rec/run = 19/10'			
46										
		no reaction to 10% HCl								
47		decreasing silt								
48		WELL-GRADED SAND (SW) - loose, dry, yellowish brown (10YR 5/6), f-VC subangular-subrounded, 5-10% gravel (f) rounded-subrounded								
49										
50										

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW107

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT			INSPECTOR				SHEET	SHEETS
Atlas "D" Missile Site 4			J. KINKADE				7	OF 40
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS	
a.	b.	c.	d.	e.	f.	g.	h.	
50		SAA.						
51								
52		Weak reaction to 10% HCl						
53		gravel increases to 15% WELL-GRADED SAND with GRAVEL (SW) SAA. pale brown (10YR 6/3) 15% gravel (f-m) rounded-subangular few 2" clasts						
54		becomes strong brown (7.5YR 5/4) Weak - moderate reaction to 10% HCl						
55		WELL-GRADED SAND (SW) - loose, dry, light yellowish brown (10YR 6/4), v-f-c subrounded-subangular, trace f. gravel (subrounded)					T = 1240 Rec/Run = 10'/10'	
56		Weak - moderate reaction to 10% HCl						
57								
58		WELL-GRADED SAND with SILT (SW-SM) - med dense - med hard, dry, light yellowish brown (10YR 6/4), f-c, rounded-subrounded, 10-15% silt						
59		Moderate - strong reaction to 10% HCl						
60								

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT			INSPECTOR				SHEET		SHEETS	
Atlas "D" Missile Site 4			J. KINKADE				8		OF 40	
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS			
a.	b.	c.	d.	e.	f.	g.	h.			
60		SAA.								
61										
62		increasing gravel <5%								
63										
64		5-10%								
65		10% f gravel (subrounded-subangular)								
66		WELL-GRADED SAND WITH GRAVEL (SW) - loose, dry, light yellowish brown (10YR 6/4) f - VC, subrounded-subangular, 15% gravel (f, subrounded-angular), 5% silt, few well cemented conglomerate clasts Weak - moderate reaction to 10% HCl					T = 1300 Roc/run = 10'/10'			
67										
68		(67.5-69') <sup>SAA</sup> becomes very pale brown (10YR 7/3) 2 3-4" cobbles								
69		gravel increases to 15-20%								
70										

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT

INSPECTOR

SHEET

SHEETS

Atlas "D" Missile Site 4

J. KINKADE

9

OF 40

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEO TECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
70		SAA gravel becomes f-C with few 3-5" cobbles one well cemented conglomerate with magnesium oxide dendrites					
71							
72							
73							
74							
75		Weak reaction to 10% HCl					T=1340 Rec/Run = <del>10'</del> 10'/10'
76		core through 74 well cemented conglomerate cobble/clast, matrix supported, f gravel					top 2 ft. was stuck in core barrel, recovered before continued drilling
77		SAA. 2 3" cobbles Strong reaction to 10% HCl					JWK
78							
79							
80							

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW107

(Proponent: CECW-EG)



## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT

INSPECTOR

SHEET

SHEETS

Atlas "D" Missile Site 4

J. KINFAD

10

OF

40

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
80		SAA.					
81		weak - moderate reaction to 10% HCl					
82		2 3-5" cobbles					
83							
84		SILTY SAND (SM) - firm, dry, light yellowish brown (10YR 6/4) w/m, rounded-subangular, 20-30% silt, 5-10% gravel (f, subrounded-angular)					
85		moderate reaction to 10% HCl					Drillers stop for repairs / recovered 2 ft. from core barrel
86		16-87 becomes very pale brown (10YR 7/4)					T = 1425 Rec/Run = 10' / 10'
87		SAA - firm - med <sup>juv</sup> hard dense, sand is f-c (subrounded-angular) 10-15% gravel (f, subrounded-angular)					
88							
89							
90							

PROJECT

HOLE NO.

Atlas "D" Missile Site 4

MW107

ENG FORM 5056-R, AUG 94

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT			INSPECTOR				SHEET		SHEETS	
Atlas "D" Missile Site 4			J. KINKADE				11		OF 40	
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS			
a.	b.	c.	d.	e.	f.	g.	h.			
90		SAA gravel becomes f-m (well rounded - sub angular) few coarse gravel clasts								
91										
92										
93										
94										
95		SAA, silt decreases					T=1500 Rec/Run=14'/14'			
96		few well cemented conglomerate clasts								
97		WELL-GRADED SAND(SW) - loose, dry, light yellowish brown (10YR 6/4), f-VC, rounded sub angular, <5% silt, 10-15% gravel (f, subrounded- sub angular) weak reaction to 10% HCl								
98										
99										
100										

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT			INSPECTOR				SHEET	SHEETS
Atlas "D" Missile Site 4			J. KINKADE				12	OF 40
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS	
a.	b.	c.	d.	e.	f.	g.	h.	
	100	S.A.A.						
	101							
	102	gravel increases to 15%						
	103	gravel becomes f-c, few 3" cobbles						
	104	(104-109') 4 1-2" layers of very fine silt, light gray (10YR 7/1)						
	105							
	106	WELL-GRADED SAND with SILT and GRAVEL (SW-SM), loose, dry, brownish yellow (10YR 6/6), f-vc, rounded-subangular, 5-10% silt, 15% gravel (f-m, rounded-subrounded) very weak reaction to 10% HCl						
	107							
	108							
	109	S.A.A. one 4-5" cobble					END DRILLING @ 1535 for 6-23-21 T = 6/24/21 0755 Rec/Run = 12'/12'	
	110							

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE MW107

PROJECT			INSPECTOR			SHEET		SHEETS	
Atlas "D" Missile Site 4			J. KINKADE			13		OF 40	
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS		
a.	b.	c.	d.	e.	f.	g.	h.		
	110	S.A.A. gravel becomes f-c					Run = 109' - 121'		
111	112	no reaction to 10% HCl							
112	113								
113	114								
	115								
	116								
	117	3-4" cobble							
	118								
	119	several <sup>small</sup> cemented conglomerate, matrix supported, clasts (1-2") with very fine powdered silt. probably crushed larger cobble/boulder by drilling.							
	120								

PROJECT  
Atlas "D" Missile Site 4

HOLE NO. MW107

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT

INSPECTOR

SHEET

SHEETS

Atlas "D" Missile Site 4

J. KINFADE

14

OF

40

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
	120	S.A.A.					Run = 109' - 121'
	121	becomes med. firm, reddish yellow (5YR 6/6) gravel is f, subrounded-subangular no reaction to 10% HCl					T = 0900 Rec/Run = 13'/13'
	122						
	123	SANDY SILT (ML) - med firm, dry, grayish brown (10YR 5/2), 30% sand (f-vc, subrounded-angular), <5% gravel (f, rounded-subrounded) weak reaction to 10% HCl					
	124	WELL-GRADED SAND with SILT and GRAVEL (SW-SM) - loose-med. firm, dry, yellowish red (5YR 5/6), f-vc, rounded-subangular, 10-15% silt, 15% gravel (f-c, subrounded-angular), some weakly cemented conglomerate clasts					
	125	1 3-4" cobble no reaction to 10% HCl					
	126	silt decreases to 5-10%, gravel is f					
	127						
	128	SANDY SILT (ML) - med. firm, dry, grayish brown (10YR 5/2), 25-35% sand (f-vc, subrounded-angular), 5% gravel (f, rounded-subrounded)					
	129	no reaction to 10% HCl					
	130						

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW107

(Proponent: CECW-EG)



## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

SHEETS

15 OF 40

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
130		WELL-GRADED SAND with GRAVEL (SW) - loose, dry, yellowish red (5YR 5/6), f-VC, subrounded-subangular, <5% silt, 20-30% gravel (f, rounded-subangular)					Run=121'-134'
131		gravel size increases from 6"					
		NO reaction to 10% HCl					
132		2 3" cobbles					
133							
134							
		f-m					
135							T=1025 Rec/run=8'8" drilled to 144', lost 2' on the way out (down hole)
136		SILT with GRAVEL (ML) - loose, dry, brown (10YR 5/3), 15% gravel (f, rounded-subrounded), 10% sand (f-VC, subrounded-subangular)					
137		NO reaction to 10% HCl					
138		WELL GRADED SAND with GRAVEL (SW) - loose, dry, reddish brown (5YR 5/4), vf-VC subrounded-subangular sand is mostly VC, 30-40% gravel (vf-f) subrounded to subangular					
139		NO reaction to 10% HCl					
140		weak, JWK					

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW107

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT

INSPECTOR

SHEET

SHEETS

Atlas "D" Missile Site 4

J. KINKADE

16

OF 40

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
140		SILTY SAND with GRAVEL (SM) - loose - med. firm, dry, yellowish brown (10YR 5/6), mottled with silt (grayish brown, 10YR 5/2), f-VC, subrounded - subangular, 15-25% silt, 15% gravel (f, rounded - subangular)					
141		gravel increases from f weak reaction to 10% HCl some well cemented conglomerate clasts					
142		f-c					T = 1125 Rec/run = 3' / 6'
143							Top 3' mixed together and lost in hopper
144							NO RECOVERY (NR)
145		SAA					
146		becomes pale brown (10YR 4/3) SILT with SAND (ML) - loose dry, pale brown (10YR 6/3), 15% sand (f-c, subrounded - subangular), < 5% gravel					
147		weak reaction to 10% HCl					
148							END Drilling @ 1130 for 6-24-21
149							6-25-21 T = 1355 Rec/run = 7' / 10'
150							Drilling with 7" CORE BARREL using water for drilling

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW107

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

SHEETS

17

OF

40

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.

150

151

152

153

154

155

156

157

158

159

160

WELL-GRADED SAND (SW) - loose/slightly firm,  
wet (possibly from drill fluid), strong  
brown (7.5YR 4/6) f-vc, subrounded-  
subangular, 5% silt

SILTY SAND with GRAVEL (SM) - loose,  
wet (possible water table), f-vc,  
subrounded - subangular, 20-25% silt,  
15% GRAVEL (f-c, rounded - subrounded),  
3 3-4" cobbles

SANDY SILT with GRAVEL (ML) - firm, wet  
dark grayish brown (10YR 4/2), 20% sand (m-vc,  
subrounded - angular), 15% GRAVEL (f-m, rounded -  
subrounded), 25% clay (low plasticity)

weak reaction to 10% HCl  
~~sand amount decreases~~ JWK

sand amount decreases 20%  
gravel amount decreases 15%

CLAYEY SILT with SAND (ML/CL) -  
med firm, wet, light brownish  
gray (10YR 6/2), med plasticity  
30-35% clay, 15% sand (f-c),  
subrounded - angular  
strong reaction to 10% HCl  
5% 5-10%

core through 7" well cemented  
conglomerate

Assume similar to above

NR

Run = 148' - 158'

152.5 possible  
water table

NR

6-27-21

T = 1445

Rec/Run = 10'/67'

Almost all  
fines washed  
out due to  
mud system

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW107

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT

INSPECTOR

SHEET

SHEETS

Atlas "D" Missile Site 4

J. KINKADE

18

OF

40

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
	160						Run = 158'-225'
	161						
	162						
	163	All fines washed out due to mud system. little recovery listed below.					
	164						
	165						
	166						
	167						
	168						
	169						
	170						

PROJECT

Atlas "D" Missile Site 4

HOLE NO.

MW107

ENG FORM 5056-R, AUG 94

(Proponent: CECW-EG)

(CONTINUATION SHEET)

SHEET 1918 OF SHEETS 40

INSPECTOR

## Atlas "D" Missile Site 4

J. KINKADE

SHEET

SHEETS

STILL  
10.1.0k



115

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
170							Run = 158' - 225'
171							
172							
173							
174							
175							
176							
177							
178							
179							
180							

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.	
----------	--

MW107

(Proponent: CECW-EG)



## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

32920

SHEETS

OF 40

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
180							Run = 158'-225'
181							
182							
183		All fines washed out due to mud system. little recovery listed below.					
184							
185							
186							
187							
188							
189							
190							

PROJECT

Atlas "D" Missile Site 4

HOLE NO.

MW107

ENG FORM 5056-R, AUG 94

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

2021

SHEETS

OF 40

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
	190						Run = 158' - 225'
	191						
	192						
	193	All fines washed out due to mud system. little recovery listed below.					
	194						
	195						
	196						
	197						
	198						
	199						
	200						

PROJECT

Atlas "D" Missile Site 4

HOLE NO.

MW107

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT

INSPECTOR

SHEET

SHEETS

Atlas "D" Missile Site 4

J. KINKADE

52122 OF

40

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
	200						Run = 158' - 225'
	201						
	202						
	203	All fines washed out due to mud system. little recovery listed below.					
	204						
	205						
	206						
	207						
	208						
	209						
	210						

PROJECT

HOLE NO.

Atlas "D" Missile Site 4

MW107

ENG FORM 5056-R, AUG 94

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE MW107

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINFADE

SHEET

223 OF

SHEETS

40

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
210							Run = 158' - 225'
211							
212		All fines washed out due to mud system. little recovery listed below					
213							
214							
215							
216		many coarse gravels (1.5 ft. JWF in core bag) with some 3-5" cobbles					
217		approximately 5 ft. of JWF strong cemented conglomerate, gravel is f-m-c, broken into 2-6" sections.					
218		1.5 ft. of strongly cemented, very hard SANDSTONE, f-c grained, subrounded-angular, some silt, <5% f-gravel					
219		weak-moderate reaction to 10% HCl					
220							

indeterminate depth

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW107

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE MW107

PROJECT Atlas "D" Missile Site 4			INSPECTOR J. KINKADE				SHEET 24 OF 40 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.	
220							Run = 158'-225'	
221								
222								
223		<p>SANDY SILT (ML) - Hard, chips off with several blows from chisel end of hammer, moist, Moderate cementation</p> <p>brown (7.5 yr 4/3), ~50% sand (f-c, subrounded-subangular), ~50% silt, &lt;5% gravel (f, rounded-subrounded), magnesium oxide dendrites present</p> <p>no reaction to 10% HCl</p>						
224							drilled to 245' will pull up core tomorrow. END 6-27-21	
225							6-28-21 T = 0940 Rec/Run = 12'/70'	
226								
227		All fines washed out due to mud system. Recovery listed below						
228								
229								
230								



## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE **MW107**

PROJECT Atlas "D" Missile Site 4			INSPECTOR <b>J. KINCADE</b>				SHEET <b>25</b> OF <b>40</b> 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.	
	<b>230</b>						<b>Run = 225' - 295'</b>	
	<b>231</b>							
	<b>232</b>	All fines washed out due to mud system. Recovery listed below						
	<b>233</b>							
	<b>234</b>							
	<b>235</b>							
	<b>236</b>							
	<b>237</b>							
	<b>238</b>							
	<b>239</b>							
	<b>240</b>							

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

26

SHEETS

OF 40

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
	240						Run = 225' - 245'
	241						
	242	All fines washed out due to mud system. Recovery listed below.					
	243						
	244						
	245						
	246						
	247						
	248						
	249						
	250						

NR

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW107

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE **MW107**

PROJECT		INSPECTOR					SHEET		SHEETS	
Atlas "D" Missile Site 4		<b>J. KINCADE</b>					<b>27</b> OF		<b>40</b>	
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS			
a.	b.	c.	d.	e.	f.	g.	h.			
	<b>250</b>						<b>Run = 225' - 295'</b>			
	<b>251</b>									
	<b>252</b>	<b>All fines washed out due to mud system. Recovery listed below</b>								
	<b>253</b>									
	<b>254</b>									
	<b>255</b>									
	<b>256</b>									
	<b>257</b>									
	<b>258</b>									
	<b>259</b>									
	<b>260</b>									

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT		INSPECTOR		SHEET		SHEETS	
Atlas "D" Missile Site 4		J. KINKADE		28 OF		40	
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
260							Run = 225' - 275'
261							
262		All fines washed out due to mud system. Recovery listed below					
263							
264							
265							
266							
267							
268							
269							
270							

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW107

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE MW107

PROJECT		INSPECTOR		SHEET		SHEETS	
Atlas "D" Missile Site 4		J. KINKADE		29 OF		40	
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
270							Run = 285' - 295'
271							
272							
273							
274							
275							
276							
277							
278							
279							
280							

All fines washed out due to mud system. Recovery listed below.

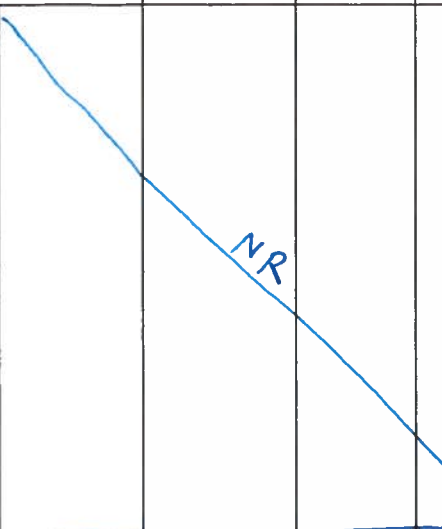
NP



## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE MW107

PROJECT Atlas "D" Missile Site 4			INSPECTOR J. KINKADE				SHEET 30	SHEETS OF 40
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.	
280	280	All fines washed out due to mud system. Recovery listed below.					Run=225'-295'	
281	281							
282	282	1.5 ft. Very hard strongly cemented conglomerate (clasts f-m), 5 ft. SILTY SAND(SM)-hard, moist, brown(7.5yr 4/2), 60-75% sand, vf-m, rounded-subangular, 25-40% silt, magnesium oxide present, weak reaction to 10% HCl ~ 2 ft. coarse gravel (fines washed out) some 3-5" cobbles cored through 1 boulder (3-4" thick, 7" diameter)					moderate	
283	283						indetermined depth	
284	284							
285	285							
286	286							
287	287							
288	288							
289	289							
290	290							

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE MW107

PROJECT		INSPECTOR					SHEET	
Atlas "D" Missile Site 4		J. KINKADE					31	OF 40
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS	
a.	b.	c.	d.	e.	f.	g.	h.	
290							Run = 228' - 295'	
291		SILTY SAND/SANDY SILT (SM/ML) - Hard with very hard pockets/lenses, moist, yellowish brown (10YR 5/4), 50-60% sand, vf-c, subrounded - subangular, ~40-50% silt, magnesium oxide <del>weak</del> NO reaction to 10% HCl JWK						
292		Sand becomes vf - M						
293								
294								
295							T = 1200 Rec/Run = 18'/20'	
296								
297								
297.5		SILTY SAND with GRAVEL (SM) - hard, moderate cementation, moist, yellowish brown (10YR 5/4), f-c subround-angular, 15-20% gravel (f-c, subrounded - subangular), 20-30% silt					297' - 297.5'	
298		297.5 SILTY SAND (SM) - hard, moist, yellowish brown (10YR 5/4), f-c, subrounded - subangular, 20-35% silt, 5% gravel (f, rounded-angular) weak reaction to 10% HCl						
299		gravel decreases to < 5% becomes hard - very hard <del>sp</del> JWK						
300								

PROJECT  
Atlas "D" Missile Site 4

HOLE NO. MW107

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE MW107

PROJECT		INSPECTOR				SHEET	SHEETS
Atlas "D" Missile Site 4		J. KINKADE				32	OF 40
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
	300	S.A.A.					Rm = 295' - 315'
	301						
	302	sand becomes f-m					
	303						
	304	WELL-GRADED GRAVEL (GW) - Probable fines washed out by drill fluid, loose, wet (drill fluid), f-C, subrounded - subangular					
	305	conglomerate - strong cementation, very hard, f-gravel 305-307', strong reaction to 10% HCl					
	306	conglomerate becomes weakly cemented					
	307	SILTY SAND (SM) - hard, moist, brown (7.5 yr 5/4), vf-f, subrounded - subangular, 30-40% silt, magnesium oxide present throughout run, moderate reaction to 10% HCl					
	308						
	309						
	310	becomes hard - very hard					

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT			INSPECTOR				SHEET	SHEETS
Atlas "D" Missile Site 4			J. KINKADE				33	OF 40
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS	
a.	b.	c.	d.	e.	f.	g.	h.	
310		S.A.A.					Run=295'-315'	
311								
312		~5% clay, very low plasticity weak reaction to 10% HCl						
313								
314		no reaction to 10% HCl						
315		S.A.A. 0% clay					T=1615 Rec/Run=20'/20'	
316								
317								
318		SILT (ML) - hard, moist, yellowish brown (10% S <sub>u</sub> ), 10% Sand (f, subrounded-subangular) magnesium oxide present. weak reaction to 10% HCl						
319								
320								

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW107

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE MW107

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

SHEETS

34 OF 40

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
320		Mottled SILTY SAND / SANDY SILT (SM-ML) - hard-very hard, moist, yellowish brown (10YR 5/4) 30-70% sand (f-c, subrounded - angular) + trace gravel (f-m) subrounded very weak reaction to 10% HCl becomes very hard					Run = 315'-335'
321							
322							
		silt decreases					
323		WELL-GRADED SAND with SILT (SW-SM), firm-hard f-c, rounded-subangular, brown (7.5YR 5/3), moist 10-15% silt, <5% gravel (f, subrounded), ~5% clay (med. plasticity) weak reaction to 10% HCl					
324							
		gravel increases to 5% (f-m) few c gravels					
325		WELL-GRADED SAND (SW) - firm, moist, yellowish brown (10YR 5/4), m-vc, rounded-subangular, <5% silt, 5-10% gravel (f, subrounded) weak reaction to 10% HCl					
326							
327							
		SILT (ML) - hard, moist, brown (7.5YR 5/4), 10-15% sand (f-m, subangular), + trace gravel (f, subrounded) magnesium oxide present no reaction to 10% HCl					
328							
329		clay increases to 5%					
330							

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW107

(Proponent: CECW-EG)



## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT			INSPECTOR				SHEET		SHEETS	
Atlas "D" Missile Site 4			J. KINKADE				35		OF 40	
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS			
a.	b.	c.	d.	e.	f.	g.	h.			
330		SAA, sand increases to 10-25% (Mottled sandier portions)					Run = 3rs'-335'			
331		LEAN CLAY (CL) with <sup>weak</sup> sand & SILT lenses - hard, moist, low plasticity NO reaction to 10% HCl								
332										
333										
334							drill to 355' will pull up tomorrow			
335							END 8-28-21			
336		SILTY SAND (SM) - hard, moist, brown (10YR 5/3), mostly f, 10-15% <sup>fine</sup> m-c, subrounded-subangular, 30-35% silt, magnesium oxide present no reaction to 10% HCl					6-29-21 T = 0940 Rec/Run = 10'/20'			
337										
338										
339		weak-moderate reaction to 10% HCl								
340										

PROJECT  
Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW107

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE MW107

PROJECT		INSPECTOR					SHEET SHEETS	
Atlas "D" Missile Site 4		J. KINKADE					36 OF 40	
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS	
a.	b.	c.	d.	e.	f.	g.	h.	
	340						Run = 335'-355'	
	341	conglomerate - strongly cemented, f-c, grain/clast supported, gravel is well graded, subangular-subrounded						
	342							
	343							
	344	SILTY SAND (SM) - hard-very hard, moist, yellowish brown (10YR 5/4) mostly f, 10-15% m-c, subrounded-subangular, 30-35% silt, ~5% gravel (f-m) subround-subangular, pockets of increased gravel (10-15%) (mostly f)						
	345	strong reaction to 10% HCl						
		Assume SAA.						
	346							
	347							
	348							
	349							
	350							

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT

INSPECTOR

SHEET

SHEETS

Atlas "D" Missile Site 4

J. KINKADE

37

OF

40

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
350		Assume S.A.A.					
351							
352							
353							
354							
355							
356		S.A.A. moderate reaction to 10% HCl					T = 1215 Pec/Run = 33'/35'
357		LEAN CLAY (CL) - hard - very hard, moist, yellowish brown (10YR 5/4), <del>very low</del> <sup>low</sup> plasticity, 5-10% silt weak - moderate reaction to 10% HCl					begin transition to White River Formation
358							
359							
360							

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW107

(Proponent: CECW-EG)

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE MW107

PROJECT Atlas "D" Missile Site 4			INSPECTOR J. KINKADE				SHEET 38 OF 40 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.	
360		SAA					Run = 355'-390'	
361								
362								
363								
364								
365		some CLAYSTONE, very hard moderate - strong reaction to 10% HCl						
366								
367		SILTY SAND (SM) - Very hard, moist, yellowish brown (10YR 5/4), mostly f, ~5% m-c, subrounded-subangular, ~30% silt magnesium oxide present throughout moderate - strong reaction to 10% HCl ↓						
368								
369		core through 2 7+'' cobbles, some gravel (m-c) (gravel at 369.5-370')						
370								

## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE MW107

PROJECT		INSPECTOR				SHEET	SHEETS
Atlas "D" Missile Site 4		J. KINKADE				39	OF 40
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
370		LEAN CLAY (CL) - Very hard, moist, yellowish brown (10YR 5/4), very low-low plasticity, ~5% sand (f, subround-subangular), 10-15% silt, magnesium present throughout ↓ (trace, very small spots)					Run = 355'-396'
371		very weak reaction to 10% HCl					
		becomes light yellowish brown (2.5Y 6/4)					
372		sand decreases to <5%					
373		trace sand, becomes hard					
374							
375							
376		becomes firm-hard, low plasticity, light yellowish brown (2.5Y 6/3)					
		<del>silt decreases to ~5%</del>					
377		becomes wet (water observed on fresh fractures)					
		very weak reaction to 10% HCl					
378							
379		silt decreases to ~5%					
380							



## HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE

MW107

PROJECT

Atlas "D" Missile Site 4

INSPECTOR

J. KINKADE

SHEET

SHEETS

40 OF 40

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.
	380	S.A.A.					Run = 355-390'
	381						
	382	becomes med. plasticity weak reaction to 10% HCl					
	383						
	384	becomes light olive brown (2.5y 5/3) weak reaction to 10% HCl					
	385						
	386						
	387						
	388	few claystone clasts (1-3") very weak reaction to 10% HCl					
	389						
	390	BOTTOM OF BORING @ 390ft. bgs					

PROJECT

Atlas "D" Missile Site 4

ENG FORM 5056-R, AUG 94

HOLE NO.

MW107

(Proponent: CECW-EG)





# Focused Density

COMPANY: URS Group

PROJECT: Atlas Missile Site 4

DATE LOGGED: 16 July 2021

WELL: MW-54B

Colog, Inc.

810 Quail St., Suite E, Lakewood, CO 80215

Phone: (303) 279-0171, Fax: (303) 278-0135

www.colog.com

Natural Gamma

Depth

Near Density

0 CPS 200

1ft:320ft

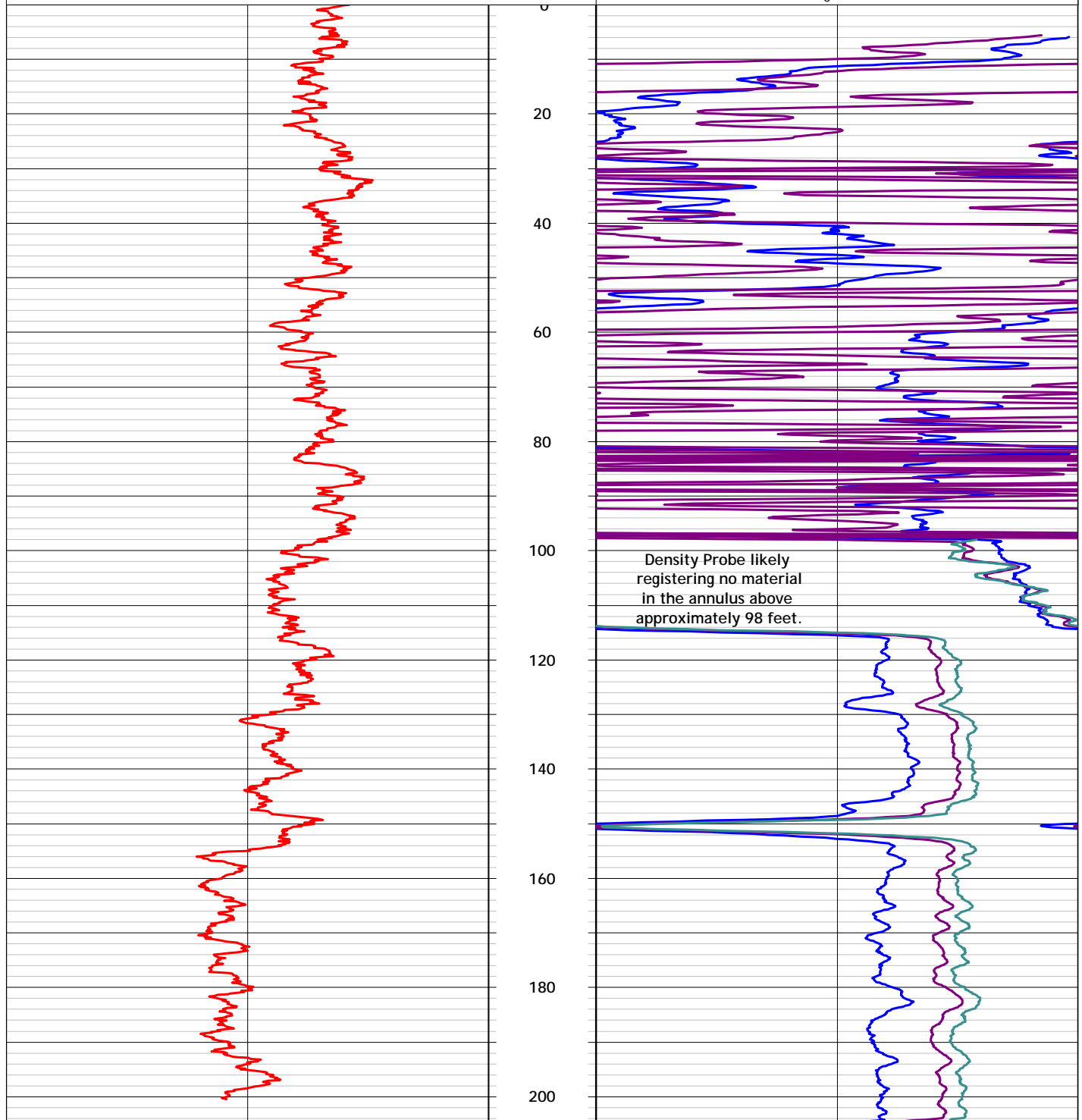
1 g/cc 3

Far Density

1 g/cc 3

Compensated Density

1 g/cc 3





# Dual Neutron

COMPANY: URS Group

PROJECT: Atlas Missile Site 4

DATE LOGGED: 16 July 2021

WELL: MW-54B

Colog, Inc.

810 Quail St., Suite E, Lakewood, CO 80215

Phone: (303) 279-0171, Fax: (303) 278-0135

www.colog.com



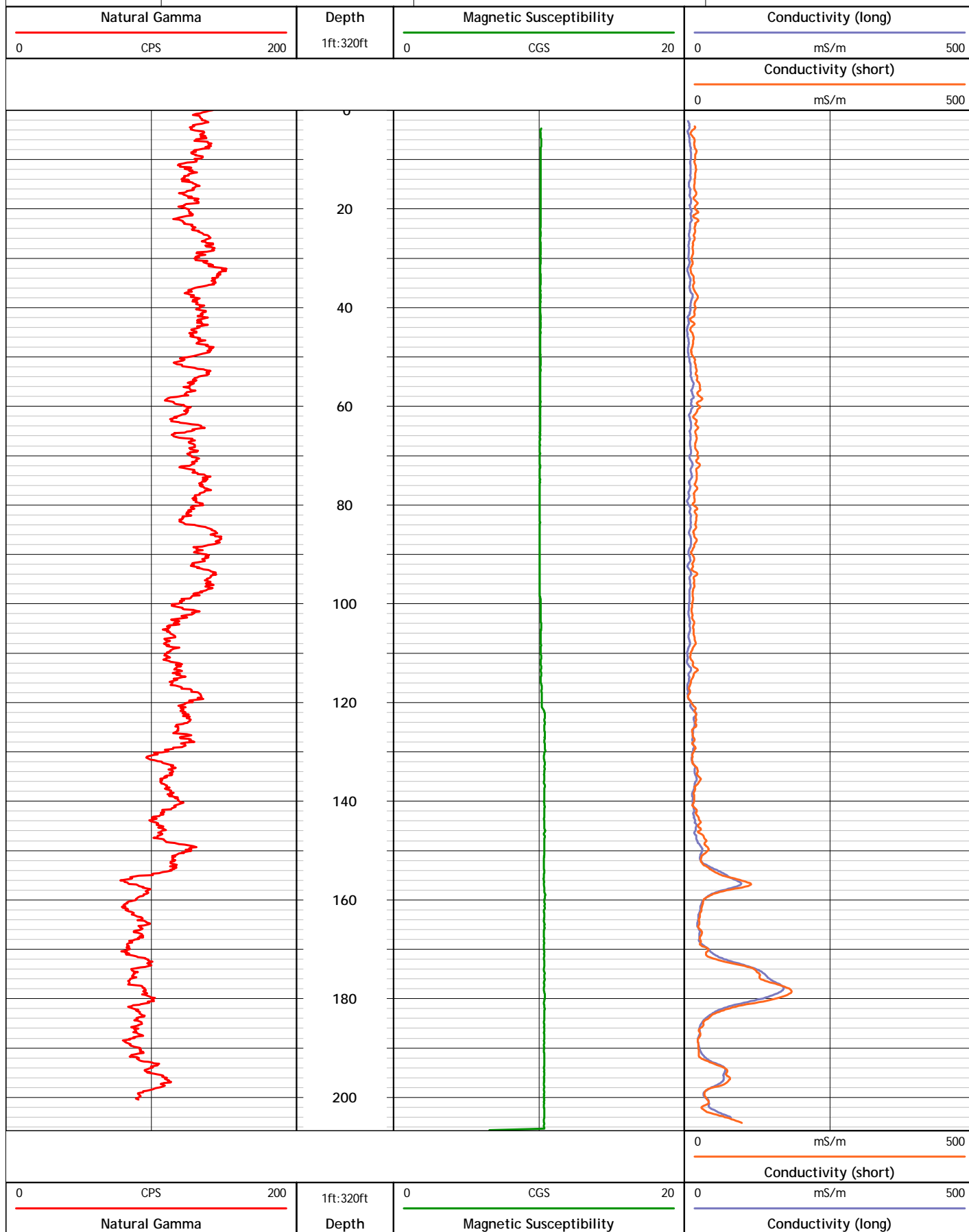




FIGURE MW-54B:1. Ambient Temperature and Fluid Electrical Conductivity; URS Group; Atlas Missile Site 4; Cheyenne, WY; Wellbore: MW-54B

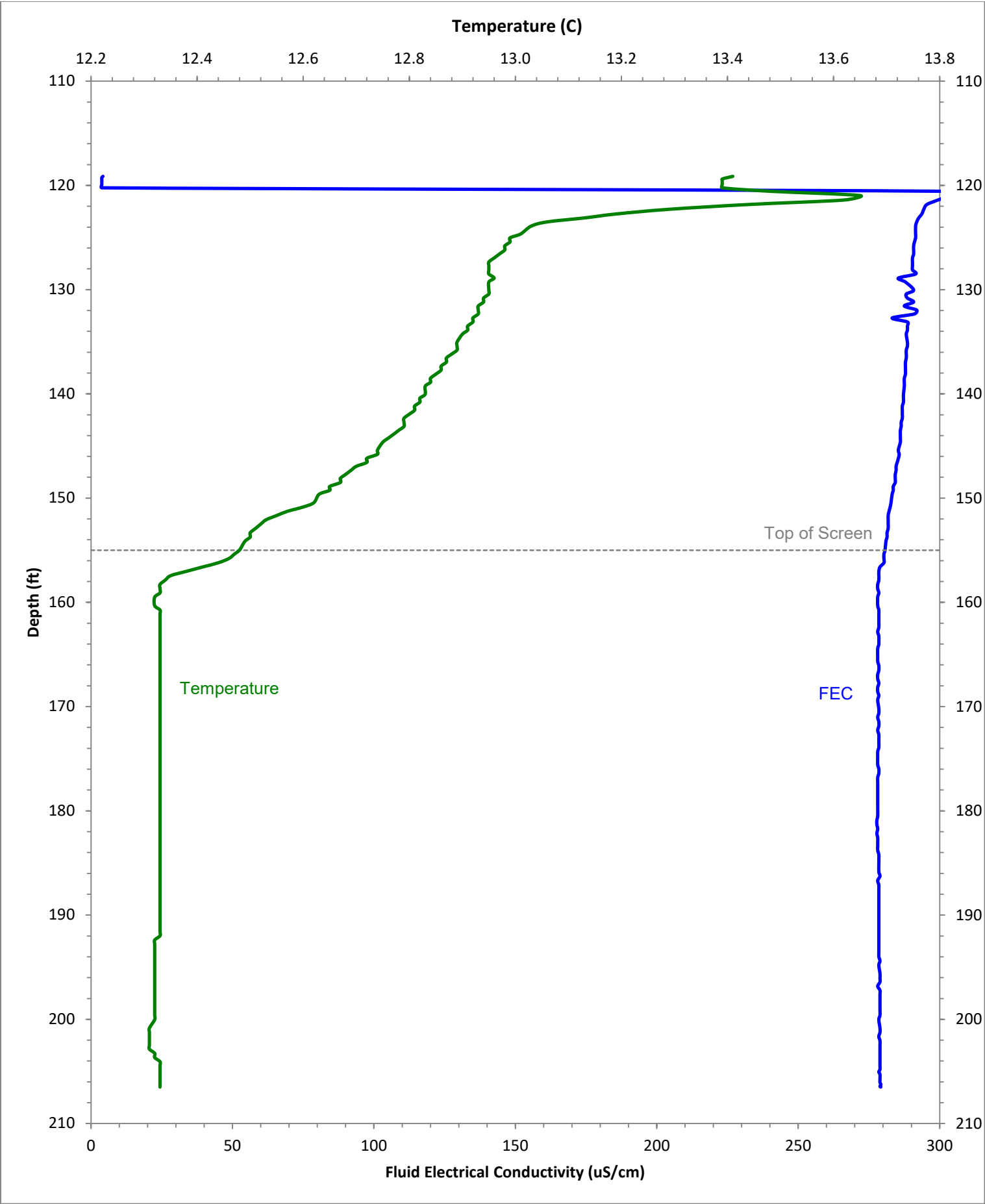


FIGURE MW-54B:2. Summary of Hydrophysical Logs During Ambient Flow Characterization; URS Group; Atlas Missile Site 4; Cheyenne, WY; Wellbore: MW-54B

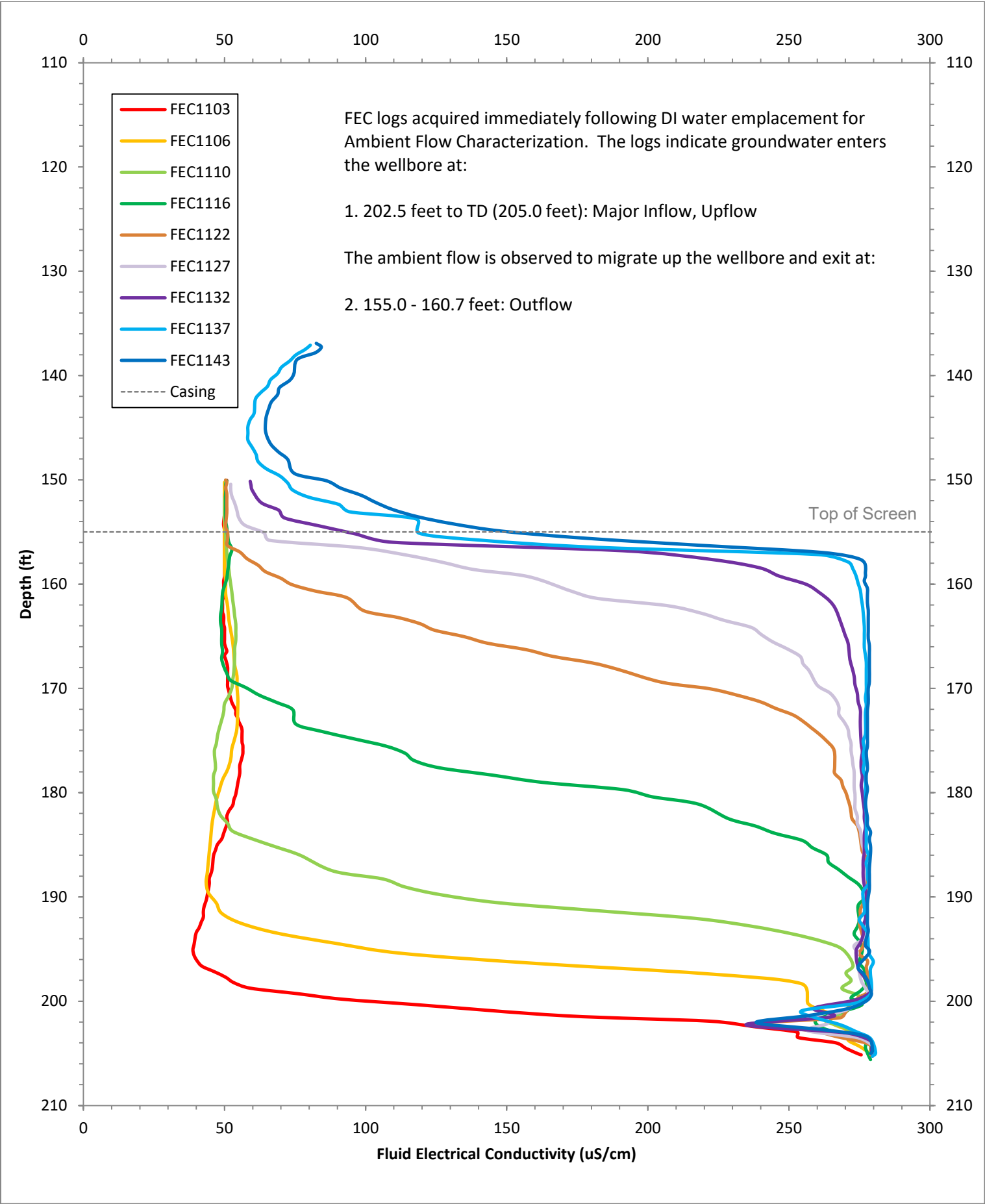
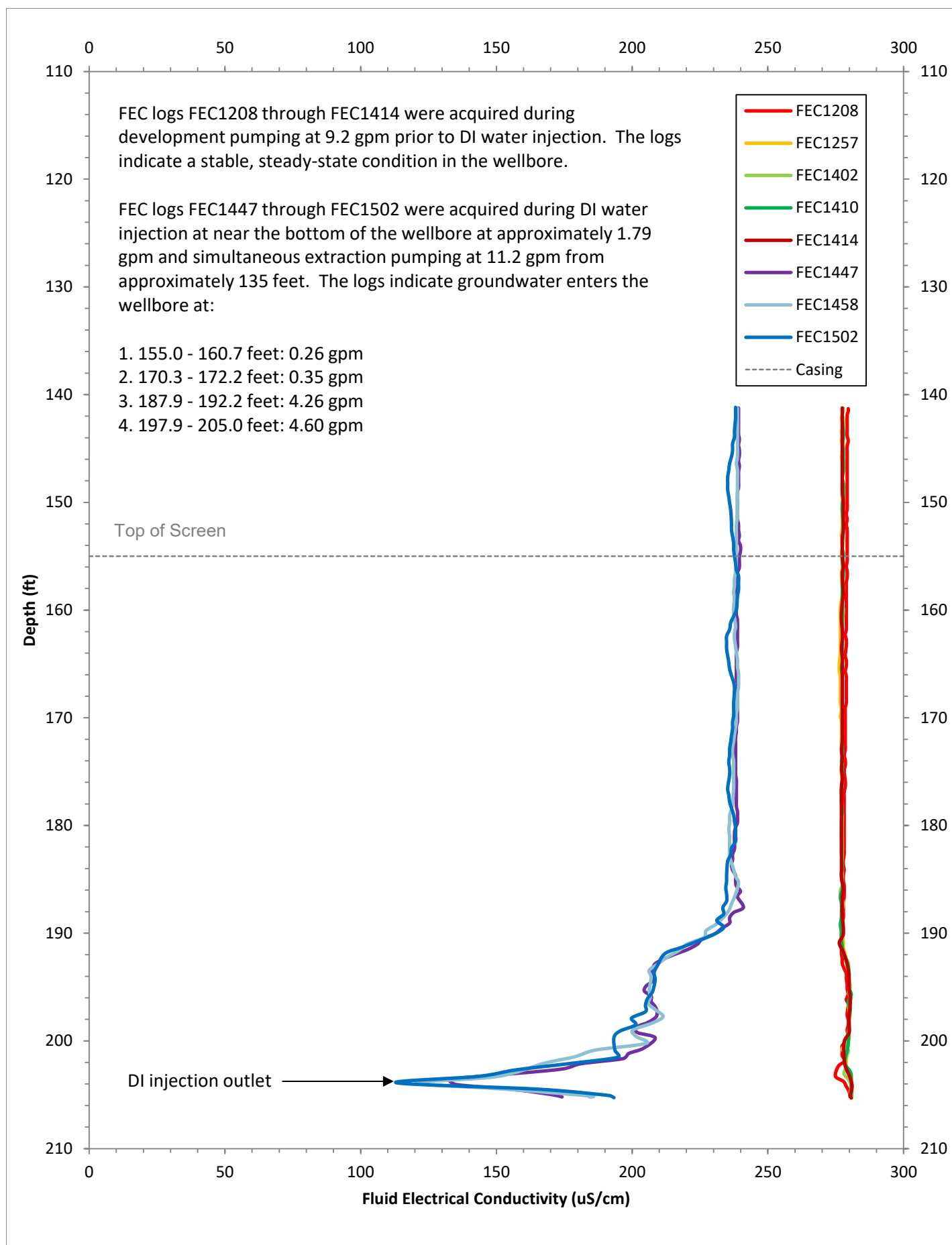


FIGURE MW-54B:4. Summary of Hydrophysical Logs During 9 GPM Hydrophysical Stress Test; URS Group; Atlas Missile Site 4; Cheyenne, WY; Wellbore: MW-54B





## Focused Density

COMPANY: URS Group

PROJECT: Atlas Missile Site 4

DATE LOGGED: 15 July 2021

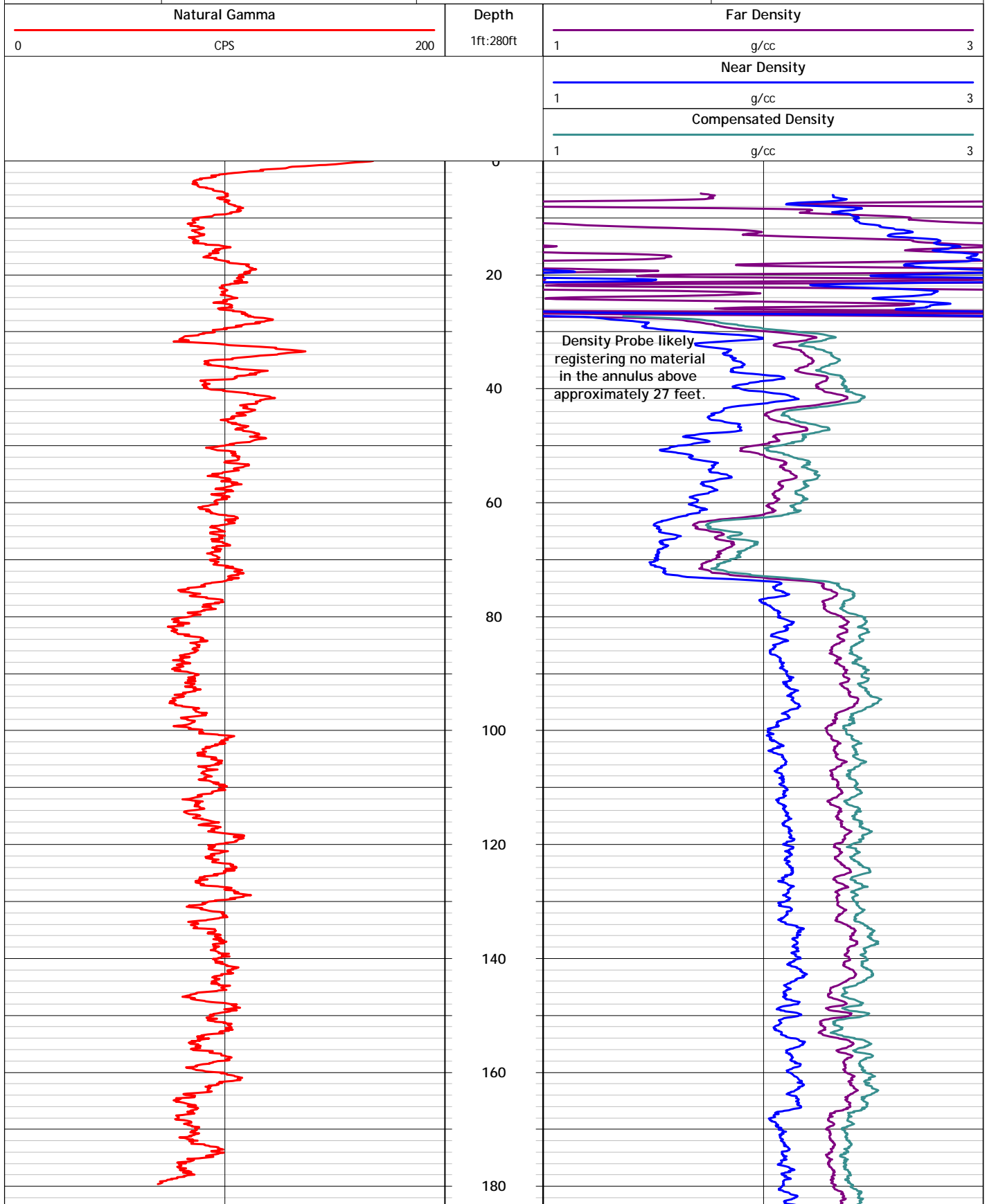
WELL: MW-105

Colog, Inc.

810 Quail St., Suite E, Lakewood, CO 80215

Phone: (303) 279-0171, Fax: (303) 278-0135

www.colog.com





# Dual Induction & Magnetic Susceptibility

COMPANY: URS Group

PROJECT: Atlas Missile Site 4

DATE LOGGED: 15 July 2021

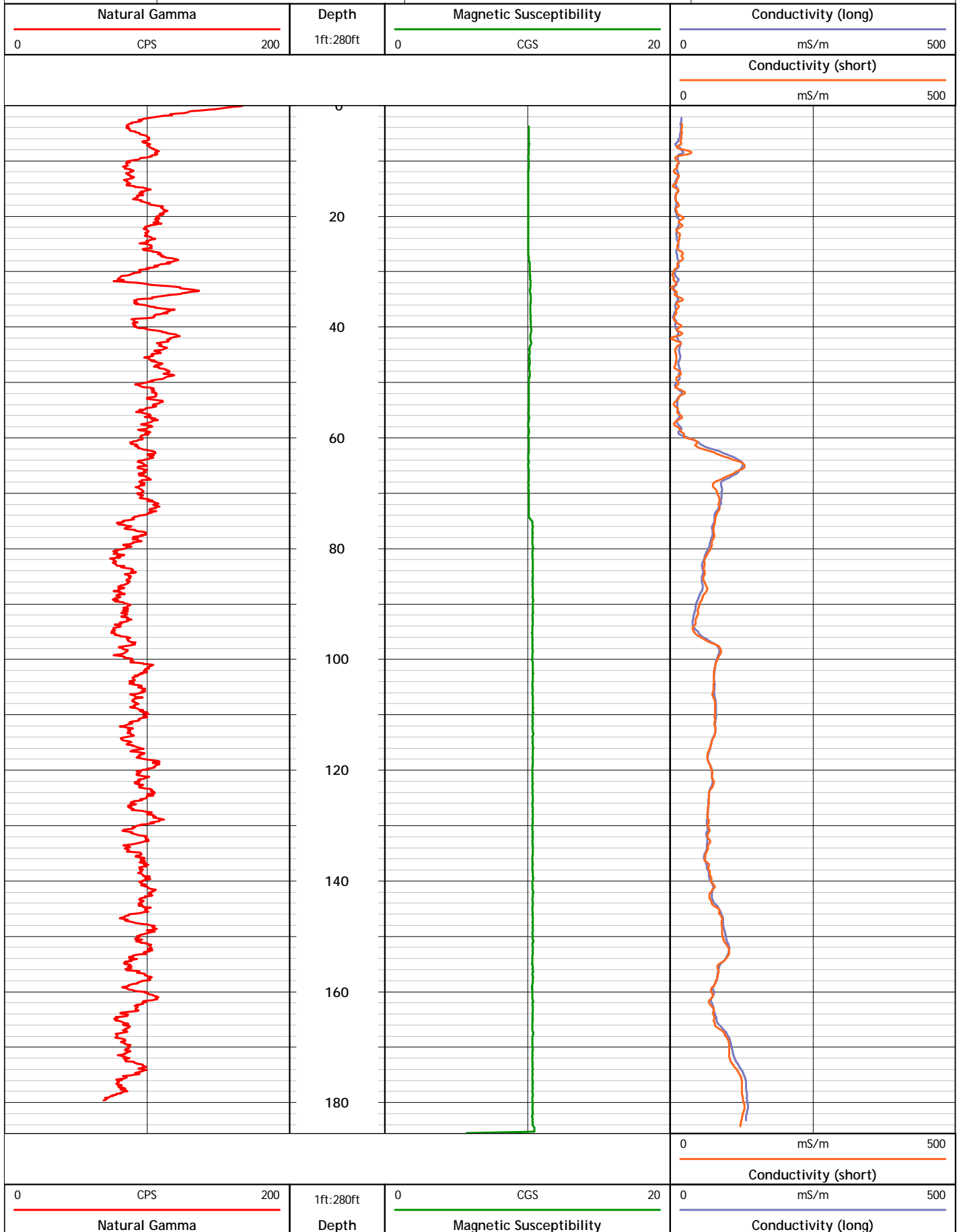
WELL: MW-105

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# Dual Neutron

COMPANY: URS Group

PROJECT: Atlas Missile Site 4

DATE LOGGED: 15 July 2021

WELL: MW-105

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Natural Gamma

Depth

Neutron - Near Detector

0 CPS 200

1ft:280ft

0 CPS 1000

Neutron - Far Detector

0 CPS 200

Neutron - Far Detector - Above WL

0 CPS 4000

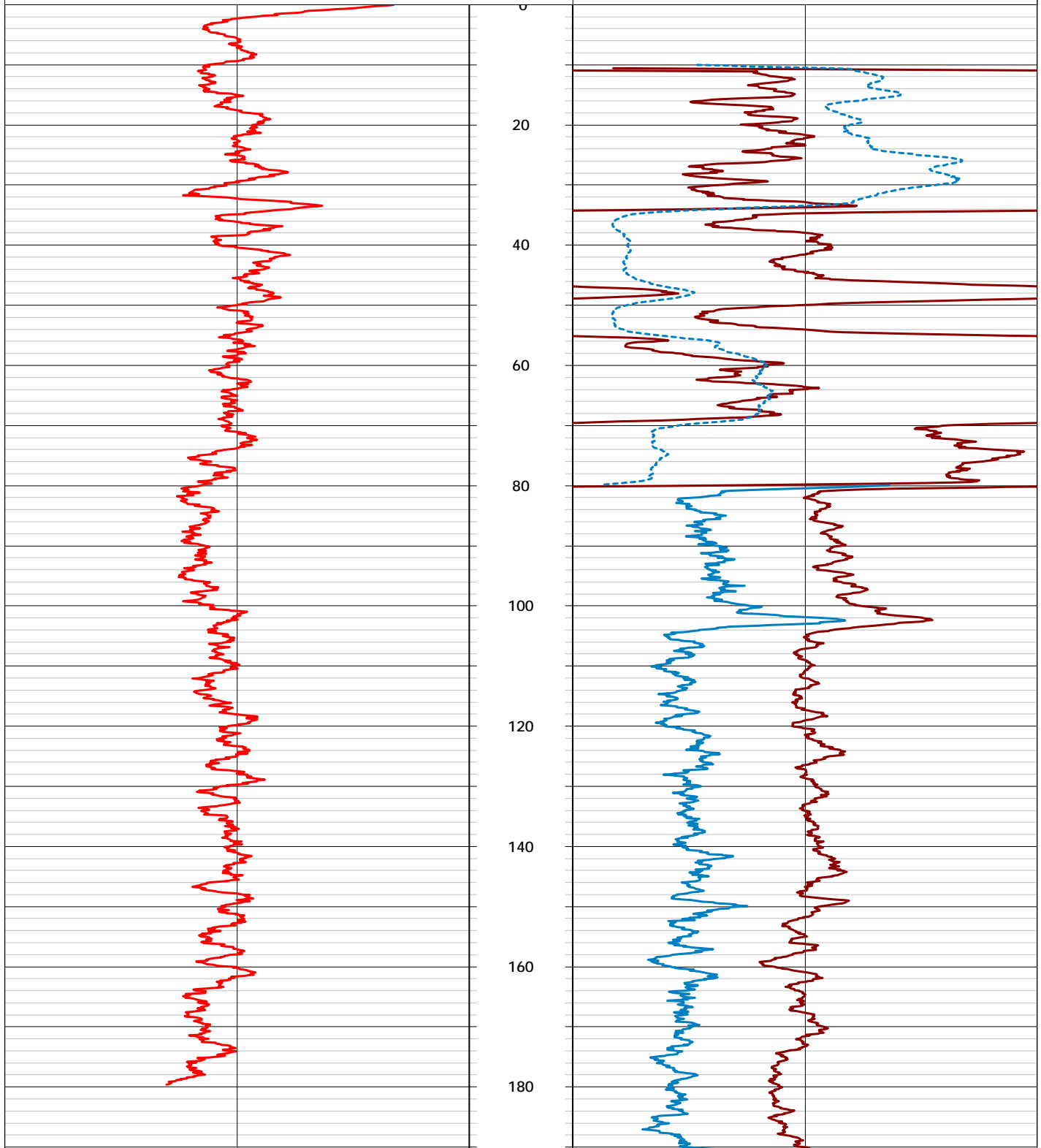


FIGURE MW-105:1. Ambient Temperature and Fluid Electrical Conductivity; URS Group; Atlas Missile Site 4; Cheyenne, WY; Wellbore: MW-105

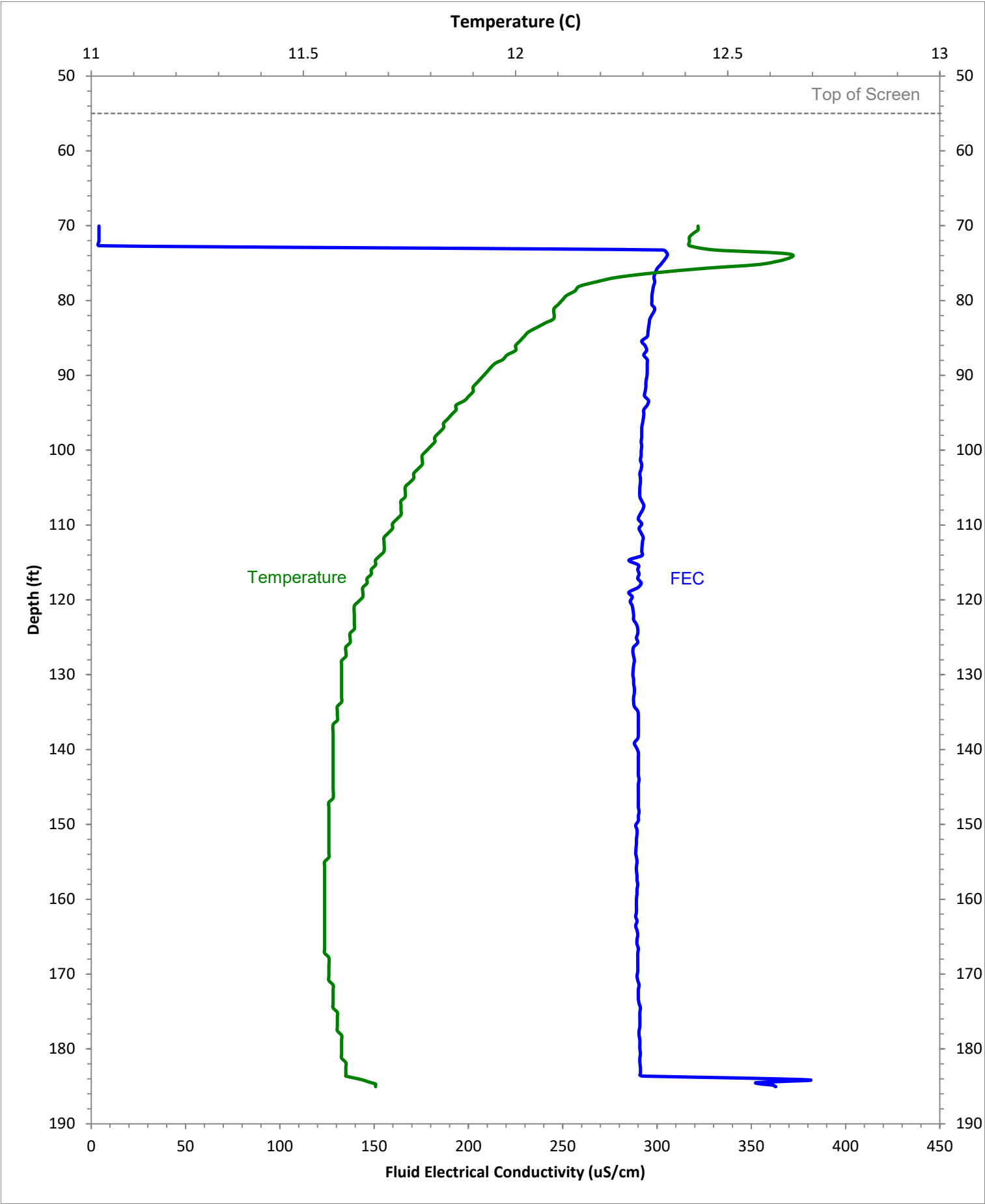


FIGURE MW-105:2. Summary of Hydrophysical Logs During Ambient Flow Characterization; URS Group; Atlas Missile Site 4; Cheyenne, WY; Wellbore: MW-105

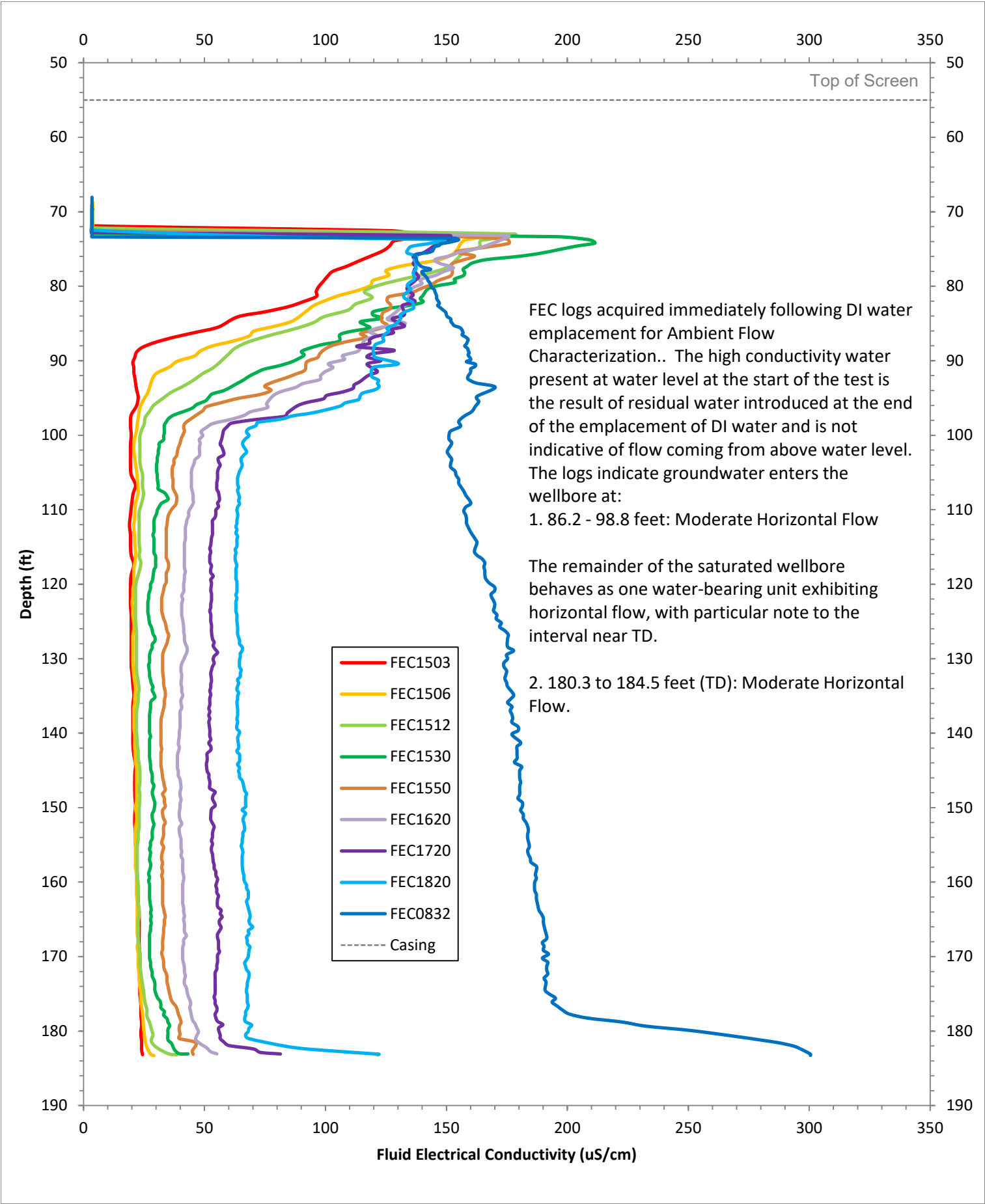
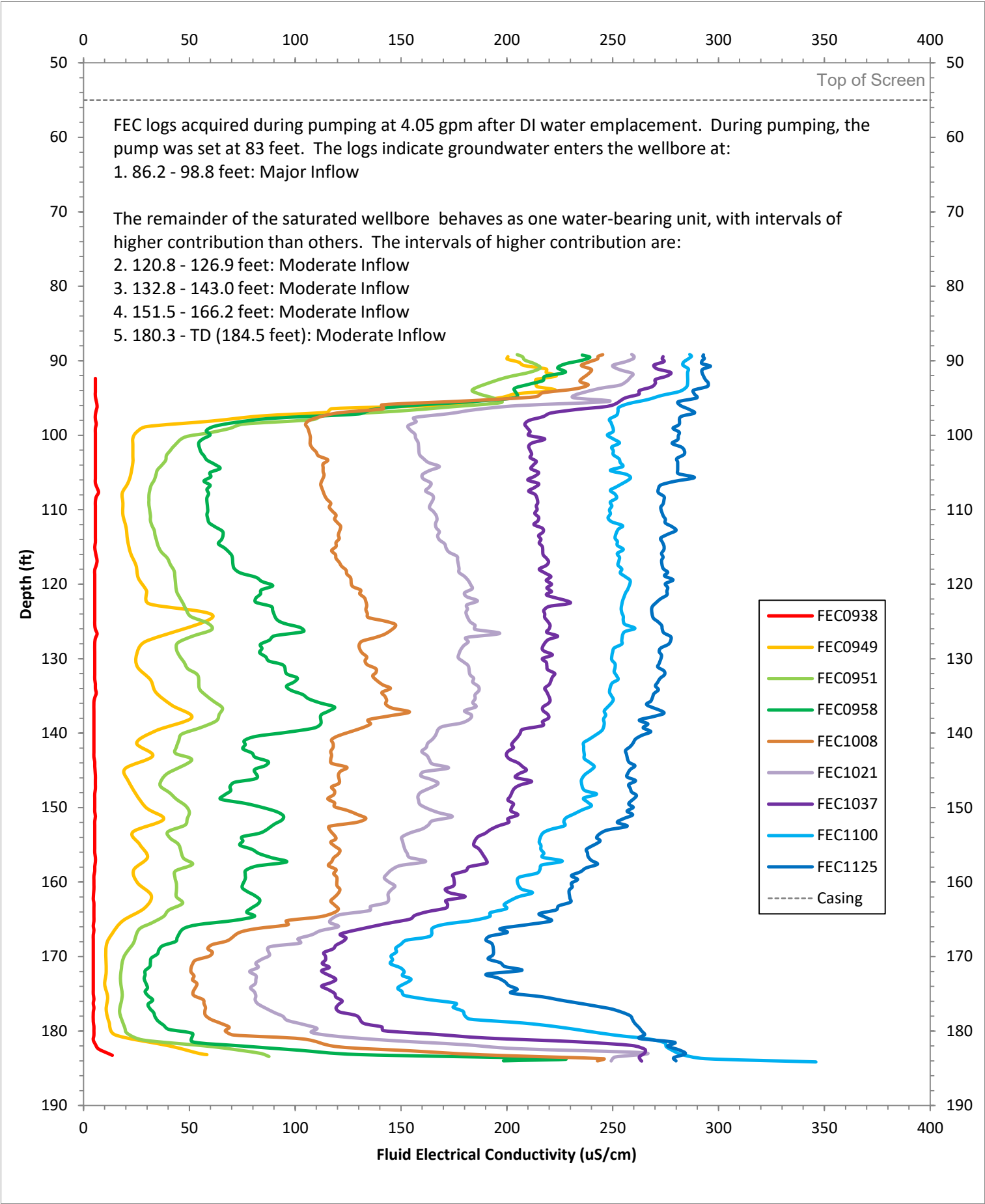


FIGURE MW-105:4. Summary of Hydrophysical Logs During Low-Rate Pumping at 4 GPM After DI Water Emplacement; URS Group; Atlas Missile Site 4; Cheyenne, WY; Wellbore: MW-105





## Focused Density

COMPANY: URS Group

PROJECT: Atlas Missile Site 4

DATE LOGGED: 14 July 2021

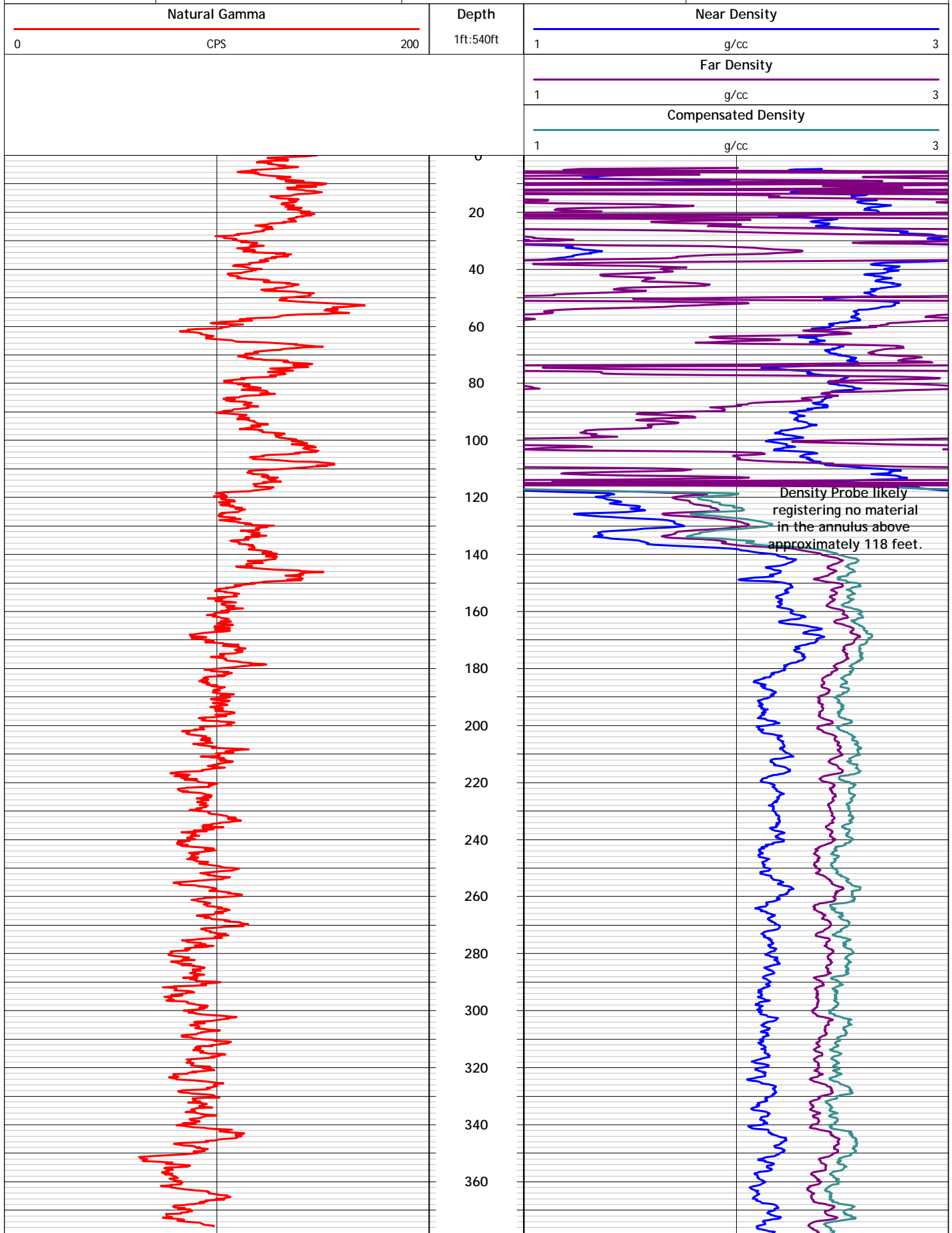
WELL: MW-107

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# Dual Induction & Magnetic Susceptibility

COMPANY: URS Group

PROJECT: Atlas Missile Site 4

DATE LOGGED: 14 July 2021

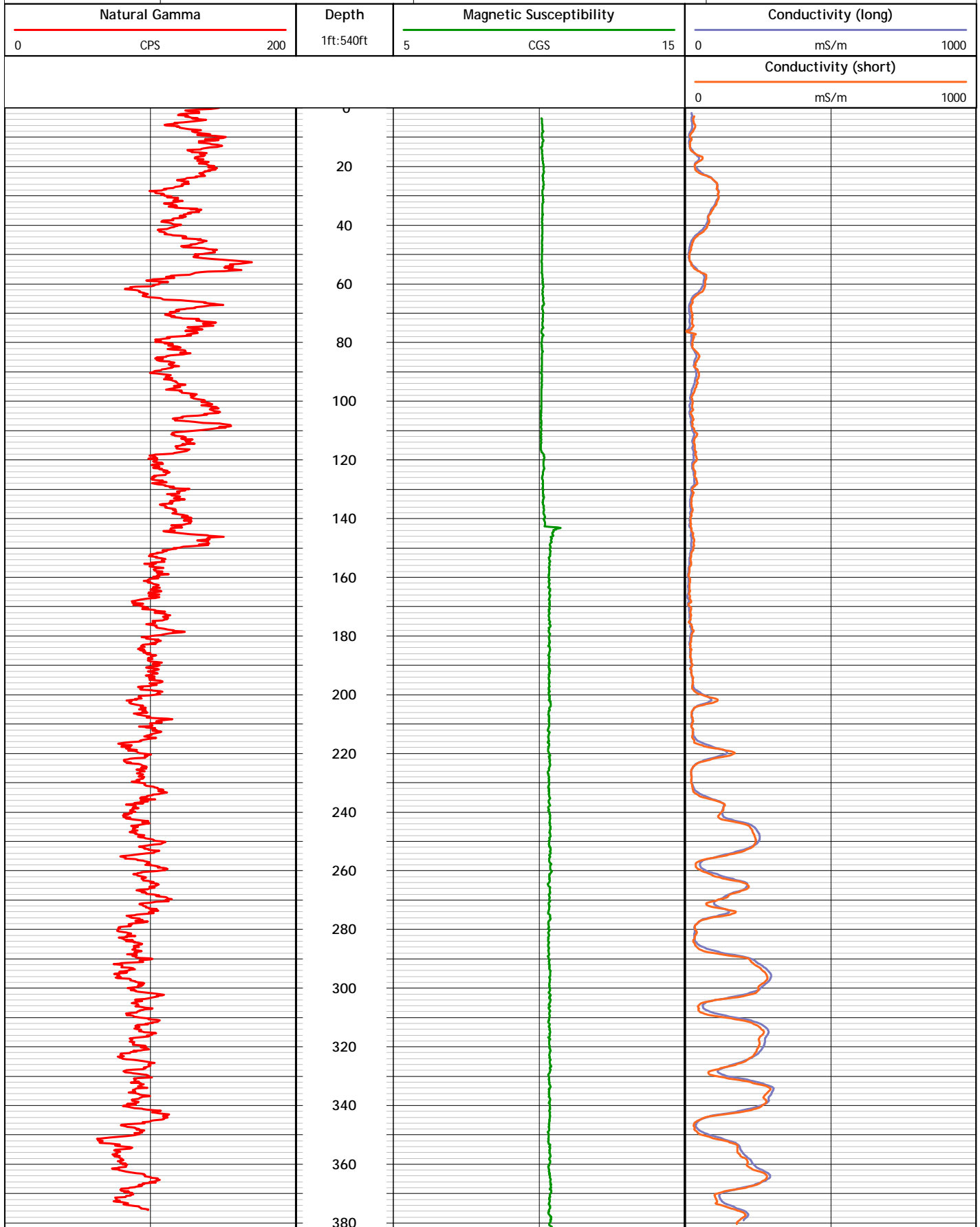
WELL: MW-107

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## Dual Neutron

COMPANY: URS Group

PROJECT: Atlas Missile Site 4

DATE LOGGED: 14 July 2021

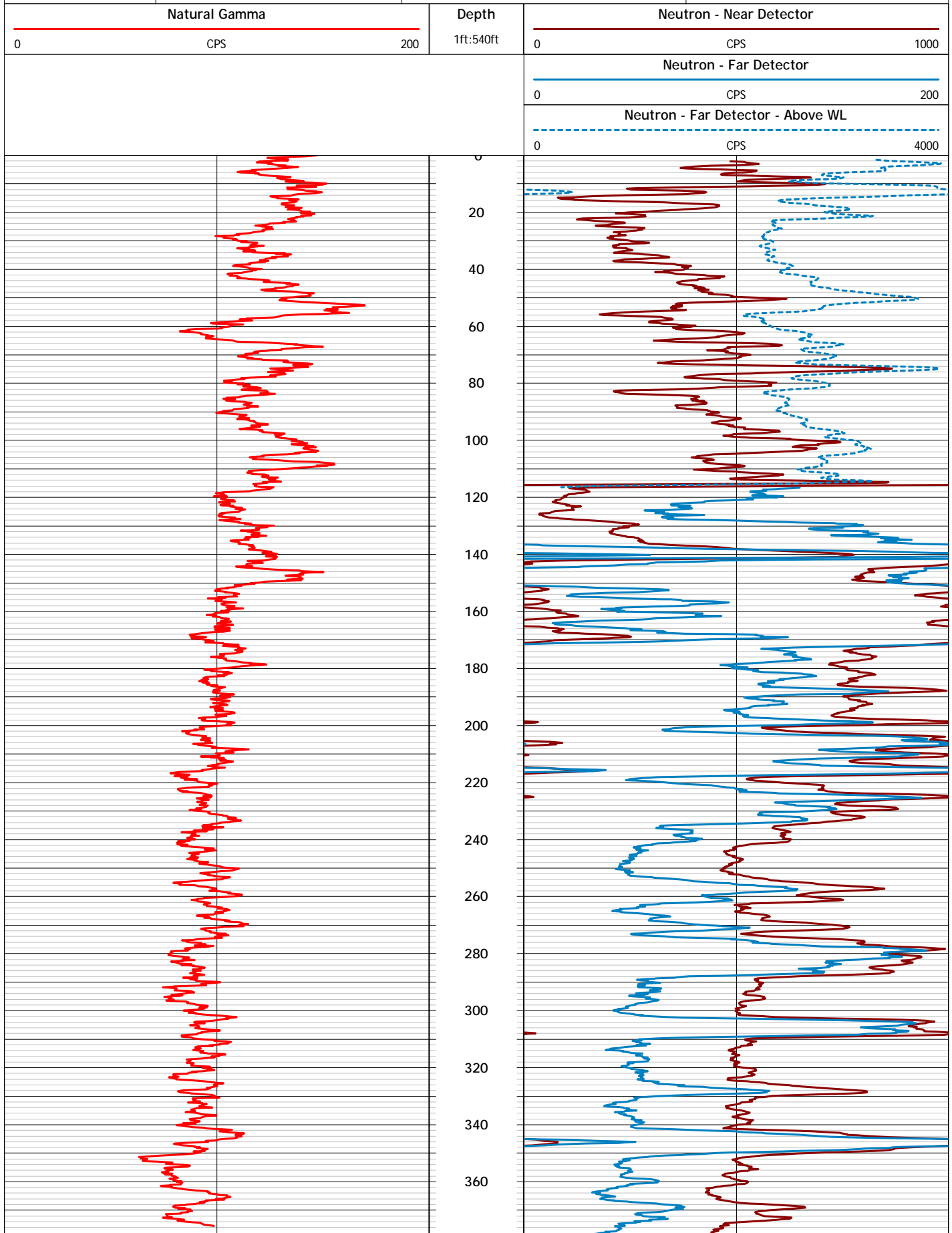
WELL: MW-107

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#### General Well Information

Well Name MW-107

Client URS Group

Project Atlas Missile Site 4

Location Cheyenne, WY

Bottom of C 150

#### ABFT Test

Date 7/13/2021

Time 14:03

AWL 140.91

#### AFC Test

Date 7/13/2021

Time 17:35

AWL 140.91

#### PDD Test

Date 1/1/2001

Time 4.93E-02

AWL 0.1

Type SLUG

#### Prod. Test

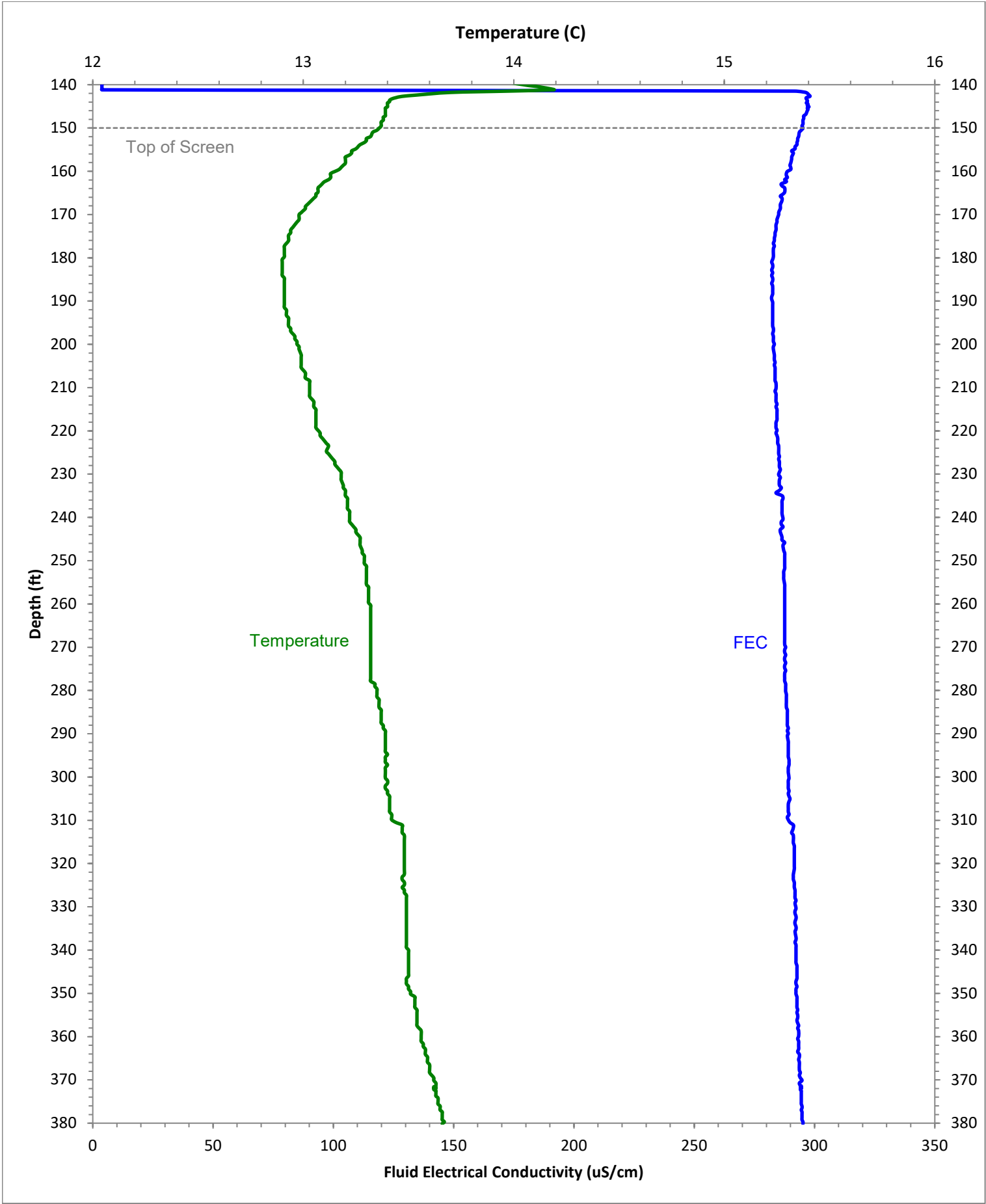
Date 7/14/2021

Time 9:07

AWL 140.91

Type FALSE

FIGURE MW-107:1. Ambient Temperature and Fluid Electrical Conductivity; URS Group; Atlas Missile Site 4; Cheyenne, WY; Wellbore: MW-107



FEC1403	DEPTH	TEMP	TIME
4.1	1.15	17.21	14.06611
4.1	1.88	17.19	14.06639
4.1	3.15	17.15	14.06694
3.8	5.96	17.11	14.06722
3.8	7.4	17.04	14.0675
3.8	8.8	16.97	14.06778
3.8	10.23	16.89	14.06806
3.8	11.64	16.8	14.06833
3.8	13.05	16.71	14.06861
3.8	14.49	16.62	14.06917
3.8	15.89	16.53	14.06944
3.8	17.3	16.44	14.06972
3.8	18.7	16.34	14.07
3.8	20.14	16.25	14.07028
3.8	21.52	16.17	14.07056
3.8	22.93	16.08	14.07083
3.8	25.73	16	14.07139
3.8	27.17	15.93	14.07167
3.8	28.6	15.86	14.07194
3.8	30.01	15.79	14.07222
3.8	31.41	15.72	14.0725
3.8	32.81	15.65	14.07278
3.8	34.24	15.59	14.07306
3.8	35.66	15.53	14.07361
3.8	37.03	15.47	14.07389
3.8	38.41	15.41	14.07417
3.8	39.83	15.36	14.07444
3.8	41.21	15.32	14.07472
3.8	44.02	15.27	14.075
3.8	45.4	15.22	14.07528
3.8	46.83	15.17	14.07583
3.8	48.24	15.14	14.07611
3.8	49.64	15.09	14.07639
4.1	51.05	15.05	14.07667
3.8	52.46	15.01	14.07694
3.8	53.85	14.97	14.07722
3.8	55.3	14.93	14.0775
3.8	56.7	14.9	14.07806
3.8	58.14	14.86	14.07833
4.1	61.02	14.83	14.07861
3.8	62.45	14.79	14.07889
3.8	63.83	14.76	14.07917
3.8	65.26	14.73	14.07944
3.8	66.69	14.7	14.07972
3.8	68.09	14.67	14.08
3.8	69.49	14.64	14.08056
3.8	70.91	14.61	14.08083
3.8	72.31	14.59	14.08111
3.8	73.69	14.55	14.08139
3.8	75.1	14.53	14.08167
3.8	76.52	14.5	14.08194
3.8	77.92	14.48	14.08222
3.8	80.76	14.45	14.08278
3.8	82.18	14.43	14.08306
3.8	83.57	14.41	14.08333
3.8	84.98	14.38	14.08361
3.8	86.4	14.37	14.08389
3.8	87.83	14.35	14.08417
3.8	89.23	14.32	14.08444
3.8	90.62	14.3	14.085
3.8	92.08	14.28	14.08528

3.8	93.46	14.26	14.08556
3.8	94.93	14.25	14.08583
3.8	96.5	14.23	14.08611
3.8	99.61	14.21	14.08639
3.8	101.18	14.19	14.08667
3.8	102.76	14.18	14.08722
3.8	104.32	14.16	14.0875
3.8	105.91	14.14	14.08778
3.8	107.46	14.13	14.08806
3.8	109.02	14.11	14.08833
3.8	110.62	14.1	14.08861
3.8	112.19	14.09	14.08889
3.8	113.77	14.07	14.08944
3.8	115.32	14.06	14.08972
3.8	116.91	14.05	14.09
3.8	118.47	14.04	14.09028
3.8	121.6	14.02	14.09056
3.8	123.2	14.01	14.09083
3.8	124.74	13.99	14.09111
3.8	126.32	13.99	14.09139
3.8	127.87	13.97	14.09194
3.8	129.43	13.96	14.09222
3.8	130.98	13.95	14.0925
3.8	132.48	13.95	14.09278
3.8	133.95	13.94	14.09306
3.8	135.4	13.94	14.09333
3.8	136.41	13.95	14.09361
3.8	137.25	13.95	14.09417
3.8	138.91	13.97	14.09444
3.8	139.41	13.98	14.09472
4.1	139.73	14.01	14.095
3.8	139.95	14.04	14.09528
3.8	140.18	14.07	14.09556
3.8	140.41	14.11	14.09611
3.8	140.65	14.14	14.09639
3.8	140.91	14.17	14.09667
3.8	141.18	14.19	14.09694
291.6	141.48	13.97	14.09722
296.3	141.78	13.7	14.0975
297.7	142.38	13.54	14.09778
298.1	142.69	13.47	14.09833
296.6	142.99	13.44	14.09861
296.6	143.29	13.42	14.09889
297	143.6	13.41	14.09917
297	143.9	13.41	14.09944
296.6	144.21	13.4	14.09972
297.3	144.51	13.4	14.1
297	144.81	13.4	14.10056
297.7	145.1	13.4	14.10083
297	145.39	13.39	14.10111
297.3	145.69	13.39	14.10139
297	145.99	13.39	14.10167
296.6	146.59	13.39	14.10194
296.3	146.89	13.39	14.10222
295.5	147.2	13.39	14.10278
295.5	147.5	13.38	14.10306
295.5	147.82	13.38	14.10333
295.2	148.19	13.38	14.10361
295.2	148.61	13.37	14.10389
295.2	149.09	13.37	14.10417
294.8	149.56	13.37	14.10444
295.2	150.04	13.36	14.10472

294.5	150.51	13.35	14.10528
293.7	150.99	13.33	14.10556
293.4	151.95	13.32	14.10583
293	152.42	13.3	14.10611
293	152.9	13.3	14.10639
292.7	153.36	13.29	14.10667
292.7	153.85	13.27	14.10694
291.9	154.33	13.26	14.1075
291.9	154.81	13.25	14.10778
290.5	155.29	13.23	14.10806
291.2	155.76	13.23	14.10833
290.9	156.23	13.22	14.10861
290.5	156.71	13.2	14.10889
290.5	157.17	13.2	14.10917
290.1	158.13	13.2	14.10972
289.8	158.62	13.19	14.11
290.1	159.1	13.18	14.11028
290.1	159.59	13.17	14.11056
288.7	160.05	13.15	14.11083
288.3	160.52	13.13	14.11111
288.3	160.99	13.13	14.11139
288.7	161.46	13.13	14.11194
287.6	161.94	13.12	14.11222
288.3	162.42	13.1	14.1125
286.2	162.9	13.09	14.11278
286.5	163.39	13.08	14.11306
287.6	163.87	13.07	14.11333
287.6	164.81	13.07	14.11361
286.9	165.27	13.06	14.11389
285.8	165.75	13.06	14.11444
286.5	166.22	13.05	14.11472
286.5	166.71	13.04	14.115
286.2	167.19	13.03	14.11528
285.8	167.67	13.02	14.11556
285.8	168.16	13.01	14.11583
285.8	168.63	13.01	14.11639
285.4	169.1	13	14.11667
285.1	169.57	12.99	14.11694
285.1	170.04	12.98	14.11722
284.4	171.13	12.98	14.1175
284.4	171.74	12.97	14.11778
284	172.35	12.96	14.11806
284	172.98	12.95	14.11861
284	173.58	12.94	14.11889
283.6	174.21	12.94	14.11917
283.6	174.81	12.93	14.11944
283.3	175.44	12.93	14.11972
283.3	176.05	12.93	14.12
282.9	176.67	12.92	14.12028
283.3	177.28	12.91	14.12056
282.9	177.91	12.91	14.12111
282.9	179.14	12.91	14.12139
282.9	179.76	12.91	14.12167
282.6	180.37	12.9	14.12194
282.2	180.98	12.9	14.12222
282.6	181.6	12.9	14.1225
282.6	182.21	12.9	14.12278
282.2	182.85	12.9	14.12333
282.6	183.47	12.9	14.12361
282.2	184.08	12.9	14.12389
282.6	184.69	12.91	14.12417
282.6	185.3	12.91	14.12444



282.2	185.92	12.91	14.12472
282.6	186.54	12.91	14.125
282.6	187.79	12.91	14.12556
282.6	188.4	12.91	14.12583
282.2	189	12.91	14.12611
282.2	189.61	12.91	14.12639
282.6	190.23	12.91	14.12667
282.6	190.85	12.91	14.12694
282.6	191.47	12.91	14.12722
282.6	192.09	12.92	14.12778
282.6	192.71	12.92	14.12806
282.6	193.32	12.92	14.12833
282.6	193.92	12.93	14.12861
282.6	194.52	12.93	14.12889
282.6	195.74	12.93	14.12917
282.9	196.33	12.94	14.12944
282.9	196.95	12.94	14.13
282.6	197.55	12.95	14.13028
282.9	198.14	12.96	14.13056
282.9	198.74	12.96	14.13083
282.9	199.36	12.97	14.13111
283.3	199.96	12.97	14.13139
282.9	200.55	12.98	14.13194
282.9	201.16	12.98	14.13222
283.3	202.38	12.99	14.1325
283.3	202.97	12.99	14.13278
283.3	203.58	12.99	14.13306
283.6	204.17	12.99	14.13333
283.3	204.77	12.99	14.13361
283.6	205.38	12.99	14.13417
283.6	205.98	13	14.13444
283.6	206.6	13.01	14.13472
283.6	207.21	13.01	14.135
283.6	207.8	13.01	14.13528
283.6	208.4	13.03	14.13556
284	209	13.03	14.13583
284	210.2	13.03	14.13639
283.6	210.81	13.03	14.13667
284	211.44	13.03	14.13694
284	212.04	13.03	14.13722
284	212.63	13.04	14.1375
284	213.23	13.05	14.13778
284.4	213.83	13.05	14.13806
284	214.43	13.05	14.13861
284.4	215.05	13.06	14.13889
284.4	215.65	13.06	14.13917
284.4	216.85	13.06	14.13944
284.4	217.45	13.06	14.13972
284	218.05	13.06	14.14
284	218.66	13.06	14.14056
284	219.28	13.06	14.14083
284.4	219.87	13.07	14.14111
284	220.49	13.08	14.14139
284.4	221.09	13.08	14.14167
284.7	221.68	13.09	14.14194
284.7	222.28	13.1	14.14222
284.7	222.9	13.11	14.14278
285.1	223.49	13.12	14.14306
285.1	224.7	13.11	14.14333
285.1	225.31	13.12	14.14361
285.4	225.93	13.13	14.14389
285.1	226.52	13.14	14.14417

285.4	227.12	13.15	14.14444
285.4	227.72	13.15	14.145
285.4	228.33	13.16	14.14528
285.8	228.92	13.17	14.14556
285.4	229.53	13.18	14.14583
285.1	230.14	13.18	14.14611
285.8	230.77	13.18	14.14639
285.4	231.35	13.18	14.14667
285.4	232.55	13.19	14.14722
286.2	233.15	13.19	14.1475
285.4	233.75	13.2	14.14778
284	234.37	13.2	14.14806
286.5	234.98	13.2	14.14833
286.9	235.59	13.21	14.14861
286.5	236.17	13.21	14.14889
286.5	236.77	13.21	14.14944
286.5	237.37	13.21	14.14972
286.5	237.98	13.21	14.15
286.5	238.59	13.22	14.15028
286.5	239.2	13.22	14.15056
286.9	240.4	13.22	14.15083
286.2	241	13.22	14.15111
286.2	241.6	13.23	14.15167
286.9	242.2	13.24	14.15194
285.8	242.82	13.25	14.15222
285.8	243.41	13.25	14.1525
286.2	244.03	13.26	14.15278
286.5	244.63	13.27	14.15306
286.5	245.23	13.27	14.15333
287.6	245.82	13.27	14.15389
286.9	246.44	13.27	14.15417
287.2	247.64	13.28	14.15444
287.6	248.23	13.28	14.15472
287.6	248.85	13.29	14.155
287.6	249.46	13.29	14.15528
287.6	250.05	13.29	14.15556
287.6	250.66	13.29	14.15611
287.6	251.25	13.3	14.15639
287.6	251.85	13.3	14.15667
287.2	252.46	13.3	14.15694
287.2	253.06	13.3	14.15722
287.2	253.68	13.3	14.1575
287.2	254.3	13.3	14.15778
287.6	255.48	13.3	14.15833
287.6	256.08	13.31	14.15861
287.6	256.69	13.31	14.15889
287.6	257.29	13.31	14.15917
287.6	257.9	13.31	14.15944
287.6	258.52	13.31	14.15972
287.6	259.12	13.31	14.16028
287.6	259.71	13.31	14.16056
287.6	260.31	13.32	14.16083
287.6	260.91	13.32	14.16111
287.6	261.52	13.32	14.16139
287.6	262.73	13.32	14.16167
287.6	263.35	13.32	14.16194
287.6	263.94	13.32	14.1625
287.6	264.54	13.32	14.16278
287.6	265.13	13.32	14.16306
287.6	265.75	13.32	14.16333
287.6	266.36	13.32	14.16361
287.6	266.96	13.32	14.16389

287.6	267.57	13.32	14.16444
287.6	268.18	13.32	14.16472
287.6	269.38	13.32	14.165
288	269.99	13.32	14.16528
287.6	270.58	13.32	14.16556
287.6	271.19	13.32	14.16583
288	271.79	13.32	14.16611
287.6	272.4	13.32	14.16667
287.6	273	13.32	14.16694
288	273.61	13.32	14.16722
287.6	274.21	13.32	14.1675
287.6	274.81	13.32	14.16778
288	275.4	13.32	14.16806
287.6	276.02	13.32	14.16833
287.6	277.24	13.32	14.16889
287.6	277.85	13.32	14.16917
288	278.45	13.34	14.16944
288	279.04	13.34	14.16972
288	279.65	13.35	14.17
288	280.25	13.35	14.17028
288.3	280.86	13.35	14.17056
288.3	281.47	13.35	14.17111
288.3	282.09	13.36	14.17139
288.3	282.67	13.36	14.17167
288.3	283.88	13.36	14.17194
288.7	284.48	13.37	14.17222
288.7	285.09	13.37	14.1725
288.7	285.7	13.37	14.17306
288.7	286.31	13.37	14.17333
288.7	286.91	13.37	14.17361
288.7	287.52	13.37	14.17389
288.7	288.11	13.38	14.17417
289.1	288.72	13.38	14.17444
288.7	289.32	13.39	14.17472
289.1	289.93	13.39	14.17528
288.7	290.53	13.39	14.17556
289.1	291.75	13.39	14.17583
289.1	292.35	13.39	14.17611
289.1	292.96	13.39	14.17639
289.1	293.57	13.39	14.17667
289.1	294.17	13.39	14.17694
289.1	294.78	13.4	14.17722
289.1	295.37	13.39	14.17778
289.4	295.99	13.39	14.17806
289.4	296.6	13.39	14.17833
289.4	297.2	13.4	14.17861
289.1	297.81	13.39	14.17889
289.1	298.4	13.39	14.17917
289.1	298.99	13.39	14.17944
289.4	300.21	13.39	14.18
289.1	300.82	13.4	14.18028
289.1	301.45	13.4	14.18056
289.1	302.04	13.39	14.18083
289.1	302.62	13.39	14.18111
289.4	303.23	13.4	14.18139
289.1	303.83	13.4	14.18194
289.4	304.44	13.41	14.18222
289.8	305.05	13.41	14.1825
289.4	305.67	13.41	14.18278
289.1	306.27	13.41	14.18306
289.1	307.45	13.41	14.18333
289.1	308.05	13.41	14.18361

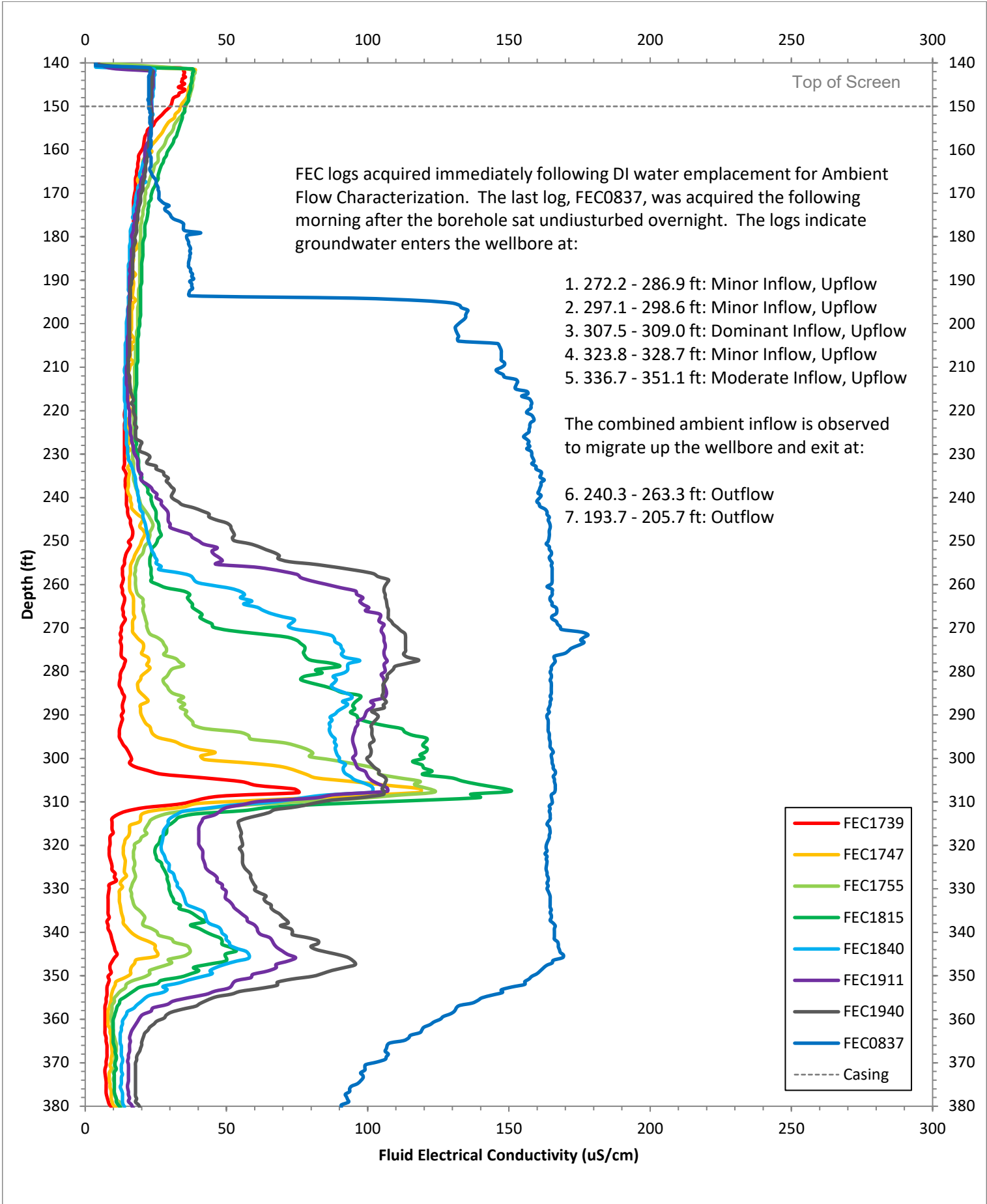
289.4	308.67	13.42	14.18417
288.7	309.28	13.42	14.18444
289.1	309.89	13.42	14.18472
289.8	310.5	13.44	14.185
291.2	311.09	13.47	14.18528
291.2	311.69	13.47	14.18556
290.9	312.29	13.47	14.18583
290.5	312.89	13.47	14.18639
291.2	313.5	13.48	14.18667
291.2	314.68	13.48	14.18694
291.2	315.26	13.48	14.18722
291.6	315.87	13.48	14.1875
291.6	316.46	13.48	14.18778
291.6	317.08	13.48	14.18806
291.6	317.67	13.48	14.18861
291.6	318.27	13.48	14.18889
291.6	318.86	13.48	14.18917
291.6	319.49	13.48	14.18944
291.6	320.1	13.48	14.18972
291.6	320.7	13.48	14.19
291.6	321.3	13.48	14.19028
291.2	322.49	13.48	14.19083
291.2	323.1	13.47	14.19111
291.2	323.7	13.47	14.19139
291.6	324.33	13.48	14.19167
291.6	324.94	13.48	14.19194
291.6	325.52	13.47	14.19222
291.9	326.12	13.48	14.1925
291.9	326.72	13.48	14.19306
291.9	327.33	13.49	14.19333
291.9	327.94	13.49	14.19361
292.3	328.54	13.49	14.19389
291.9	329.17	13.49	14.19417
292.3	330.34	13.49	14.19444
291.9	330.95	13.49	14.195
291.9	331.55	13.49	14.19528
292.3	332.16	13.49	14.19556
292.3	332.77	13.49	14.19583
291.9	333.38	13.49	14.19611
291.9	333.97	13.49	14.19639
292.3	334.57	13.49	14.19667
292.3	335.17	13.49	14.19722
291.9	335.77	13.49	14.1975
292.3	336.99	13.49	14.19778
292.3	337.58	13.49	14.19806
291.9	338.2	13.49	14.19833
292.3	338.8	13.49	14.19861
292.3	339.4	13.49	14.19889
292.3	339.99	13.5	14.19944
292.3	340.61	13.5	14.19972
292.3	341.19	13.5	14.2
292.3	341.79	13.5	14.20028
292.3	342.37	13.5	14.20056
292.3	342.97	13.5	14.20083
292.7	343.58	13.5	14.20111
292.7	344.18	13.5	14.20167
292.7	345.37	13.5	14.20194
292.7	345.97	13.5	14.20222
292.7	346.57	13.49	14.2025
292.3	347.18	13.49	14.20278
292.3	347.8	13.49	14.20306
292.7	348.42	13.5	14.20333

292.3	349	13.5	14.20389
292.3	349.6	13.51	14.20417
292.3	350.18	13.51	14.20444
292.7	350.8	13.53	14.20472
292.7	351.4	13.53	14.205
292.7	352.63	13.53	14.20528
292.7	353.23	13.53	14.20556
293	353.82	13.54	14.20611
292.7	354.43	13.54	14.20639
293	355.02	13.54	14.20667
293	355.64	13.54	14.20694
292.7	356.24	13.54	14.20722
293	356.85	13.54	14.2075
293.4	357.46	13.54	14.20778
293	358.05	13.55	14.20833
293.4	358.65	13.56	14.20861
293.4	359.87	13.56	14.20889
293	360.47	13.56	14.20917
293.4	361.07	13.56	14.20944
293.4	361.67	13.57	14.20972
293.4	362.29	13.57	14.21028
293.4	362.88	13.58	14.21056
293	363.49	13.58	14.21083
293.7	364.1	13.58	14.21111
293.7	364.7	13.59	14.21139
293.4	365.3	13.59	14.21167
293.7	365.91	13.59	14.21194
293.7	366.52	13.6	14.2125
293.7	367.73	13.6	14.21278
294.1	368.33	13.6	14.21306
293.7	368.93	13.61	14.21333
294.1	369.53	13.62	14.21361
294.8	370.13	13.62	14.21389
293.7	370.73	13.63	14.21417
294.1	371.31	13.63	14.21472
294.5	371.39	13.63	14.215
294.5	371.44	13.63	14.21528
294.5	371.49	13.63	14.21556
294.5	371.53	13.63	14.21583
294.1	371.58	13.62	14.21611
294.5	371.68	13.62	14.21639
294.5	371.72	13.62	14.21694
294.5	371.77	13.62	14.21722
294.5	371.82	13.62	14.2175
294.5	371.86	13.63	14.21778
294.1	371.9	13.62	14.21806
294.5	371.95	13.62	14.21833
294.5	372	13.63	14.21861
294.1	372.23	13.62	14.21889
294.5	372.49	13.63	14.21944
294.5	372.84	13.63	14.21972
294.5	373.28	13.63	14.22
294.5	373.73	13.63	14.22028
294.5	374.19	13.64	14.22056
294.5	375.1	13.64	14.22083
294.5	375.57	13.64	14.22111
294.8	376.05	13.65	14.22139
294.8	376.5	13.65	14.22194
294.5	376.95	13.65	14.22222
294.8	377.4	13.66	14.2225
294.8	377.85	13.66	14.22278
294.8	378.31	13.66	14.22306

294.8	378.77	13.66	14.22333
294.8	379.24	13.66	14.22361
295.2	379.7	13.67	14.22389
295.2	380.11	13.66	14.22444



FIGURE MW-107:2. Summary of Hydrophysical Logs During Ambient Flow Characterization; URS Group; Atlas Missile Site 4; Cheyenne, WY; Wellbore: MW-107



FEC1739	DEPTH	TEMP	TIME	FEC1747	DEPTH	TEMP	TIME	FEC1755	DEPTH
4.1	138.39	16.95	17.65556	4.1	138.15	16.66	17.79083	4.1	138.07
4.1	138.5	16.94	17.65611	4.1	138.41	16.65	17.79111	4.1	138.48
4.1	138.65	16.93	17.65639	4.1	138.98	16.62	17.79139	4.1	139.14
4.1	139.02	16.92	17.65667	4.1	139.81	16.59	17.79167	4.1	139.89
4.1	139.22	16.91	17.65694	4.1	140.66	16.56	17.79194	35.9	141.33
4.1	139.46	16.9	17.65722	38.8	141.49	16.61	17.7925	38.8	142.05
4.1	139.7	16.89	17.6575	38.4	142.36	16.71	17.79278	38.4	142.83
4.1	139.95	16.89	17.65778	38	143.21	16.76	17.79306	38.4	143.62
4.1	140.22	16.88	17.65833	37.7	144.08	16.78	17.79333	38	144.46
4.1	140.52	16.87	17.65861	37.3	144.96	16.78	17.79361	38	145.25
4.1	140.82	16.87	17.65889	36.6	145.81	16.78	17.79389	37.7	146.06
33.7	141.14	16.9	17.65917	36.2	147.52	16.78	17.79417	37.3	146.89
34.8	141.48	17.01	17.65944	35.5	148.38	16.78	17.79472	37	147.7
34.8	141.82	17.06	17.65972	34.4	149.24	16.77	17.795	36.2	148.55
35.2	142.17	17.08	17.66	33.7	150.1	16.76	17.79528	35.9	149.38
34.8	142.9	17.09	17.66056	33.3	150.93	16.75	17.79556	35.5	150.2
35.5	143.27	17.11	17.66083	31.9	151.81	16.75	17.79583	34.4	151.84
34.4	143.64	17.11	17.66111	31.5	152.67	16.74	17.79611	33.3	152.66
34.4	144.01	17.11	17.66139	29.7	153.52	16.73	17.79639	32.3	153.49
34.1	144.41	17.12	17.66167	28.7	154.38	16.72	17.79694	31.5	154.33
35.2	144.8	17.12	17.66194	27.9	155.24	16.71	17.79722	31.2	155.17
34.1	145.21	17.12	17.66222	27.2	156.1	16.7	17.7975	30.5	155.98
33	145.62	17.11	17.66278	26.1	156.96	16.69	17.79778	29.4	156.8
35.2	146.07	17.11	17.66306	25.1	157.79	16.68	17.79806	28.7	157.63
34.8	146.51	17.11	17.66333	22.9	159.54	16.68	17.79833	28.3	158.46
33.3	146.95	17.1	17.66361	23.6	160.4	16.67	17.79861	27.6	159.29
33	147.48	17.09	17.66389	22.2	161.24	16.66	17.79917	26.5	160.13
31.2	148.11	17.09	17.66417	20.7	162.09	16.66	17.79944	25.8	160.94
30.5	149.54	17.07	17.66444	20.4	162.95	16.65	17.79972	25.8	162.57
29.7	150.31	17.06	17.665	21.1	163.82	16.65	17.8	24.7	163.4
28.3	151.1	17.05	17.66528	20	164.69	16.64	17.80028	24.3	164.25
27.2	151.92	17.03	17.66556	20.7	165.52	16.63	17.80056	24	165.05
25.8	152.76	17.01	17.66583	18.9	166.38	16.63	17.80083	23.3	165.88
24.7	153.58	16.99	17.66611	18.6	167.23	16.62	17.80111	22.9	166.7
24	154.44	16.97	17.66639	20	168.11	16.62	17.80167	22.5	167.52
22.2	155.31	16.96	17.66667	19.6	168.97	16.61	17.80194	22.2	168.35
21.8	156.18	16.94	17.66722	19.6	169.82	16.61	17.80222	21.4	169.18
21.1	157.05	16.93	17.6675	19.3	171.52	16.6	17.8025	21.4	170.01
20.7	158.78	16.92	17.66778	19.3	172.39	16.59	17.80278	21.1	170.82
20.4	159.65	16.91	17.66806	18.9	173.23	16.59	17.80306	21.1	172.48
19.6	160.5	16.9	17.66833	18.6	174.11	16.59	17.80333	20.7	173.29
18.9	161.36	16.89	17.66861	17.5	174.94	16.59	17.80389	20.4	174.14
18.9	162.22	16.89	17.66889	17.5	175.81	16.59	17.80417	20.4	174.94
18.6	163.1	16.89	17.66944	18.6	176.66	16.59	17.80444	20	175.78
18.6	163.98	16.88	17.66972	17.1	177.52	16.59	17.80472	20	176.6
18.2	164.84	16.88	17.67	18.2	178.38	16.58	17.805	19.6	177.43
18.2	165.69	16.87	17.67028	17.1	179.23	16.58	17.80528	19.6	178.25
17.8	166.56	16.87	17.67056	17.1	180.1	16.57	17.80583	19.6	179.08
17.8	167.43	16.87	17.67083	18.2	181.8	16.57	17.80611	19.6	179.9
17.8	168.29	16.85	17.67111	18.2	182.66	16.57	17.80639	19.6	180.72
17.8	169.17	16.85	17.67139	17.1	183.53	16.57	17.80667	19.3	181.55
17.5	170	16.84	17.67194	16.8	184.38	16.56	17.80694	19.3	182.36
17.1	171.75	16.84	17.67222	17.1	185.23	16.56	17.80722	19.3	184.03
17.1	172.62	16.83	17.6725	16.8	186.08	16.54	17.8075	19.3	184.84
17.1	173.49	16.83	17.67278	16.8	186.94	16.54	17.80778	19.3	185.66
17.1	174.36	16.83	17.67306	16.8	187.8	16.54	17.80833	19.3	186.48
17.1	175.21	16.83	17.67333	17.8	188.68	16.54	17.80861	19.3	187.31
17.1	176.09	16.83	17.67361	16.8	189.5	16.53	17.80889	19.3	188.15
17.1	176.95	16.83	17.67417	17.1	190.36	16.52	17.80917	19.3	188.97
17.1	177.8	16.83	17.67444	17.1	191.21	16.51	17.80944	19.3	189.78
16.8	178.69	16.82	17.67472	16.8	192.91	16.51	17.80972	19.3	190.59

TEMP	TIME	FEC1815	DEPTH	TEMP	TIME	FEC1840	DEPTH	TEMP	TIME
16.34	17.92694	3.8	138.41	15.25	18.25611	3.8	138.16	14.61	18.66889
16.31	17.92722	3.8	138.67	15.24	18.25639	3.8	138.27	14.61	18.66917
16.27	17.9275	3.8	139.07	15.23	18.25667	3.8	138.53	14.61	18.66944
16.25	17.92778	3.8	139.94	15.22	18.25694	3.8	139.3	14.59	18.66972
16.23	17.92806	3.8	140.39	15.21	18.25722	3.8	139.72	14.59	18.67
16.35	17.92833	3.8	140.87	15.2	18.2575	3.8	140.15	14.58	18.67028
16.45	17.92889	38	141.36	15.28	18.25778	3.8	140.58	14.57	18.67083
16.49	17.92917	38.4	141.85	15.72	18.25833	3.8	140.99	14.56	18.67111
16.51	17.92944	38	142.35	15.96	18.25861	24.3	141.41	14.78	18.67139
16.51	17.92972	38	142.84	16.06	18.25889	24.7	141.84	15.3	18.67167
16.51	17.93	37.7	143.35	16.1	18.25917	24.3	142.27	15.55	18.67194
16.51	17.93028	37.7	143.88	16.1	18.25944	24.7	142.7	15.63	18.67222
16.51	17.93056	37.7	144.47	16.1	18.25972	24.3	143.15	15.65	18.6725
16.51	17.93111	37.3	145.04	16.11	18.26	24.3	143.61	15.66	18.67306
16.51	17.93139	37.3	145.61	16.1	18.26028	24.3	144.08	15.66	18.67333
16.5	17.93167	37.3	146.19	16.1	18.26083	24.3	145	15.65	18.67361
16.49	17.93194	36.6	147.37	16.09	18.26111	24.3	145.47	15.65	18.67389
16.49	17.93222	36.6	148.03	16.08	18.26139	24.3	145.91	15.65	18.67417
16.47	17.9325	36.6	148.68	16.08	18.26167	24	146.37	15.65	18.67444
16.47	17.93278	35.9	149.33	16.08	18.26194	24	146.83	15.65	18.675
16.46	17.93333	35.2	149.98	16.08	18.26222	24	147.28	15.65	18.67528
16.46	17.93361	35.2	150.63	16.08	18.2625	24	147.74	15.64	18.67556
16.45	17.93389	35.2	151.28	16.07	18.26306	23.6	148.23	15.64	18.67583
16.44	17.93417	34.4	151.92	16.06	18.26333	23.6	148.71	15.63	18.67611
16.44	17.93444	34.4	152.59	16.05	18.26361	23.6	149.21	15.63	18.67639
16.44	17.93472	34.1	153.24	16.03	18.26389	23.6	149.72	15.63	18.67667
16.43	17.935	33.7	153.94	16.01	18.26417	23.6	150.75	15.62	18.67722
16.42	17.93556	33	155.37	16.01	18.26444	23.6	151.29	15.62	18.6775
16.42	17.93583	32.6	156.09	16	18.265	24	151.85	15.61	18.67778
16.41	17.93611	32.3	156.8	15.98	18.26528	23.6	152.4	15.6	18.67806
16.41	17.93639	31.5	157.51	15.98	18.26556	23.6	152.95	15.59	18.67833
16.41	17.93667	31.2	158.26	15.98	18.26583	23.6	153.52	15.58	18.67861
16.39	17.93694	30.5	159.04	15.97	18.26611	23.3	154.08	15.57	18.67889
16.39	17.9375	29.7	159.82	15.97	18.26639	23.3	154.64	15.57	18.67944
16.38	17.93778	29	160.58	15.96	18.26667	23.3	155.19	15.55	18.67972
16.37	17.93806	28.7	161.35	15.96	18.26722	22.9	155.75	15.55	18.68
16.37	17.93833	27.9	162.11	15.94	18.2675	22.9	156.85	15.55	18.68028
16.37	17.93861	27.6	162.89	15.94	18.26778	22.5	157.42	15.54	18.68056
16.35	17.93889	26.9	163.66	15.93	18.26806	22.5	157.97	15.52	18.68083
16.35	17.93917	26.1	165.2	15.93	18.26833	22.2	158.53	15.51	18.68139
16.35	17.93972	25.8	165.96	15.93	18.26861	21.8	159.1	15.51	18.68167
16.35	17.94	25.8	166.73	15.92	18.26889	21.8	159.65	15.51	18.68194
16.35	17.94028	25.1	167.51	15.91	18.26917	21.4	160.22	15.51	18.68222
16.34	17.94056	24.7	168.29	15.91	18.26972	21.4	160.76	15.5	18.6825
16.34	17.94083	24	169.05	15.9	18.27	21.4	161.32	15.49	18.68278
16.34	17.94111	23.6	169.82	15.9	18.27028	21.1	161.87	15.48	18.68306
16.34	17.94139	23.3	170.59	15.89	18.27056	20.7	162.48	15.47	18.68361
16.34	17.94167	23.3	171.37	15.88	18.27083	20.4	163.08	15.46	18.68389
16.34	17.94222	22.5	172.15	15.87	18.27111	20	164.34	15.46	18.68417
16.33	17.9425	22.5	172.91	15.88	18.27139	19.6	164.95	15.46	18.68444
16.33	17.94278	22.2	173.68	15.89	18.27194	19.3	165.55	15.46	18.68472
16.32	17.94306	22.2	174.45	15.88	18.27222	19.3	166.17	15.46	18.685
16.32	17.94333	21.8	175.99	15.87	18.2725	20	166.78	15.46	18.68528
16.32	17.94361	21.4	176.77	15.87	18.27278	21.4	167.41	15.46	18.68583
16.31	17.94389	21.1	177.53	15.87	18.27306	19.3	168.04	15.45	18.68611
16.3	17.94444	21.1	178.3	15.87	18.27333	18.6	168.66	15.44	18.68639
16.3	17.94472	21.1	179.08	15.86	18.27389	18.6	169.33	15.43	18.68667
16.3	17.945	21.1	179.85	15.85	18.27417	18.2	170.01	15.41	18.68694
16.29	17.94528	20.7	180.62	15.85	18.27444	17.8	171.42	15.41	18.68722
16.28	17.94556	20.4	181.38	15.85	18.27472	17.8	172.14	15.41	18.68778
16.27	17.94583	20.4	182.15	15.85	18.275	17.5	172.84	15.4	18.68806

FEC1911	DEPTH	TEMP	TIME	FEC1940	DEPTH	TEMP	TIME	FEC0837	DEPTH
3.8	138.31	14.47	19.19194	3.8	138.03	14.52	19.68	3.4	138.03
3.8	138.73	14.47	19.19222	3.8	138.23	14.51	19.68028	3.8	138.3
3.8	139.28	14.45	19.1925	3.8	138.55	14.5	19.68056	3.8	138.68
3.8	139.96	14.43	19.19306	3.8	138.93	14.5	19.68083	3.4	139.14
9.5	141.26	14.42	19.19333	3.8	139.31	14.49	19.68111	3.8	139.65
24	141.91	14.77	19.19361	3.8	139.76	14.48	19.68139	3.8	140.15
24	142.58	15.07	19.19389	3.8	140.31	14.47	19.68167	3.8	140.64
24	143.24	15.19	19.19417	23.6	141.65	14.53	19.68222	22.9	141.12
24	143.93	15.22	19.19444	23.6	142.35	14.72	19.6825	22.9	142.08
24	144.67	15.22	19.19472	23.6	143.05	14.82	19.68278	22.9	142.58
24	145.41	15.22	19.19528	23.6	143.76	14.86	19.68306	22.5	143.07
23.6	146.14	15.22	19.19556	23.6	144.48	14.88	19.68333	22.5	143.57
23.6	146.92	15.21	19.19583	23.6	145.18	14.88	19.68361	22.5	144.07
23.6	147.7	15.21	19.19611	23.3	145.86	14.89	19.68389	22.5	145.06
23.3	148.49	15.21	19.19639	23.3	146.56	14.89	19.68444	22.5	145.55
23.3	149.27	15.2	19.19667	23.3	147.26	14.89	19.68472	22.5	146.02
23.6	150.85	15.19	19.19694	23.3	147.97	14.88	19.685	22.5	146.51
23.6	151.64	15.18	19.1975	22.9	148.68	14.88	19.68528	22.5	147
23.6	152.42	15.17	19.19778	22.9	149.4	14.86	19.68556	22.5	147.49
23.6	153.2	15.15	19.19806	23.3	150.79	14.85	19.68583	22.5	148
23.6	153.99	15.14	19.19833	23.6	151.48	14.85	19.68611	22.2	148.48
23.3	154.78	15.13	19.19861	23.6	152.2	14.84	19.68667	22.5	148.98
22.9	155.56	15.12	19.19889	23.3	152.9	14.83	19.68694	22.5	149.97
22.5	156.35	15.12	19.19917	23.3	153.6	14.82	19.68722	22.5	150.45
22.5	157.13	15.1	19.19944	23.3	154.3	14.81	19.6875	22.9	150.93
22.5	157.91	15.09	19.2	23.3	155.02	14.81	19.68778	22.9	151.42
21.8	158.68	15.08	19.20028	23.3	155.71	14.8	19.68806	23.3	151.91
21.4	159.49	15.07	19.20056	23.3	156.42	14.79	19.68833	22.9	152.42
21.1	160.27	15.07	19.20083	22.9	157.1	14.79	19.68861	22.9	152.9
21.1	161.83	15.07	19.20111	22.9	157.81	14.78	19.68917	22.9	153.38
21.1	162.62	15.05	19.20139	22.5	158.5	14.78	19.68944	22.9	153.88
21.4	163.4	15.03	19.20167	22.5	159.94	14.77	19.68972	23.3	154.38
21.1	164.2	15.02	19.20222	22.2	160.64	14.76	19.69	23.3	154.88
20.7	164.99	15	19.2025	22.2	161.32	14.75	19.69028	23.3	155.35
20.7	165.75	15	19.20278	21.8	162.03	14.74	19.69056	23.3	155.85
20	166.54	14.99	19.20306	21.8	162.72	14.73	19.69111	23.3	156.83
19.6	167.32	14.99	19.20333	21.4	163.44	14.72	19.69139	22.9	157.31
19.6	168.12	14.99	19.20361	21.4	164.15	14.71	19.69167	23.3	157.8
19.6	168.91	14.98	19.20389	21.4	164.86	14.71	19.69194	23.3	158.29
18.9	169.68	14.97	19.20444	21.1	165.54	14.7	19.69222	23.3	158.78
18.9	171.22	14.97	19.20472	21.1	166.24	14.69	19.6925	23.3	159.29
18.6	172.04	14.96	19.205	20.7	166.94	14.69	19.69278	22.9	159.78
18.6	172.81	14.96	19.20528	20.4	167.64	14.68	19.69333	22.5	160.28
18.2	173.6	14.95	19.20556	20.4	169.08	14.67	19.69361	22.9	160.75
18.2	174.38	14.94	19.20583	20	169.76	14.66	19.69389	22.9	161.24
17.5	175.15	14.95	19.20611	19.6	170.46	14.66	19.69417	23.3	161.72
17.5	175.95	14.95	19.20667	19.6	171.15	14.64	19.69444	23.3	162.21
17.5	176.73	14.95	19.20694	19.6	171.87	14.64	19.69472	23.3	162.71
17.1	177.51	14.95	19.20722	19.3	172.56	14.64	19.695	23.3	163.7
17.1	178.29	14.93	19.2075	18.9	173.28	14.64	19.69528	22.9	164.21
16.8	179.09	14.93	19.20778	18.9	173.98	14.63	19.69583	22.9	164.7
16.4	179.86	14.93	19.20806	18.6	174.68	14.62	19.69611	23.3	165.17
16.8	180.64	14.93	19.20833	18.6	175.37	14.62	19.69639	23.6	165.65
16.8	182.2	14.93	19.20889	18.6	176.09	14.62	19.69667	24	166.14
16.4	182.99	14.91	19.20917	18.2	176.78	14.62	19.69694	24.7	166.63
16.4	183.79	14.91	19.20944	18.2	178.2	14.61	19.69722	25.1	167.12
16.4	184.57	14.91	19.20972	18.2	178.89	14.61	19.6975	25.1	167.62
16.4	185.34	14.91	19.21	17.8	179.59	14.6	19.69806	25.4	168.14
16	186.11	14.91	19.21028	17.5	180.31	14.61	19.69833	25.8	168.68
16	186.9	14.91	19.21056	17.8	181	14.61	19.69861	25.8	169.19
15.7	187.69	14.9	19.21111	17.5	181.7	14.61	19.69889	26.1	169.71

TEMP	TIME
13.41	8.631667
13.41	8.631944
13.41	8.632222
13.41	8.632778
13.41	8.633056
13.41	8.633333
13.41	8.633611
13.41	8.633889
13.42	8.634167
13.42	8.634444
13.43	8.635
13.44	8.635278
13.44	8.635556
13.44	8.636111
13.44	8.636389
13.43	8.636667
13.43	8.636944
13.43	8.637222
13.42	8.637778
13.42	8.638056
13.42	8.638333
13.42	8.638611
13.42	8.638889
13.42	8.639167
13.41	8.639444
13.41	8.64
13.41	8.640278
13.4	8.640556
13.4	8.640833
13.4	8.641111
13.39	8.641389
13.39	8.641667
13.39	8.641944
13.37	8.6425
13.37	8.642778
13.36	8.643056
13.35	8.643333
13.35	8.643611
13.35	8.643889
13.34	8.644167
13.34	8.644722
13.32	8.645
13.3	8.645278
13.27	8.645556
13.26	8.645833
13.25	8.646111
13.24	8.646389
13.23	8.646944
13.23	8.647222
13.23	8.6475
13.22	8.647778
13.22	8.648056
13.22	8.648333
13.2	8.648611
13.18	8.648889
13.17	8.649444
13.16	8.649722
13.15	8.65
13.15	8.650278
13.14	8.650556
13.13	8.650833

16.8	179.54	16.81	17.675	16.8	193.73	16.51	17.81028	19.3	191.43
16.8	180.41	16.81	17.67528	17.8	194.57	16.51	17.81056	18.9	192.24
16.8	181.25	16.81	17.67556	16.8	195.4	16.51	17.81083	18.9	193.86
16.8	182.13	16.8	17.67583	16.8	196.25	16.51	17.81111	18.9	194.65
16.8	183.89	16.8	17.67639	16.4	197.08	16.51	17.81139	18.9	195.47
16.4	184.74	16.8	17.67667	16.4	197.94	16.49	17.81167	18.6	196.28
16.4	185.59	16.8	17.67694	16.4	198.76	16.49	17.81194	18.6	197.08
16.4	186.46	16.78	17.67722	16.4	199.61	16.49	17.81222	18.6	197.9
16.4	187.32	16.78	17.6775	16.4	200.43	16.49	17.81278	18.6	198.69
16.4	188.22	16.78	17.67778	16.4	201.28	16.49	17.81306	18.6	199.5
16.4	189.06	16.77	17.67806	16	202.12	16.49	17.81333	18.6	200.31
16.4	189.91	16.77	17.67861	17.5	203.8	16.49	17.81361	18.6	201.12
16.4	190.78	16.77	17.67889	16	204.63	16.5	17.81389	18.2	201.92
16.4	191.67	16.76	17.67917	17.1	205.47	16.5	17.81417	18.2	203.54
16.4	192.54	16.76	17.67944	16	206.3	16.49	17.81444	18.2	204.35
16	193.4	16.76	17.67972	16	207.16	16.49	17.815	17.8	205.15
16	195.08	16.76	17.68	16	208	16.49	17.81528	17.8	205.96
16	195.95	16.77	17.68028	17.1	208.82	16.49	17.81556	17.8	206.77
16	196.77	16.76	17.68056	16	209.66	16.49	17.81583	17.8	207.59
16	197.65	16.76	17.68111	15.7	210.51	16.48	17.81611	17.8	208.39
16	198.48	16.75	17.68139	15.3	211.34	16.48	17.81639	17.8	209.18
16	199.31	16.74	17.68167	15.7	212.2	16.49	17.81694	17.5	209.98
16	200.17	16.74	17.68194	15.7	213.85	16.49	17.81722	17.5	210.8
16	201.01	16.74	17.68222	15.3	214.7	16.49	17.8175	17.5	211.64
16	201.87	16.74	17.6825	16.4	215.54	16.49	17.81778	17.5	212.44
16	202.73	16.73	17.68278	16.4	216.4	16.5	17.81806	17.5	213.23
15.7	203.57	16.74	17.68333	15.3	217.22	16.49	17.81833	17.5	214.83
15.7	204.42	16.74	17.68361	15.3	218.06	16.48	17.81861	17.1	215.66
15.7	205.24	16.74	17.68389	15.3	218.88	16.47	17.81917	17.1	216.46
15.7	206.95	16.73	17.68417	16	219.75	16.47	17.81944	17.1	217.28
15.7	207.82	16.73	17.68444	16	220.58	16.48	17.81972	17.1	218.07
15.3	208.65	16.73	17.68472	15.7	221.42	16.49	17.82	17.1	218.88
14.6	209.49	16.73	17.685	15	222.25	16.49	17.82028	17.1	219.69
14.6	210.34	16.73	17.68556	15.3	223.1	16.49	17.82056	17.1	220.51
15	211.19	16.73	17.68583	15	223.94	16.48	17.82083	17.1	221.32
15	212.06	16.73	17.68611	15.3	225.6	16.47	17.82111	17.1	222.11
14.2	212.89	16.73	17.68639	15.3	226.46	16.47	17.82167	17.1	223.73
14.2	213.72	16.72	17.68667	15.7	227.3	16.48	17.82194	17.1	224.54
14.2	214.58	16.73	17.68694	15	228.13	16.49	17.82222	16.8	225.33
14.2	215.43	16.73	17.68722	15.7	228.96	16.49	17.8225	16.8	226.16
14.2	216.3	16.73	17.68778	15	229.8	16.5	17.82278	16.8	226.96
14.2	217.97	16.72	17.68806	15	230.66	16.49	17.82306	16.8	227.78
14.6	218.82	16.71	17.68833	15.7	231.5	16.5	17.82333	16.8	228.57
14.2	219.68	16.71	17.68861	15.7	232.32	16.5	17.82389	16.8	229.37
13.9	220.52	16.72	17.68889	15	233.15	16.49	17.82417	16.8	230.18
13.9	221.37	16.72	17.68917	15.7	234	16.49	17.82444	16.8	231.02
14.2	222.21	16.71	17.68944	15.3	235.69	16.5	17.82472	17.1	231.82
13.9	223.04	16.71	17.69	15.3	236.51	16.5	17.825	17.1	232.61
13.9	223.9	16.71	17.69028	15.3	237.35	16.49	17.82528	17.1	234.22
13.9	224.74	16.7	17.69056	15	238.19	16.5	17.82583	17.1	235.04
13.9	225.61	16.69	17.69083	15.3	239.04	16.51	17.82611	17.1	235.86
13.9	226.46	16.69	17.69111	16	239.88	16.49	17.82639	17.5	236.64
13.9	227.31	16.7	17.69139	16	240.72	16.5	17.82667	17.8	237.45
13.9	228.14	16.7	17.69167	16.4	241.53	16.52	17.82694	18.2	238.25
13.9	229.84	16.71	17.69194	16.4	242.38	16.52	17.82722	18.6	239.07
13.9	230.68	16.71	17.6925	17.5	243.23	16.51	17.8275	18.9	239.88
13.9	231.55	16.71	17.69278	18.9	244.06	16.51	17.82806	19.3	240.7
13.9	232.38	16.71	17.69306	20.4	244.91	16.51	17.82833	19.6	241.48
13.5	233.23	16.71	17.69333	19.3	246.57	16.51	17.82861	20.4	242.28
14.2	234.07	16.7	17.69361	20.4	247.41	16.49	17.82889	22.2	243.9
14.6	234.94	16.71	17.69389	21.1	248.26	16.47	17.82917	22.9	244.73
14.2	235.79	16.73	17.69417	20.7	249.08	16.47	17.82944	23.6	245.53



16.27	17.94639	20.4	182.92	15.84	18.27528	17.1	173.56	15.4	18.68833
16.27	17.94667	20.4	183.71	15.85	18.27556	17.1	174.25	15.4	18.68861
16.27	17.94694	20.4	184.47	15.84	18.27583	17.1	174.94	15.4	18.68889
16.27	17.94722	20	185.99	15.83	18.27639	16.8	175.66	15.4	18.68917
16.26	17.9475	20	186.77	15.82	18.27667	18.2	176.38	15.4	18.68944
16.27	17.94778	20	187.54	15.82	18.27694	16.8	177.07	15.39	18.69
16.28	17.94806	20	188.34	15.82	18.27722	16.4	177.78	15.39	18.69028
16.27	17.94861	20	189.09	15.82	18.2775	16	178.49	15.39	18.69056
16.26	17.94889	20	189.85	15.82	18.27778	16	179.2	15.38	18.69083
16.26	17.94917	20	190.6	15.81	18.27806	16	180.6	15.38	18.69111
16.27	17.94944	19.6	191.38	15.8	18.27861	16	181.32	15.38	18.69139
16.27	17.94972	19.6	192.15	15.78	18.27889	15.7	182.05	15.38	18.69167
16.28	17.95	19.6	192.91	15.78	18.27917	15.7	182.78	15.38	18.69222
16.28	17.95028	19.6	193.66	15.78	18.27944	15.7	183.53	15.37	18.6925
16.27	17.95083	19.6	194.4	15.79	18.27972	15.7	184.27	15.37	18.69278
16.28	17.95111	19.6	195.9	15.79	18.28	15.7	185	15.37	18.69306
16.28	17.95139	19.6	196.67	15.8	18.28028	15.7	185.71	15.35	18.69333
16.27	17.95167	19.6	197.41	15.79	18.28083	15.3	186.46	15.35	18.69361
16.27	17.95194	19.6	198.18	15.78	18.28111	15.3	187.2	15.35	18.69389
16.27	17.95222	19.3	198.92	15.78	18.28139	15.3	187.96	15.35	18.69444
16.26	17.9525	19.3	199.66	15.79	18.28167	15.3	188.69	15.33	18.69472
16.26	17.95306	19.3	200.42	15.8	18.28194	15.3	190.14	15.34	18.695
16.25	17.95333	18.9	201.18	15.82	18.28222	15.3	190.88	15.33	18.69528
16.26	17.95361	18.9	201.93	15.82	18.2825	15.3	191.63	15.34	18.69556
16.27	17.95389	18.9	202.68	15.81	18.28306	15.3	192.35	15.34	18.69583
16.27	17.95417	18.6	203.43	15.82	18.28333	16	193.07	15.33	18.69611
16.28	17.95444	18.6	204.2	15.84	18.28361	15.3	193.78	15.33	18.69667
16.27	17.95472	18.6	205.7	15.84	18.28389	15.3	194.49	15.31	18.69694
16.28	17.95528	18.6	206.45	15.84	18.28417	15.3	195.21	15.31	18.69722
16.29	17.95556	18.6	207.23	15.84	18.28444	15.3	195.93	15.32	18.6975
16.29	17.95583	18.6	207.98	15.82	18.28472	15	196.67	15.31	18.69778
16.29	17.95611	18.6	208.73	15.81	18.28528	15	197.39	15.32	18.69806
16.29	17.95639	18.2	209.46	15.81	18.28556	15	198.12	15.33	18.69833
16.29	17.95667	18.2	210.22	15.82	18.28583	14.6	199.55	15.34	18.69889
16.29	17.95694	18.2	210.98	15.81	18.28611	14.6	200.27	15.35	18.69917
16.29	17.9575	18.2	211.76	15.79	18.28639	14.6	200.99	15.34	18.69944
16.29	17.95778	18.2	212.5	15.81	18.28667	14.6	201.7	15.36	18.69972
16.29	17.95806	18.2	213.25	15.82	18.28694	14.6	202.44	15.37	18.7
16.29	17.95833	18.2	213.98	15.84	18.2875	14.6	203.16	15.38	18.70028
16.28	17.95861	17.8	215.51	15.85	18.28778	14.6	203.89	15.39	18.70056
16.28	17.95889	17.8	216.29	15.86	18.28806	14.2	204.59	15.39	18.70111
16.28	17.95917	17.8	217.03	15.86	18.28833	14.2	205.32	15.41	18.70139
16.29	17.95972	17.8	217.78	15.87	18.28861	14.2	206.03	15.4	18.70167
16.29	17.96	17.8	218.52	15.87	18.28889	14.2	206.77	15.39	18.70194
16.29	17.96028	17.8	219.28	15.87	18.28917	14.2	207.5	15.38	18.70222
16.29	17.96056	17.8	220.04	15.86	18.28972	14.2	208.93	15.38	18.7025
16.3	17.96083	17.8	220.79	15.86	18.29	14.2	209.65	15.37	18.70278
16.31	17.96111	17.8	221.56	15.86	18.29028	13.9	210.36	15.37	18.70333
16.31	17.96167	17.8	222.3	15.84	18.29056	13.9	211.09	15.38	18.70361
16.31	17.96194	17.8	223.06	15.83	18.29083	14.2	211.83	15.39	18.70389
16.32	17.96222	17.8	224.57	15.85	18.29111	13.9	212.55	15.39	18.70417
16.32	17.9625	17.8	225.31	15.85	18.29139	13.9	213.25	15.39	18.70444
16.31	17.96278	17.8	226.09	15.86	18.29194	13.9	213.97	15.39	18.70472
16.32	17.96306	17.8	226.83	15.86	18.29222	13.9	214.69	15.42	18.705
16.34	17.96333	18.2	227.58	15.87	18.2925	13.9	215.42	15.43	18.70556
16.32	17.96389	17.8	228.33	15.88	18.29278	13.9	216.16	15.45	18.70583
16.32	17.96417	18.2	229.08	15.88	18.29306	13.9	217.59	15.44	18.70611
16.32	17.96444	18.6	229.84	15.9	18.29333	14.2	218.31	15.45	18.70639
16.32	17.96472	18.6	230.61	15.9	18.29361	14.2	219.03	15.44	18.70667
16.3	17.965	18.9	231.37	15.9	18.29417	14.2	219.75	15.44	18.70694
16.31	17.96528	18.9	232.11	15.91	18.29444	14.2	220.48	15.43	18.7075
16.31	17.96556	18.9	232.85	15.91	18.29472	14.2	221.2	15.44	18.70778

16	188.5	14.9	19.21139	17.1	182.39	14.61	19.69917	26.1	170.74
15.7	189.26	14.89	19.21167	17.1	183.11	14.61	19.69944	26.1	171.26
15.7	190.03	14.88	19.21194	17.1	183.82	14.6	19.69972	26.9	171.79
15.7	190.82	14.88	19.21222	17.1	184.52	14.6	19.70028	27.9	172.32
15.7	192.37	14.88	19.2125	16.8	185.2	14.6	19.70056	29.7	172.84
15.7	193.15	14.87	19.21278	16.8	185.9	14.59	19.70083	28.3	173.36
15.7	193.9	14.87	19.21333	16.8	186.6	14.59	19.70111	28.3	173.88
15.7	194.66	14.88	19.21361	16.8	188.02	14.59	19.70139	29.4	174.4
15.7	195.43	14.89	19.21389	16.8	188.73	14.58	19.70167	30.1	174.91
15.3	196.19	14.9	19.21417	16.8	189.4	14.58	19.70194	30.5	175.43
15.3	196.96	14.9	19.21444	16.4	190.1	14.58	19.7025	31.5	175.96
15.3	197.75	14.9	19.21472	16.4	190.8	14.57	19.70278	33.7	176.49
15.3	198.5	14.92	19.215	16	191.5	14.57	19.70306	34.8	177
15.3	199.26	14.92	19.21528	16	192.2	14.56	19.70333	34.8	177.52
15.3	200.04	14.93	19.21583	16	192.89	14.57	19.70361	35.2	178.57
15.3	200.81	14.92	19.21611	16	193.58	14.57	19.70389	40.9	179.09
15.3	202.35	14.93	19.21639	16	194.25	14.57	19.70417	36.2	179.61
15	203.11	14.93	19.21667	15.7	194.93	14.57	19.70472	35.9	180.13
15	203.89	14.93	19.21694	15.7	195.62	14.58	19.705	36.2	180.65
15	204.64	14.95	19.21722	15.7	197	14.59	19.70528	36.6	181.17
15	205.4	14.96	19.2175	15.7	197.7	14.59	19.70556	36.6	181.68
15	206.17	14.97	19.21806	15.7	198.36	14.59	19.70583	37	182.2
15	206.96	14.96	19.21833	15.7	199.05	14.59	19.70611	37.3	182.72
15	207.74	14.95	19.21861	15.7	199.74	14.59	19.70639	37	183.26
15	208.49	14.95	19.21889	15.7	200.42	14.62	19.70694	37.3	183.79
15	209.24	14.95	19.21917	15.7	201.12	14.63	19.70722	37	184.3
14.6	210.01	14.95	19.21944	15.7	201.79	14.64	19.7075	37	184.82
14.6	210.77	14.96	19.21972	15.7	202.5	14.65	19.70778	36.6	185.85
14.6	212.33	14.96	19.22028	15.7	203.18	14.66	19.70806	36.6	186.36
14.6	213.09	14.97	19.22056	15.7	203.87	14.67	19.70833	36.6	186.88
14.6	213.85	14.98	19.22083	15.7	204.55	14.66	19.70861	37.3	187.44
15	214.62	15	19.22111	15.7	205.92	14.66	19.70917	37.3	188.02
15	215.39	15.02	19.22139	15.7	206.61	14.64	19.70944	38	188.59
15	216.18	15.03	19.22167	15.7	207.31	14.64	19.70972	37.7	189.13
15	216.94	15.03	19.22222	15.3	208	14.64	19.71	38.4	189.69
15	217.7	15.03	19.2225	15.3	208.67	14.64	19.71028	37	190.24
15.3	218.45	15.03	19.22278	15.3	209.36	14.64	19.71056	37.7	190.79
15.3	219.24	15.04	19.22306	15.3	210.04	14.66	19.71083	37.7	191.36
15.7	220	15.05	19.22333	15.3	210.73	14.66	19.71139	38	191.92
15.7	220.78	15.07	19.22361	15.3	211.43	14.66	19.71167	37	192.47
15.7	222.31	15.07	19.22389	15.7	212.13	14.67	19.71194	37	193.57
15.7	223.07	15.06	19.22417	15.7	212.8	14.69	19.71222	94.7	194.11
16	223.85	15.06	19.22472	15.7	213.48	14.69	19.7125	118.1	194.65
16	224.62	15.07	19.225	16	214.86	14.69	19.71278	129.6	195.21
16	225.37	15.07	19.22528	16	215.55	14.71	19.71306	132.5	195.76
16.4	226.16	15.08	19.22556	16.4	216.24	14.74	19.71361	133.2	196.32
16.4	226.92	15.09	19.22583	16.8	216.93	14.75	19.71389	135.4	196.86
16.8	227.7	15.08	19.22611	17.1	217.61	14.75	19.71417	135.1	197.41
17.1	228.45	15.08	19.22639	16.4	218.28	14.76	19.71444	134.7	197.97
17.1	229.21	15.1	19.22667	17.1	218.98	14.75	19.71472	134.7	198.51
17.5	229.98	15.11	19.22722	17.1	219.67	14.76	19.715	134	199.06
18.2	230.76	15.12	19.2275	17.1	220.36	14.76	19.71528	132.9	199.61
18.6	231.54	15.13	19.22778	17.5	221.05	14.76	19.71583	131.1	200.7
18.6	232.29	15.14	19.22806	17.8	221.74	14.77	19.71611	131.1	201.25
18.9	233.82	15.15	19.22833	17.5	223.11	14.77	19.71639	131.4	201.8
20	234.59	15.17	19.22861	18.2	223.8	14.79	19.71667	131.8	202.36
19.6	235.38	15.17	19.22889	17.8	224.48	14.79	19.71694	132.2	202.91
20	236.13	15.17	19.22944	17.8	225.15	14.77	19.71722	131.8	203.45
21.8	236.9	15.18	19.22972	17.8	225.87	14.76	19.7175	132.2	204.01
23.3	237.65	15.19	19.23	18.2	226.55	14.76	19.71806	145.9	204.55
24	238.43	15.2	19.23028	20	227.24	14.78	19.71833	146.6	205.11
25.4	239.2	15.21	19.23056	19.6	227.92	14.8	19.71861	147	205.65

13.13	8.651111
13.12	8.651667
13.11	8.651944
13.11	8.652222
13.11	8.6525
13.11	8.652778
13.1	8.653056
13.09	8.653333
13.08	8.653611
13.08	8.654167
13.08	8.654444
13.08	8.654722
13.08	8.655
13.08	8.655278
13.08	8.655556
13.08	8.655833
13.08	8.656111
13.08	8.656667
13.08	8.656944
13.08	8.657222
13.08	8.6575
13.08	8.657778
13.08	8.658056
13.07	8.658333
13.07	8.658889
13.07	8.659167
13.07	8.659444
13.06	8.659722
13.06	8.66
13.06	8.660278
13.06	8.660556
13.06	8.660833
13.06	8.661389
13.06	8.661667
13.06	8.661944
13.06	8.662222
13.06	8.6625
13.06	8.662778
13.06	8.663056
13.06	8.663611
13.06	8.663889
13.07	8.664167
13.13	8.664444
13.17	8.664722
13.17	8.665
13.18	8.665278
13.18	8.665556
13.18	8.666111
13.17	8.666389
13.17	8.666667
13.17	8.666944
13.18	8.667222
13.18	8.6675
13.18	8.668056
13.18	8.668333
13.18	8.668611
13.18	8.668889
13.18	8.669167
13.18	8.669444
13.22	8.669722
13.25	8.67
13.26	8.670556

14.2	236.61	16.73	17.69472	20	249.92	16.47	17.82972	24	246.33
14.2	237.46	16.73	17.695	19.6	250.79	16.48	17.83028	23.6	247.14
14.6	238.32	16.72	17.69528	18.9	251.62	16.49	17.83056	22.9	247.94
14.6	239.17	16.71	17.69556	18.2	252.44	16.51	17.83083	22.9	248.75
14.6	240.86	16.72	17.69583	17.5	253.29	16.53	17.83111	22.5	249.57
14.6	241.7	16.73	17.69611	17.1	254.13	16.54	17.83139	22.2	250.37
15	242.56	16.73	17.69639	16.4	254.99	16.57	17.83167	21.1	251.17
15	243.4	16.74	17.69667	16	255.81	16.61	17.83194	20.4	252.76
15.3	244.25	16.74	17.69722	16	257.48	16.63	17.8325	19.3	253.6
16	245.1	16.74	17.6975	15.7	258.32	16.64	17.83278	18.6	254.42
16	245.95	16.73	17.69778	15.7	259.18	16.64	17.83306	18.2	255.23
16.4	246.79	16.71	17.69806	15.7	260.01	16.64	17.83333	17.8	256.01
16.8	247.62	16.68	17.69833	15.7	260.84	16.63	17.83361	17.8	256.82
16.8	248.49	16.69	17.69861	16	261.67	16.62	17.83389	17.5	257.63
16.4	249.34	16.68	17.69889	16.8	262.52	16.61	17.83417	17.8	258.42
15.3	250.19	16.68	17.69944	17.1	263.37	16.6	17.83444	17.8	259.27
16	251.03	16.68	17.69972	17.1	264.21	16.59	17.835	17.8	260.06
14.6	252.72	16.69	17.7	17.1	265.02	16.57	17.83528	18.2	261.66
14.2	253.57	16.69	17.70028	17.1	265.86	16.54	17.83556	18.9	262.47
13.9	254.43	16.7	17.70056	17.1	266.72	16.52	17.83583	20.4	263.3
13.9	255.28	16.73	17.70083	17.5	267.55	16.52	17.83611	20.4	264.1
13.2	256.12	16.75	17.70111	16.8	268.4	16.54	17.83639	20.7	264.9
13.2	256.96	16.78	17.70139	16.8	270.06	16.56	17.83667	20.4	265.7
13.2	257.82	16.8	17.70194	16.8	270.91	16.58	17.83694	20.7	266.51
13.5	258.68	16.8	17.70222	17.8	271.75	16.59	17.8375	21.1	267.32
13.2	259.54	16.8	17.7025	18.9	272.58	16.6	17.83778	21.4	268.13
12.8	260.36	16.79	17.70278	20.4	273.44	16.59	17.83806	21.8	268.94
13.2	261.21	16.78	17.70306	20.7	274.27	16.57	17.83833	21.8	269.74
13.2	262.04	16.78	17.70333	20.4	275.11	16.54	17.83861	22.9	271.35
13.9	262.91	16.77	17.70361	20	275.94	16.51	17.83889	25.4	272.14
13.9	263.78	16.76	17.70417	22.2	276.77	16.46	17.83917	27.2	272.97
13.2	265.45	16.73	17.70444	22.5	277.62	16.46	17.83972	27.9	273.78
13.5	266.3	16.7	17.70472	21.8	278.48	16.46	17.84	28.7	274.58
13.5	267.16	16.68	17.705	22.9	279.3	16.44	17.84028	28.7	275.39
14.2	268.01	16.68	17.70528	20	280.97	16.43	17.84056	27.9	276.18
13.5	268.87	16.7	17.70556	19.6	281.79	16.42	17.84083	31.9	276.99
12.8	269.7	16.72	17.70583	18.6	282.68	16.41	17.84111	33.3	277.81
12.8	270.56	16.75	17.70639	18.6	283.5	16.39	17.84139	34.8	278.63
12.4	271.4	16.78	17.70667	18.9	284.33	16.35	17.84194	30.8	279.42
12.8	272.22	16.8	17.70694	20	285.15	16.33	17.84222	29	281.03
12.4	273.11	16.8	17.70722	21.4	286	16.33	17.8425	27.6	281.84
12.8	273.96	16.78	17.7075	22.2	286.86	16.34	17.84278	27.9	282.66
12.8	274.8	16.75	17.70778	19.6	287.71	16.37	17.84306	29	283.45
12.8	276.49	16.72	17.70806	19.6	288.51	16.41	17.84333	29.7	284.26
14.2	277.35	16.7	17.70861	19.6	289.37	16.43	17.84361	31.2	285.06
13.9	278.21	16.72	17.70889	20	290.21	16.44	17.84417	34.8	285.87
13.5	279.06	16.73	17.70917	21.4	291.89	16.44	17.84444	33	286.68
12.8	279.89	16.73	17.70944	22.9	292.72	16.44	17.84472	35.2	287.5
12.4	280.73	16.7	17.70972	23.3	293.56	16.43	17.845	33.7	288.3
12.4	281.59	16.68	17.71	24	294.4	16.43	17.84528	35.9	289.09
12.1	282.45	16.67	17.71028	26.1	295.24	16.43	17.84556	35.5	289.92
12.1	283.3	16.66	17.71056	31.5	296.07	16.43	17.84583	38	291.53
12.8	284.13	16.66	17.71111	34.4	296.92	16.41	17.84611	38.4	292.34
13.2	284.97	16.64	17.71139	38.8	297.75	16.39	17.84667	42.4	293.14
13.9	285.83	16.63	17.71167	46	298.59	16.37	17.84694	54.6	293.95
13.2	287.54	16.63	17.71194	40.9	299.43	16.34	17.84722	57.9	294.75
13.2	288.37	16.65	17.71222	42.4	300.26	16.3	17.8475	58.6	295.55
13.5	289.22	16.65	17.7125	59	301.12	16.27	17.84778	70.1	296.37
12.8	290.07	16.66	17.71278	70.1	301.97	16.23	17.84806	75.2	297.18
13.2	290.93	16.66	17.71333	78.1	303.62	16.19	17.84833	78.8	297.99
12.8	291.76	16.66	17.71361	81.7	304.47	16.15	17.84889	80.6	298.8
12.4	292.63	16.68	17.71389	94.3	305.3	16.07	17.84917	79.5	299.58

16.32	17.96611	19.3	234.37	15.89	18.295	14.2	221.93	15.44	18.70806
16.31	17.96639	20	235.14	15.9	18.29528	14.2	222.64	15.45	18.70833
16.32	17.96667	20	235.89	15.91	18.29556	14.2	223.36	15.46	18.70861
16.32	17.96694	20.7	236.63	15.92	18.29611	14.2	224.09	15.47	18.70889
16.31	17.96722	21.8	237.37	15.93	18.29639	14.6	224.81	15.47	18.70917
16.31	17.9675	22.2	238.13	15.94	18.29667	14.6	225.53	15.46	18.70944
16.31	17.96806	22.2	238.88	15.94	18.29694	14.6	226.98	15.46	18.71
16.34	17.96833	23.3	239.65	15.94	18.29722	14.6	227.7	15.47	18.71028
16.35	17.96861	23.3	240.41	15.94	18.2975	15	228.41	15.48	18.71056
16.38	17.96889	23.6	241.16	15.93	18.29778	15	229.12	15.5	18.71083
16.42	17.96917	24	241.9	15.93	18.29806	15	229.85	15.5	18.71111
16.46	17.96944	24.7	242.66	15.93	18.29861	15.3	230.59	15.51	18.71139
16.47	17.97	25.1	243.42	15.94	18.29889	15.3	231.31	15.51	18.71167
16.49	17.97028	25.1	244.93	15.94	18.29917	16	232.02	15.51	18.71194
16.5	17.97056	25.8	245.67	15.94	18.29944	16.4	232.74	15.51	18.7125
16.49	17.97083	26.1	246.43	15.94	18.29972	16.8	233.46	15.54	18.71278
16.48	17.97111	26.1	247.19	15.93	18.3	17.1	234.18	15.55	18.71306
16.47	17.97139	26.5	247.94	15.91	18.30028	17.5	234.91	15.56	18.71333
16.46	17.97167	26.9	248.7	15.91	18.30056	17.8	235.65	15.57	18.71361
16.45	17.97222	25.8	249.45	15.92	18.30111	17.8	236.36	15.56	18.71389
16.44	17.9725	25.4	250.21	15.94	18.30139	18.2	237.78	15.56	18.71417
16.42	17.97278	24.7	250.96	15.96	18.30167	18.6	238.51	15.57	18.71472
16.4	17.97306	23.6	251.7	15.99	18.30194	18.6	239.24	15.57	18.715
16.38	17.97333	23.6	252.45	16.03	18.30222	18.9	239.97	15.57	18.71528
16.35	17.97361	23.3	253.21	16.05	18.3025	18.9	240.69	15.56	18.71556
16.35	17.97417	22.9	253.97	16.08	18.30278	19.3	241.39	15.55	18.71583
16.35	17.97444	22.9	255.48	16.11	18.30333	19.3	242.12	15.55	18.71611
16.36	17.97472	23.3	256.23	16.11	18.30361	19.6	242.85	15.56	18.71639
16.37	17.975	23.3	256.98	16.15	18.30389	20.4	243.56	15.57	18.71667
16.36	17.97528	23.3	257.72	16.18	18.30417	20.4	244.28	15.58	18.71722
16.34	17.97556	23.6	258.49	16.19	18.30444	20.7	245.02	15.58	18.7175
16.32	17.97583	23.3	259.27	16.18	18.30472	21.1	245.73	15.58	18.71778
16.29	17.97639	25.8	260	16.17	18.305	21.4	246.45	15.57	18.71806
16.25	17.97667	28.7	260.75	16.15	18.30528	21.8	247.9	15.56	18.71833
16.22	17.97694	34.8	261.5	16.11	18.30583	22.2	248.61	15.57	18.71861
16.17	17.97722	37	262.26	16.08	18.30611	22.2	249.35	15.59	18.71889
16.15	17.9775	36.2	263.02	16.05	18.30639	22.5	250.07	15.6	18.71944
16.15	17.97778	37	263.78	16.02	18.30667	22.9	250.78	15.62	18.71972
16.16	17.97806	38	264.53	16	18.30694	23.3	251.51	15.64	18.72
16.17	17.97861	38	265.28	15.97	18.30722	23.6	252.21	15.65	18.72028
16.17	17.97889	41.3	266.79	15.94	18.3075	24.3	252.94	15.66	18.72056
16.15	17.97917	40.6	267.54	15.91	18.30778	24.7	253.65	15.69	18.72083
16.13	17.97944	42.4	268.29	15.87	18.30833	25.4	254.41	15.72	18.72111
16.11	17.97972	44.9	269.06	15.85	18.30861	25.1	255.12	15.74	18.72139
16.1	17.98	45.3	269.79	15.83	18.30889	26.9	255.83	15.74	18.72167
16.08	17.98056	51	270.56	15.81	18.30917	26.1	256.55	15.75	18.72222
16.09	17.98083	61.1	271.3	15.79	18.30944	33	257.28	15.75	18.7225
16.15	17.98111	71.2	272.06	15.75	18.30972	37.3	257.99	15.72	18.72278
16.18	17.98139	74.8	272.8	15.72	18.31	39.5	259.46	15.67	18.72306
16.2	17.98167	76.3	273.57	15.7	18.31056	44.9	260.17	15.63	18.72333
16.21	17.98194	77.7	274.31	15.67	18.31083	51.4	260.87	15.6	18.72361
16.2	17.98222	77.7	275.07	15.65	18.31111	55	261.6	15.55	18.72389
16.18	17.98278	77.3	275.8	15.62	18.31139	56.4	262.33	15.49	18.72444
16.15	17.98306	79.5	277.33	15.59	18.31167	55	263.05	15.45	18.72472
16.14	17.98333	87.1	278.1	15.56	18.31194	59	263.79	15.41	18.725
16.14	17.98361	90	278.84	15.55	18.31222	56.1	264.49	15.39	18.72528
16.12	17.98389	81.7	279.59	15.57	18.31278	60.8	265.21	15.36	18.72556
16.1	17.98417	83.8	280.35	15.58	18.31306	62.9	265.92	15.33	18.72583
16.06	17.98444	77.7	281.1	15.6	18.31333	65.8	266.67	15.3	18.72611
16.03	17.98472	76.3	281.86	15.6	18.31361	69.8	267.38	15.26	18.72667
16.01	17.98528	79.9	282.63	15.58	18.31389	74.1	268.11	15.24	18.72694
15.97	17.98556	84.6	283.38	15.56	18.31417	71.9	269.55	15.22	18.72722

25.1	239.99	15.22	19.23083	19.3	228.61	14.81	19.71889	147.3	206.2
26.9	240.74	15.22	19.23111	19.3	229.29	14.81	19.71917	147.3	206.76
26.9	241.49	15.22	19.23139	21.8	229.98	14.8	19.71944	147.3	207.87
27.9	242.27	15.22	19.23194	22.9	230.68	14.82	19.72	147.3	208.41
29	243.04	15.22	19.23222	21.8	232.05	14.83	19.72028	148.4	208.96
29.4	243.8	15.21	19.2325	25.1	232.73	14.85	19.72056	148.4	209.5
29.4	245.36	15.21	19.23278	25.1	233.41	14.86	19.72083	147.3	210.05
30.1	246.1	15.21	19.23306	27.6	234.1	14.88	19.72111	145.5	210.6
30.1	246.88	15.2	19.23333	27.9	234.79	14.89	19.72139	146.2	211.15
33.3	247.65	15.19	19.23361	29.4	235.51	14.9	19.72167	148	211.72
37	248.42	15.21	19.23389	28.7	236.18	14.91	19.72222	148.4	212.28
38	249.18	15.21	19.23417	29.7	236.86	14.9	19.7225	152.4	212.81
40.2	249.97	15.22	19.23472	30.5	237.53	14.9	19.72278	153.1	213.35
42	250.72	15.22	19.235	31.5	238.23	14.9	19.72306	152.7	213.9
46.7	251.49	15.22	19.23528	30.5	239.61	14.9	19.72333	152.4	215
44.9	252.26	15.24	19.23556	31.2	240.3	14.9	19.72361	156.3	215.55
45.6	253.02	15.23	19.23583	33	240.98	14.9	19.72389	156.7	216.12
47.4	253.8	15.22	19.23611	34.4	241.66	14.91	19.72444	154.5	216.67
48.5	254.57	15.22	19.23639	38.4	242.34	14.91	19.72472	157.1	217.22
46.3	255.34	15.21	19.23694	41.3	243.05	14.91	19.725	157.8	217.75
61.8	256.1	15.2	19.23722	43.8	243.74	14.91	19.72528	158.1	218.29
74.8	257.63	15.17	19.2375	43.8	244.42	14.91	19.72556	157.8	218.85
76.3	258.41	15.13	19.23778	46.3	245.11	14.9	19.72583	157.8	219.4
80.2	259.18	15.09	19.23806	49.9	245.79	14.9	19.72639	156.7	219.96
85.3	259.94	15.03	19.23833	51.4	246.47	14.9	19.72667	156.3	220.5
90.3	260.71	14.98	19.23861	51.7	247.16	14.9	19.72694	158.1	221.07
95.7	261.47	14.92	19.23889	52.8	248.54	14.88	19.72722	158.9	222.15
96.1	262.24	14.86	19.23944	52.1	249.23	14.87	19.7275	157.8	222.7
98.3	263.02	14.82	19.23972	52.8	249.93	14.86	19.72778	157.4	223.25
97.2	263.8	14.79	19.24	58.2	250.61	14.86	19.72806	157.4	223.81
98.3	264.55	14.78	19.24028	61.5	251.29	14.85	19.72861	157.1	224.36
100.4	265.32	14.76	19.24056	64	251.97	14.85	19.72889	157.1	224.91
99.3	266.08	14.74	19.24083	66.9	252.65	14.84	19.72917	156	225.45
104.4	266.85	14.71	19.24111	68.7	253.35	14.84	19.72944	155.2	226.01
104	268.39	14.69	19.24167	68.3	254.05	14.83	19.72972	156.3	226.57
105.8	269.16	14.67	19.24194	72.3	254.75	14.81	19.73	157.1	227.11
105.1	269.92	14.66	19.24222	82.4	255.43	14.81	19.73028	156.7	227.67
104.8	270.7	14.63	19.2425	96.5	256.79	14.79	19.73083	157.4	228.21
105.5	271.46	14.61	19.24278	101.9	257.47	14.76	19.73111	156.3	228.76
105.8	272.21	14.58	19.24306	103.7	258.17	14.73	19.73139	157.8	229.31
105.8	272.99	14.56	19.24333	107.3	258.87	14.68	19.73167	158.1	229.85
106.2	273.78	14.54	19.24361	106.9	259.56	14.63	19.73194	158.1	230.41
106.2	274.54	14.52	19.24417	106.2	260.23	14.57	19.73222	158.9	231.61
105.8	275.29	14.51	19.24444	105.8	260.91	14.52	19.7325	158.1	232.21
105.8	276.06	14.5	19.24472	105.8	261.59	14.49	19.73306	159.6	232.82
106.2	276.81	14.47	19.245	106.2	262.28	14.46	19.73333	159.6	233.44
106.9	277.61	14.44	19.24528	106.2	262.98	14.43	19.73361	161.4	234.05
105.8	278.39	14.48	19.24556	106.6	263.68	14.42	19.73389	161.4	234.67
106.2	279.9	14.51	19.24583	106.9	265.02	14.4	19.73417	161	235.3
104.8	280.67	14.52	19.24639	107.3	265.71	14.39	19.73444	162.5	235.92
105.5	281.44	14.54	19.24667	107.3	266.41	14.38	19.73472	161.4	236.51
105.8	282.22	14.55	19.24694	107.3	267.1	14.37	19.73528	161.4	237.12
105.8	282.99	14.55	19.24722	107.3	267.78	14.36	19.73556	161	237.73
106.2	283.73	14.54	19.2475	108.4	268.48	14.35	19.73583	160.7	238.34
106.6	284.51	14.52	19.24778	109.1	269.15	14.34	19.73611	160.3	238.97
106.6	285.27	14.51	19.24806	110.5	269.84	14.33	19.73639	161.4	239.58
105.8	286.05	14.52	19.24833	111.6	270.53	14.31	19.73667	159.9	240.82
101.2	286.83	14.56	19.24889	113.1	271.22	14.29	19.73722	160.7	241.43
102.2	287.59	14.59	19.24917	113.4	271.9	14.27	19.7375	161	242.03
101.5	288.35	14.6	19.24944	113.4	272.59	14.26	19.73778	162.8	242.66
99.7	289.11	14.62	19.24972	113.4	273.97	14.25	19.73806	163.5	243.28
98.6	290.64	14.63	19.25	113.4	274.66	14.25	19.73833	163.5	243.89



13.27	8.670833
13.27	8.671111
13.27	8.671389
13.27	8.671667
13.27	8.671944
13.28	8.672222
13.28	8.672778
13.28	8.673056
13.28	8.673333
13.28	8.673611
13.29	8.673889
13.3	8.674167
13.31	8.674722
13.31	8.675
13.32	8.675278
13.32	8.675556
13.34	8.675833
13.34	8.676111
13.35	8.676389
13.37	8.676667
13.37	8.677222
13.35	8.6775
13.35	8.677778
13.35	8.678056
13.35	8.678333
13.35	8.678611
13.35	8.678889
13.36	8.679444
13.36	8.679722
13.35	8.68
13.35	8.680278
13.35	8.680556
13.35	8.680833
13.35	8.681111
13.35	8.681389
13.35	8.681944
13.35	8.682222
13.35	8.6825
13.35	8.682778
13.35	8.683056
13.35	8.683333
13.37	8.683611
13.37	8.683889
13.37	8.684167
13.37	8.684722
13.38	8.685
13.39	8.685278
13.41	8.685556
13.42	8.685833
13.43	8.686111
13.44	8.686389
13.44	8.686944
13.44	8.687222
13.44	8.6875
13.44	8.687778
13.44	8.688056
13.44	8.688333
13.44	8.688611
13.45	8.688889
13.46	8.689444
13.46	8.689722
13.47	8.69

12.1	293.46	16.69	17.71417	106.6	306.16	15.98	17.84944	87.8	300.4
12.1	294.3	16.7	17.71444	118.8	306.98	15.88	17.84972	101.5	302.04
12.1	295.15	16.7	17.71472	118.5	307.8	15.8	17.85	104	302.83
12.8	296	16.69	17.715	92.9	308.64	15.79	17.85028	104	303.62
13.5	296.87	16.68	17.71556	65.4	309.5	15.94	17.85056	110.9	304.44
14.6	297.71	16.68	17.71583	40.2	310.33	16.16	17.85111	118.5	305.25
16	299.39	16.66	17.71611	34.8	311.18	16.32	17.85139	116.7	306.07
16.4	300.24	16.68	17.71639	24	312.02	16.43	17.85167	123.9	307.67
15.7	301.09	16.7	17.71667	20	312.84	16.47	17.85194	110.2	308.47
17.8	301.96	16.7	17.71694	19.3	314.51	16.49	17.85222	95	309.28
22.2	302.79	16.68	17.71722	16	315.32	16.51	17.8525	72.7	310.1
27.2	303.63	16.63	17.71778	15.7	316.15	16.52	17.85278	52.5	310.91
42.4	304.49	16.56	17.71806	15.7	316.99	16.53	17.85333	41.6	311.7
55.3	305.33	16.47	17.71833	15.3	317.84	16.53	17.85361	30.5	312.5
60.8	306.21	16.36	17.71861	14.2	318.66	16.54	17.85389	25.8	313.31
74.1	307.04	16.23	17.71889	13.9	319.5	16.55	17.85417	23.3	314.12
75.5	307.87	16.13	17.71917	13.5	320.36	16.56	17.85444	22.5	314.9
47.1	308.72	16.23	17.71944	13.5	321.19	16.57	17.85472	21.1	316.49
34.1	310.42	16.39	17.72	13.5	322.03	16.57	17.855	21.8	317.31
21.4	311.28	16.53	17.72028	13.9	322.85	16.58	17.85556	20	318.11
14.6	312.12	16.63	17.72056	14.2	323.68	16.57	17.85583	19.3	318.92
11.3	312.96	16.7	17.72083	13.9	325.39	16.57	17.85611	17.5	319.72
9.5	313.81	16.72	17.72111	13.9	326.22	16.58	17.85639	17.5	320.54
9.5	314.63	16.73	17.72139	14.6	327.04	16.59	17.85667	17.1	321.35
9.5	315.47	16.74	17.72194	13.2	327.88	16.6	17.85694	17.1	322.14
9.5	316.31	16.73	17.72222	12.4	328.72	16.63	17.85722	17.1	322.95
9.9	317.16	16.73	17.7225	13.2	329.59	16.66	17.85778	17.5	323.75
8.8	317.99	16.75	17.72278	12.1	330.42	16.68	17.85806	17.5	324.57
8.8	319.69	16.77	17.72306	12.1	331.24	16.7	17.85833	17.1	325.39
8.5	320.55	16.78	17.72333	12.1	332.07	16.69	17.85861	17.8	326.98
8.5	321.39	16.78	17.72361	12.1	332.92	16.68	17.85889	17.5	327.78
8.5	322.23	16.77	17.72417	12.4	333.77	16.67	17.85917	16.8	328.6
8.8	323.07	16.76	17.72444	12.8	335.43	16.66	17.85944	16.4	329.42
9.2	323.92	16.75	17.72472	13.2	336.27	16.65	17.86	16	330.23
9.5	324.79	16.76	17.725	13.5	337.11	16.65	17.86028	16.4	331.01
9.5	325.64	16.77	17.72528	13.5	337.95	16.65	17.86056	16.4	331.81
10.6	326.46	16.76	17.72556	14.6	338.79	16.64	17.86083	16.8	332.63
10.3	327.31	16.77	17.72583	15.7	339.63	16.65	17.86111	17.1	333.44
11	328.16	16.78	17.72611	17.1	340.45	16.66	17.86139	17.8	334.25
8.5	329.02	16.82	17.72667	19.3	341.3	16.68	17.86194	19.3	335.05
8.5	329.89	16.87	17.72694	22.5	342.12	16.7	17.86222	20.4	335.84
8.1	331.54	16.9	17.72722	24.7	342.92	16.7	17.8625	21.1	336.65
8.1	332.4	16.89	17.7275	24.7	343.77	16.72	17.86278	20.4	338.27
8.1	333.25	16.86	17.72778	25.4	345.43	16.77	17.86306	23.3	339.08
8.1	334.11	16.83	17.72806	18.2	346.26	16.79	17.86333	25.4	339.89
8.1	334.94	16.82	17.72833	17.5	347.11	16.8	17.86361	26.1	340.69
8.1	335.78	16.8	17.72889	16.4	347.95	16.79	17.86417	30.5	341.48
8.5	336.62	16.8	17.72917	16	348.8	16.76	17.86444	31.5	342.27
7.7	337.49	16.8	17.72944	16	349.63	16.72	17.86472	35.9	343.05
8.1	338.33	16.82	17.72972	13.9	350.46	16.69	17.865	37	343.87
8.1	339.18	16.81	17.73	11	351.3	16.67	17.86528	37	344.66
8.8	340.02	16.8	17.73028	10.6	352.12	16.66	17.86556	34.8	345.47
9.2	340.86	16.8	17.73056	9.9	353.01	16.66	17.86583	29.4	346.27
9.5	341.71	16.82	17.73111	9.5	353.83	16.66	17.86639	30.5	347.07
10.3	343.35	16.83	17.73139	9.2	354.64	16.67	17.86667	22.9	348.73
10.6	344.2	16.85	17.73167	9.2	355.49	16.67	17.86694	22.9	349.52
11.3	345.06	16.88	17.73194	8.5	357.19	16.68	17.86722	20.7	350.32
10.3	345.88	16.91	17.73222	8.1	358.02	16.68	17.8675	16.8	351.12
9.5	346.73	16.94	17.7325	8.1	358.86	16.7	17.86778	14.6	351.92
8.8	347.57	16.94	17.73278	8.1	359.69	16.71	17.86806	14.2	352.76
8.8	348.44	16.92	17.73333	8.1	360.52	16.71	17.86861	12.4	353.57
9.2	349.3	16.89	17.73361	8.1	361.38	16.73	17.86889	11.3	354.36

15.94	17.98583	88.2	284.11	15.53	18.31444	74.5	270.28	15.2	18.7275
15.91	17.98611	91.1	284.86	15.53	18.315	82	270.99	15.17	18.72778
15.87	17.98639	97.5	285.62	15.52	18.31528	87.1	271.7	15.12	18.72806
15.84	17.98667	95.4	287.14	15.51	18.31556	88.2	272.43	15.09	18.72833
15.8	17.98694	94.7	287.89	15.54	18.31583	88.5	273.16	15.07	18.72889
15.74	17.9875	95.4	288.63	15.57	18.31611	90.3	273.88	15.05	18.72917
15.66	17.98778	93.9	289.38	15.59	18.31639	90.7	274.6	15.03	18.72944
15.51	17.98833	96.1	290.14	15.59	18.31667	91.4	275.32	15.01	18.72972
15.51	17.98861	96.8	290.9	15.58	18.31722	90.7	276.03	15	18.73
15.67	17.98889	100.4	291.65	15.57	18.3175	92.1	276.75	14.97	18.73028
15.84	17.98917	105.8	292.41	15.55	18.31778	97.2	277.48	14.92	18.73056
15.97	17.98944	112	293.15	15.53	18.31806	93.2	278.22	14.91	18.73083
16.1	17.98972	113.1	293.91	15.51	18.31833	92.9	279.64	14.95	18.73139
16.22	17.99	115.9	294.66	15.49	18.31861	91.4	280.36	14.95	18.73167
16.28	17.99056	121	295.42	15.47	18.31889	87.8	281.08	14.98	18.73194
16.3	17.99083	119.5	296.93	15.45	18.31944	88.9	281.82	14.99	18.73222
16.32	17.99111	121	297.69	15.43	18.31972	88.2	282.55	14.99	18.7325
16.32	17.99139	120.6	298.45	15.42	18.32	87.1	283.27	14.98	18.73278
16.34	17.99167	118.5	299.19	15.4	18.32028	88.2	283.97	14.97	18.73306
16.34	17.99194	119.9	299.94	15.38	18.32056	91.1	284.7	14.95	18.73361
16.34	17.99222	115.9	300.68	15.35	18.32083	93.9	285.41	14.93	18.73389
16.37	17.99278	119.2	301.47	15.33	18.32111	94.3	286.15	14.92	18.73417
16.39	17.99306	119.9	302.22	15.29	18.32167	91.1	286.88	14.93	18.73444
16.41	17.99333	122.8	302.95	15.27	18.32194	92.9	287.6	14.96	18.73472
16.42	17.99361	119.5	303.7	15.24	18.32222	89.6	289.02	14.99	18.735
16.41	17.99389	129.6	304.46	15.21	18.3225	88.5	289.75	15.01	18.73528
16.41	17.99417	133.6	305.22	15.16	18.32278	86.7	290.48	15.02	18.73583
16.4	17.99444	139.4	305.99	15.1	18.32306	87.4	291.19	15.03	18.73611
16.41	17.995	150.9	307.48	15.04	18.32333	86.4	291.93	15.02	18.73639
16.42	17.99528	136.5	308.22	15.03	18.32361	86.7	292.64	15.02	18.73667
16.42	17.99556	139.7	308.99	15	18.32417	86.4	293.36	15.01	18.73694
16.44	17.99583	114.1	309.75	15.17	18.32444	86.7	294.09	15.01	18.73722
16.46	17.99611	84.6	310.51	15.39	18.32472	87.4	294.81	15	18.7375
16.49	17.99639	65.1	311.26	15.6	18.325	88.5	295.52	14.99	18.73778
16.52	17.99667	56.1	312	15.74	18.32528	88.2	296.26	14.97	18.73833
16.53	17.99694	39.1	312.76	15.84	18.32556	88.9	296.98	14.95	18.73861
16.53	17.9975	33.3	313.51	15.91	18.32583	88.5	297.71	14.94	18.73889
16.51	17.99778	31.9	314.25	15.96	18.32639	89.2	299.14	14.92	18.73917
16.5	17.99806	30.5	314.98	15.98	18.32667	90	299.86	14.91	18.73944
16.49	17.99833	29	315.72	15.99	18.32694	90	300.58	14.9	18.73972
16.49	17.99861	28.7	317.23	16	18.32722	92.1	301.31	14.9	18.74
16.49	17.99889	26.9	317.98	16.01	18.3275	91.4	302.05	14.89	18.74056
16.49	17.99917	26.5	318.72	16.03	18.32778	91.4	302.75	14.88	18.74083
16.49	17.99972	26.1	319.48	16.04	18.32806	92.1	303.47	14.86	18.74111
16.49	18	25.1	320.24	16.04	18.32861	93.9	304.17	14.85	18.74139
16.47	18.00028	24.7	321	16.05	18.32889	95.4	304.91	14.82	18.74167
16.49	18.00056	24.7	321.74	16.05	18.32917	98.6	305.65	14.79	18.74194
16.53	18.00083	25.1	322.49	16.05	18.32944	101.2	306.38	14.78	18.74222
16.54	18.00111	25.4	323.25	16.05	18.32972	101.9	307.08	14.77	18.7425
16.56	18.00139	26.9	323.99	16.05	18.33	101.2	307.79	14.79	18.74306
16.59	18.00194	27.2	324.75	16.05	18.33028	83.5	308.52	14.82	18.74333
16.62	18.00222	27.9	325.53	16.06	18.33083	67.3	309.97	15.01	18.74361
16.65	18.0025	29	327.02	16.08	18.33111	52.5	310.7	15.18	18.74389
16.64	18.00278	29	327.76	16.09	18.33139	43.4	311.42	15.33	18.74417
16.59	18.00306	29.4	328.53	16.1	18.33167	34.8	312.13	15.46	18.74444
16.56	18.00333	29.7	329.28	16.11	18.33194	32.6	312.83	15.55	18.74472
16.52	18.00361	29.7	330.05	16.15	18.33222	30.5	313.58	15.59	18.74528
16.5	18.00417	30.1	330.79	16.17	18.3325	29.4	314.28	15.62	18.74556
16.5	18.00444	30.5	331.53	16.18	18.33306	29.4	314.99	15.64	18.74583
16.5	18.00472	31.2	332.29	16.18	18.33333	28.7	315.69	15.65	18.74611
16.5	18.005	31.5	333.04	16.17	18.33361	27.9	316.4	15.66	18.74639
16.5	18.00528	33.7	333.79	16.16	18.33389	27.6	317.13	15.68	18.74667

96.5	291.42	14.64	19.25028	113.4	275.33	14.25	19.73861	164.3	244.5
96.5	292.2	14.65	19.25056	112.7	276.02	14.24	19.73889	163.9	245.13
95.7	292.95	14.66	19.25083	114.1	276.71	14.23	19.73944	164.3	245.73
95.4	293.73	14.66	19.25139	118.1	277.4	14.21	19.73972	164.6	246.35
95	294.49	14.67	19.25167	114.1	278.11	14.19	19.74	164.6	246.96
94.7	295.25	14.67	19.25194	109.8	278.78	14.23	19.74028	164.3	247.58
94.7	296.02	14.67	19.25222	109.1	279.46	14.26	19.74056	164.3	248.19
95	296.8	14.66	19.2525	108	280.14	14.29	19.74083	164.3	248.8
95.4	297.57	14.66	19.25278	106.9	280.84	14.3	19.74111	163.9	250.05
95.7	298.33	14.65	19.25306	106.9	281.52	14.32	19.74167	163.2	250.65
95.7	299.1	14.64	19.25333	105.5	282.92	14.33	19.74194	164.3	251.27
94.7	299.86	14.64	19.25389	105.5	283.6	14.33	19.74222	164.3	251.88
95.4	300.63	14.62	19.25417	105.5	284.25	14.32	19.7425	165	252.49
96.5	302.19	14.61	19.25444	105.5	284.95	14.32	19.74278	165	253.1
99	302.94	14.6	19.25472	105.1	285.65	14.33	19.74306	164.3	253.72
99.7	303.71	14.59	19.255	105.8	286.34	14.33	19.74333	164.6	254.35
100.4	304.47	14.57	19.25528	106.6	287.04	14.36	19.74389	165.3	254.98
101.9	305.25	14.55	19.25556	105.5	287.73	14.39	19.74417	165	255.58
104.4	306.03	14.54	19.25611	105.8	288.39	14.41	19.74444	165.3	256.18
106.9	306.8	14.52	19.25639	101.5	289.08	14.43	19.74472	165.3	256.79
106.9	307.56	14.52	19.25667	103	289.77	14.45	19.745	165.3	257.42
88.5	308.32	14.58	19.25694	103.7	290.45	14.45	19.74528	165.3	258.66
81	309.1	14.76	19.25722	101.9	291.83	14.45	19.74556	165.3	259.28
61.8	309.87	14.93	19.2575	101.2	292.53	14.45	19.74583	165	259.89
55.7	310.64	15.05	19.25778	101.5	293.19	14.45	19.74639	163.5	260.49
49.6	311.4	15.16	19.25833	101.5	293.89	14.46	19.74667	165.3	261.1
46	312.93	15.24	19.25861	101.5	294.58	14.46	19.74694	165.3	261.71
42	313.7	15.29	19.25889	101.9	295.27	14.45	19.74722	165.3	262.34
41.3	314.45	15.33	19.25917	102.2	295.94	14.45	19.7475	164.6	262.96
40.6	315.21	15.35	19.25944	100.8	296.64	14.46	19.74778	164.6	263.57
40.2	315.97	15.36	19.25972	100.8	297.34	14.47	19.74806	165.3	264.19
40.2	316.72	15.38	19.26	101.2	298.03	14.47	19.74861	165.3	264.79
40.2	317.5	15.39	19.26028	101.2	298.7	14.47	19.74889	166.8	265.4
40.2	318.26	15.4	19.26083	100.8	299.39	14.47	19.74917	166.8	266.63
40.2	319.01	15.41	19.26111	99.7	300.07	14.46	19.74944	165.3	267.25
40.2	319.78	15.41	19.26139	101.5	301.46	14.45	19.74972	165.3	267.87
40.9	320.57	15.42	19.26167	102.6	302.16	14.45	19.75	166.8	268.49
41.6	321.33	15.43	19.26194	104	302.82	14.44	19.75028	167.2	269.1
41.6	322.87	15.44	19.26222	104	303.51	14.43	19.75083	168.2	269.7
42	323.63	15.45	19.26278	105.8	304.19	14.42	19.75111	168.6	270.33
42.4	324.39	15.45	19.26306	106.6	304.87	14.41	19.75139	175.8	270.94
42.7	325.19	15.45	19.26333	106.2	305.58	14.39	19.75167	178	271.56
43.8	325.94	15.45	19.26361	105.8	306.28	14.37	19.75194	176.5	272.16
45.6	326.7	15.44	19.26389	105.1	306.95	14.35	19.75222	175.4	272.79
46.7	327.45	15.46	19.26417	105.8	307.63	14.38	19.7525	176.5	273.4
46.7	328.23	15.46	19.26444	105.5	308.3	14.42	19.75278	172.2	274.63
48.5	329.01	15.48	19.265	97.5	309.01	14.51	19.75333	171.1	275.24
48.5	329.78	15.5	19.26528	86	309.7	14.64	19.75361	169.7	275.85
49.9	330.55	15.51	19.26556	75.2	311.08	14.75	19.75389	166.1	276.47
49.6	332.07	15.52	19.26583	67.3	311.76	14.86	19.75417	166.1	277.08
51	332.84	15.53	19.26611	65.1	312.44	14.93	19.75444	166.4	277.71
52.1	333.62	15.52	19.26639	61.1	313.13	15	19.75472	165.7	278.33
52.8	334.38	15.52	19.26667	56.8	313.82	15.05	19.755	165	278.94
54.3	335.15	15.52	19.26722	54.3	314.48	15.1	19.75556	165	279.54
55.7	335.9	15.53	19.2675	54.3	315.16	15.14	19.75583	164.6	280.16
57.2	336.67	15.53	19.26778	54.6	315.83	15.15	19.75611	165	280.77
57.5	337.45	15.54	19.26806	55	316.51	15.15	19.75639	165	281.39
59.7	338.2	15.55	19.26833	55.3	317.21	15.17	19.75667	164.6	282
60.8	338.99	15.55	19.26861	55	317.89	15.19	19.75694	165	282.65
61.1	339.75	15.55	19.26889	55.3	318.57	15.19	19.75722	165	283.85
62.2	340.51	15.55	19.26944	55.7	319.95	15.2	19.75778	165	284.46
65.4	341.27	15.56	19.26972	54.6	320.65	15.2	19.75806	165	285.08

13.47	8.690278
13.47	8.690556
13.47	8.690833
13.47	8.691111
13.47	8.691389
13.47	8.691944
13.47	8.692222
13.47	8.6925
13.47	8.692778
13.47	8.693056
13.47	8.693333
13.47	8.693611
13.47	8.694167
13.47	8.694444
13.47	8.694722
13.47	8.695
13.47	8.695278
13.47	8.695556
13.47	8.695833
13.46	8.696389
13.46	8.696667
13.46	8.696944
13.46	8.697222
13.46	8.6975
13.46	8.697778
13.46	8.698056
13.46	8.698611
13.46	8.698889
13.46	8.699167
13.46	8.699444
13.46	8.699722
13.46	8.7
13.46	8.700278
13.45	8.700833
13.45	8.701111
13.45	8.701389
13.45	8.701667
13.45	8.701944
13.45	8.702222
13.45	8.7025
13.45	8.703056
13.44	8.703333
13.44	8.703611
13.44	8.703889
13.44	8.704167
13.44	8.704444
13.44	8.704722
13.44	8.705278
13.44	8.705556
13.43	8.705833
13.42	8.706111
13.44	8.706389
13.46	8.706667
13.47	8.706944
13.47	8.707222
13.47	8.707778
13.48	8.708056
13.48	8.708333
13.49	8.708611
13.49	8.708889
13.51	8.709167
13.5	8.709444

8.1	350.13	16.86	17.73389	8.8	362.21	16.75	17.86917	10.3	355.15
8.5	350.98	16.84	17.73417	8.8	363.07	16.77	17.86944	10.3	355.97
8.1	351.82	16.84	17.73444	9.2	363.89	16.77	17.86972	9.5	356.78
7.7	352.67	16.83	17.73472	9.2	364.73	16.77	17.87	9.5	357.6
7.7	354.36	16.83	17.735	9.2	365.57	16.76	17.87028	9.2	359.2
7.4	355.2	16.83	17.73528	9.5	367.26	16.75	17.87083	9.2	360.01
7.4	356.08	16.86	17.73583	9.5	368.11	16.75	17.87111	9.5	360.83
7	356.98	16.88	17.73611	9.2	368.94	16.76	17.87139	9.5	361.63
7	357.88	16.88	17.73639	9.2	369.77	16.76	17.87167	9.9	362.43
7	358.77	16.89	17.73667	8.8	370.6	16.76	17.87194	9.9	363.25
7	359.65	16.89	17.73722	9.2	371.43	16.75	17.87222	10.3	364.05
7	360.58	16.89	17.7375	8.5	372.32	16.77	17.8725	10.6	364.86
7	362.39	16.9	17.73778	8.5	373.14	16.77	17.87306	11	365.66
7	363.28	16.92	17.73806	8.5	373.96	16.78	17.87333	11	366.46
7.4	364.19	16.92	17.73833	8.8	374.81	16.78	17.87361	11	367.29
7.4	365.11	16.94	17.73861	8.8	375.65	16.79	17.87389	10.6	368.1
7.7	366	16.94	17.73889	9.2	376.52	16.78	17.87417	10.6	368.91
7.7	366.92	16.92	17.73944	9.2	378.15	16.77	17.87444	10.3	370.5
7.7	367.85	16.92	17.73972	9.5	378.9	16.77	17.87472	10.3	371.32
7.7	368.74	16.92	17.74	9.9	379.67	16.75	17.87528	9.9	372.16
7.4	369.64	16.94	17.74028	11	380.39	16.73	17.87556	10.3	372.95
7.4	370.55	16.94	17.74056	11	380.4	16.71	17.87583	9.9	373.76
7	371.46	16.96	17.74083					10.3	374.55
7	372.4	16.97	17.74111					10.3	375.37
7.4	374.19	16.97	17.74167					10.3	376.18
7.4	375.11	16.97	17.74194					10.3	377.01
7.4	376	16.97	17.74222					10.6	377.8
7.4	376.95	16.97	17.7425					11.3	378.61
7.7	377.82	16.95	17.74278					12.8	379.41
8.1	378.73	16.95	17.74306					12.8	380.15
8.5	379.54	16.94	17.74333					12.8	380.21
9.2	380.04	16.93	17.74389						
9.2	380.08	16.92	17.74417						



16.52	18.00556	33.3	334.55	16.16	18.33417	27.6	317.85	15.69	18.74694
16.53	18.00583	37	335.29	16.14	18.33444	27.2	319.28	15.7	18.7475
16.53	18.00639	40.6	336.8	16.15	18.33472	26.9	320.02	15.7	18.74778
16.53	18.00667	42.4	337.56	16.17	18.33528	26.9	320.75	15.72	18.74806
16.54	18.00694	37.3	338.31	16.18	18.33556	27.2	321.47	15.72	18.74833
16.55	18.00722	40.2	339.07	16.19	18.33583	27.9	322.18	15.72	18.74861
16.57	18.0075	42.4	339.83	16.2	18.33611	28.3	322.9	15.73	18.74889
16.58	18.00778	44.9	340.57	16.22	18.33639	28.7	323.62	15.74	18.74917
16.58	18.00806	47.8	341.32	16.23	18.33667	29.7	324.33	15.75	18.74972
16.59	18.00833	48.5	342.05	16.25	18.33694	29.7	325.08	15.75	18.75
16.59	18.00889	48.5	342.78	16.24	18.3375	29.7	325.79	15.75	18.75028
16.61	18.00917	51.7	343.53	16.27	18.33778	31.2	326.5	15.74	18.75056
16.61	18.00944	53.5	344.3	16.29	18.33806	31.9	327.94	15.75	18.75083
16.6	18.00972	49.6	345.04	16.3	18.33833	32.6	328.67	15.76	18.75111
16.59	18.01	49.9	346.53	16.31	18.33861	32.6	329.4	15.78	18.75139
16.6	18.01028	44.2	347.28	16.29	18.33889	33.7	330.13	15.81	18.75194
16.59	18.01056	38.4	348.06	16.23	18.33917	34.4	330.83	15.83	18.75222
16.6	18.01111	40.2	348.82	16.18	18.33972	34.8	331.53	15.84	18.7525
16.61	18.01139	37.3	349.55	16.14	18.34	35.2	332.26	15.84	18.75278
16.61	18.01167	33.7	350.29	16.11	18.34028	35.5	333	15.84	18.75306
16.61	18.01194	26.9	351.05	16.1	18.34056	36.2	333.71	15.85	18.75333
16.61	18.01222	25.4	351.81	16.1	18.34083	39.1	334.45	15.84	18.75361
16.61	18.0125	19.6	352.56	16.11	18.34111	41.6	335.16	15.84	18.75417
16.63	18.01278	17.5	353.33	16.13	18.34167	42.4	335.87	15.86	18.75444
16.63	18.01333	14.2	354.81	16.13	18.34194	43.1	337.32	15.86	18.75472
16.62	18.01361	12.4	355.58	16.15	18.34222	44.2	338.04	15.87	18.755
16.61	18.01389	12.1	356.34	16.16	18.3425	47.1	338.77	15.9	18.75528
16.59	18.01417	11.3	357.09	16.16	18.34278	48.1	339.48	15.91	18.75556
16.56	18.01444	11	357.86	16.17	18.34306	48.5	340.2	15.91	18.75583
16.54	18.01472	10.6	358.6	16.18	18.34333	49.9	340.92	15.92	18.75639
16.54	18.015	10.3	359.35	16.19	18.34389	49.9	341.63	15.93	18.75667
		9.9	360.1	16.2	18.34417	51	342.33	15.93	18.75694
		9.9	360.87	16.22	18.34444	51.4	343.04	15.93	18.75722
		9.9	361.62	16.23	18.34472	53.9	343.76	15.94	18.7575
		9.9	362.38	16.23	18.345	57.2	344.49	15.94	18.75778
		9.9	363.14	16.23	18.34528	57.9	345.92	15.93	18.75833
		9.9	364.64	16.26	18.34556	53.5	346.63	15.92	18.75861
		9.9	365.39	16.27	18.34611	49.6	347.34	15.86	18.75889
		10.3	366.14	16.27	18.34639	46.3	348.09	15.81	18.75917
		10.6	366.9	16.26	18.34667	44.2	348.83	15.77	18.75944
		10.6	367.66	16.24	18.34694	44.9	349.53	15.74	18.75972
		11	368.42	16.25	18.34722	40.9	350.25	15.71	18.76
		11	369.16	16.25	18.3475	36.6	350.96	15.7	18.76028
		10.6	369.91	16.25	18.34778	33	351.68	15.71	18.76083
		10.6	370.66	16.25	18.34833	27.6	352.42	15.73	18.76111
		11	371.43	16.25	18.34861	29	353.15	15.74	18.76139
		10.3	372.2	16.25	18.34889	27.2	353.87	15.74	18.76167
		10.3	372.95	16.25	18.34917	22.5	354.58	15.75	18.76194
		10.3	374.43	16.25	18.34944	19.6	356.03	15.78	18.76222
		10.3	375.19	16.26	18.34972	18.2	356.76	15.79	18.7625
		10.3	375.96	16.27	18.35	17.1	357.49	15.81	18.76306
		10.3	376.73	16.27	18.35028	15	358.2	15.82	18.76333
		10.6	377.47	16.26	18.35083	14.6	358.9	15.84	18.76361
		11	378.21	16.24	18.35111	13.9	359.63	15.85	18.76389
		11	378.97	16.21	18.35139	13.2	360.36	15.86	18.76417
		11.7	379.71	16.17	18.35167	13.2	361.08	15.87	18.76444
		12.4	380.19	16.15	18.35194	12.8	361.8	15.88	18.76472
						12.8	362.54	15.89	18.76528
						12.4	363.25	15.91	18.76556
						12.4	363.97	15.92	18.76583
						12.4	365.42	15.93	18.76611
						12.8	366.13	15.92	18.76639

66.9	342.77	15.57	19.27	55.3	321.32	15.2	19.75833	164.6	285.69
68	343.54	15.57	19.27028	55.7	322.02	15.2	19.75861	165	286.32
69.8	344.3	15.57	19.27056	55.7	322.69	15.19	19.75889	164.6	286.94
71.6	345.06	15.56	19.27083	55.7	323.38	15.19	19.75917	164.6	287.56
74.5	345.83	15.55	19.27111	55.7	324.06	15.19	19.75944	164.3	288.16
71.9	346.59	15.52	19.27167	56.1	324.77	15.19	19.76	163.9	288.77
67.6	347.36	15.46	19.27194	56.8	325.46	15.19	19.76028	164.3	289.37
67.6	348.14	15.41	19.27222	57.9	326.14	15.2	19.76056	163.5	290.01
64.4	348.93	15.38	19.2725	58.6	326.81	15.21	19.76083	163.5	290.62
59.3	349.67	15.35	19.27278	58.6	327.5	15.19	19.76111	163.9	291.24
58.6	350.44	15.34	19.27306	59.7	328.89	15.2	19.76139	163.9	292.47
53.2	351.19	15.34	19.27333	60.4	329.58	15.22	19.76167	163.9	293.07
51	352.76	15.35	19.27389	60	330.27	15.22	19.76222	163.9	293.69
46	353.52	15.36	19.27417	61.8	330.93	15.24	19.7625	164.3	294.31
42.7	354.28	15.38	19.27444	64	331.62	15.27	19.76278	164.3	294.92
36.6	355.04	15.39	19.27472	63.3	332.3	15.28	19.76306	164.3	295.53
31.2	355.81	15.42	19.275	64	333	15.29	19.76333	164.6	296.15
29	356.59	15.44	19.27528	65.8	333.69	15.29	19.76361	164.6	296.77
24	357.37	15.46	19.27556	65.8	334.38	15.29	19.76389	164.6	297.38
23.3	358.13	15.49	19.27611	66.9	335.06	15.28	19.76444	165.3	298
20.4	358.9	15.51	19.27639	68.7	335.72	15.27	19.76472	165.7	298.61
19.3	359.66	15.53	19.27667	69.8	336.42	15.27	19.765	165	299.22
18.6	360.44	15.54	19.27694	71.9	337.8	15.27	19.76528	165.3	300.45
17.1	361.96	15.56	19.27722	69.1	338.49	15.26	19.76556	165.3	301.06
16.4	362.74	15.58	19.2775	72.7	339.18	15.26	19.76583	165.7	301.7
16	363.52	15.58	19.27778	73.4	339.87	15.26	19.76611	165.7	302.31
15.7	364.28	15.6	19.27833	73.4	340.55	15.26	19.76667	166.4	302.91
16	365.06	15.6	19.27861	78.8	341.24	15.27	19.76694	166.4	303.52
15.7	365.81	15.59	19.27889	82.4	341.9	15.27	19.76722	165.7	304.13
15.7	366.59	15.59	19.27917	82.4	342.58	15.28	19.7675	166.1	304.75
15.7	367.37	15.59	19.27944	79.9	343.23	15.27	19.76778	166.1	305.36
15.3	368.14	15.58	19.27972	81.7	343.94	15.26	19.76806	166.4	306
15.3	368.9	15.58	19.28	86	344.62	15.26	19.76833	166.4	306.61
15	369.67	15.58	19.28056	90.7	345.31	15.24	19.76889	166.4	307.22
15.3	370.43	15.58	19.28083	93.6	345.98	15.24	19.76917	166.1	307.82
15.3	371.99	15.58	19.28111	95.7	347.36	15.21	19.76944	165	308.43
15.3	372.75	15.57	19.28139	92.1	348.06	15.15	19.76972	165.3	309.68
15.3	373.52	15.55	19.28167	87.4	348.76	15.11	19.77	165.3	310.29
15.3	374.27	15.54	19.28194	84.2	349.43	15.09	19.77028	164.3	310.91
15	375.05	15.54	19.28222	80.6	350.1	15.07	19.77056	164.6	311.52
15	375.82	15.55	19.2825	73	350.78	15.07	19.77111	164.3	312.12
15.3	376.62	15.55	19.28306	68	351.48	15.08	19.77139	164.6	312.74
15.3	377.38	15.53	19.28333	68	352.17	15.09	19.77167	164.6	313.35
15.7	378.12	15.51	19.28361	62.2	352.88	15.09	19.77194	164.6	313.97
15.3	378.89	15.49	19.28389	55	353.56	15.1	19.77222	163.9	314.56
16.4	379.67	15.46	19.28417	51.7	354.23	15.12	19.7725	163.5	315.17
16.8	380.38	15.45	19.28444	46	354.9	15.14	19.77278	164.3	315.77
17.1	380.4	15.43	19.28472	40.9	356.29	15.16	19.77333	164.6	316.99
				39.1	356.99	15.18	19.77361	164.3	317.61
				34.4	357.68	15.21	19.77389	164.3	318.22
				30.5	358.37	15.22	19.77417	163.9	318.84
				28.7	359.04	15.24	19.77444	163.5	319.44
				27.9	359.73	15.25	19.77472	163.2	320.08
				25.4	360.42	15.26	19.775	163.2	320.7
				24.3	361.11	15.27	19.77528	163.5	321.3
				22.9	361.79	15.29	19.77583	162.8	321.92
				22.2	362.49	15.3	19.77611	163.5	322.52
				21.1	363.18	15.31	19.77639	163.2	323.13
				20.7	363.87	15.32	19.77667	163.5	323.75
				20	365.24	15.33	19.77694	163.2	325
				20	365.92	15.33	19.77722	163.2	325.62
				19.6	366.61	15.33	19.7775	163.5	326.22

13.5	8.709722
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13.49	8.710556
13.5	8.710833
13.52	8.711111
13.52	8.711389
13.52	8.711667
13.53	8.711944
13.53	8.7125
13.54	8.712778
13.55	8.713056
13.55	8.713333
13.56	8.713611
13.55	8.713889
13.55	8.714167
13.55	8.714444
13.55	8.715
13.55	8.715278
13.55	8.715556
13.56	8.715833
13.56	8.716111
13.56	8.716389
13.56	8.716667
13.56	8.717222
13.56	8.7175
13.56	8.717778
13.56	8.718056
13.56	8.718333
13.56	8.718611
13.56	8.718889
13.55	8.719167
13.55	8.719722
13.55	8.72
13.55	8.720278
13.56	8.720556
13.58	8.720833
13.6	8.721111
13.61	8.721667
13.63	8.721944
13.65	8.722222
13.65	8.7225
13.66	8.722778
13.68	8.723056
13.69	8.723333
13.7	8.723889
13.7	8.724167
13.71	8.724444
13.73	8.724722
13.73	8.725
13.73	8.725278
13.74	8.725556
13.74	8.726111
13.74	8.726389
13.74	8.726667
13.74	8.726944
13.74	8.727222
13.74	8.7275
13.74	8.727778
13.74	8.728333
13.74	8.728611
13.74	8.728889
13.74	8.729167



12.8	366.86	15.92	18.76667
12.8	367.59	15.92	18.76694
12.8	368.32	15.91	18.7675
13.2	369.03	15.9	18.76778
13.2	369.74	15.9	18.76806
12.8	370.47	15.9	18.76833
12.8	371.19	15.91	18.76861
12.8	371.92	15.91	18.76889
13.2	372.65	15.9	18.76917
12.8	373.36	15.89	18.76972
12.8	374.8	15.9	18.77
12.4	375.53	15.91	18.77028
12.8	376.27	15.91	18.77056
13.2	376.99	15.9	18.77083
13.2	377.69	15.89	18.77111
13.2	378.4	15.86	18.77139
13.2	379.06	15.83	18.77167
13.5	379.71	15.81	18.77222
13.9	380.09	15.79	18.7725
13.9	380.13	15.77	18.77278

19.3	367.3	15.33	19.77806	163.5	326.83
18.6	368.01	15.34	19.77833	163.9	327.43
18.2	368.69	15.34	19.77861	163.9	328.06
18.2	369.37	15.34	19.77889	163.5	328.67
17.8	370.05	15.33	19.77917	163.9	329.31
17.8	370.73	15.33	19.77944	163.5	329.92
17.8	371.42	15.33	19.78	163.9	330.53
17.8	372.15	15.32	19.78028	164.3	331.13
17.8	372.83	15.31	19.78056	164.6	331.74
17.8	374.17	15.3	19.78083	164.6	332.36
17.8	374.87	15.29	19.78111	164.6	333.6
17.8	375.56	15.29	19.78139	164.6	334.22
17.8	376.27	15.29	19.78167	165	334.83
17.8	376.96	15.28	19.78222	164.6	335.44
17.8	377.64	15.27	19.7825	165	336.04
18.2	378.3	15.26	19.78278	165	336.66
17.8	379	15.25	19.78306	164.6	337.27
18.9	379.7	15.23	19.78333	165.7	337.9
19.3	380.32	15.22	19.78361	166.4	338.51
19.3	380.34	15.21	19.78389	166.1	339.13
				166.1	339.74
				166.1	340.97
				166.1	341.58
				167.2	342.17
				167.5	342.77
				167.5	343.37
				167.9	343.99
				168.2	344.61
				169.3	345.22
				169	345.83
				165.7	346.43
				165.3	347.05
				163.2	347.66
				161	348.92
				159.9	349.53
				158.1	350.13
				157.1	350.74
				155.6	351.35
				155.6	351.98
				150.9	352.59
				147.3	353.23
				147.7	353.84
				144.1	354.43
				140.5	355.05
				139	355.66
				136.9	356.29
				132.2	356.91
				130.7	358.14
				129.3	358.75
				126.8	359.36
				125.7	359.98
				123.5	360.6
				122.1	361.22
				119.9	361.83
				119.2	362.44
				118.5	363.07
				115.2	363.67
				114.5	364.29
				112.7	364.91
				107.6	365.52
				106.6	366.75
				106.2	367.37



13.74	8.729444
13.74	8.729722
13.74	8.73
13.73	8.730278
13.73	8.730833
13.73	8.731111
13.73	8.731389
13.73	8.731667
13.73	8.731944
13.73	8.732222
13.72	8.7325
13.72	8.733056
13.72	8.733333
13.72	8.733611
13.71	8.733889
13.71	8.734167
13.71	8.734444
13.71	8.734722
13.71	8.735278
13.71	8.735556
13.71	8.735833
13.71	8.736111
13.71	8.736389
13.7	8.736667
13.7	8.737222
13.7	8.7375
13.7	8.737778
13.7	8.738056
13.69	8.738333
13.68	8.738611
13.68	8.738889
13.69	8.739167
13.7	8.739722
13.71	8.74
13.71	8.740278
13.72	8.740556
13.73	8.740833
13.73	8.741111
13.74	8.741389
13.76	8.741944
13.78	8.742222
13.78	8.7425
13.79	8.742778
13.8	8.743056
13.82	8.743333
13.83	8.743611
13.84	8.743889
13.85	8.744444
13.85	8.744722
13.87	8.745
13.87	8.745278
13.87	8.745556
13.88	8.745833
13.89	8.746111
13.89	8.746667
13.89	8.746944
13.9	8.747222
13.9	8.7475
13.91	8.747778
13.92	8.748056
13.93	8.748333
13.94	8.748889





107.3	368
106.6	368.61
106.2	369.22
103.3	369.83
99.3	370.44
99	371.06
99	371.69
97.5	372.32
98.3	372.93
98.3	373.54
96.5	374.76
94.3	375.38
93.6	376
93.6	376.63
92.1	377.25
92.5	377.84
92.9	378.45
93.2	379.06
90.7	379.68
90.7	380.12

13.94	8.749167
13.95	8.749444
13.95	8.749722
13.95	8.75
13.96	8.750278
13.97	8.750556
13.97	8.750833
13.97	8.751389
13.97	8.751667
13.97	8.751944
13.97	8.752222
13.99	8.7525
13.99	8.752778
14	8.753056
14.01	8.753611
14.01	8.753889
14.01	8.754167
14.01	8.754444
14.01	8.754722
14.01	8.755

FIGURE MW-107:4A. Summary of Hydrophysical Logs During 8 GPM Hydrophysical Stress Test; URS Group; Atlas Missile Site 4; Cheyenne, WY; Wellbore: MW-107

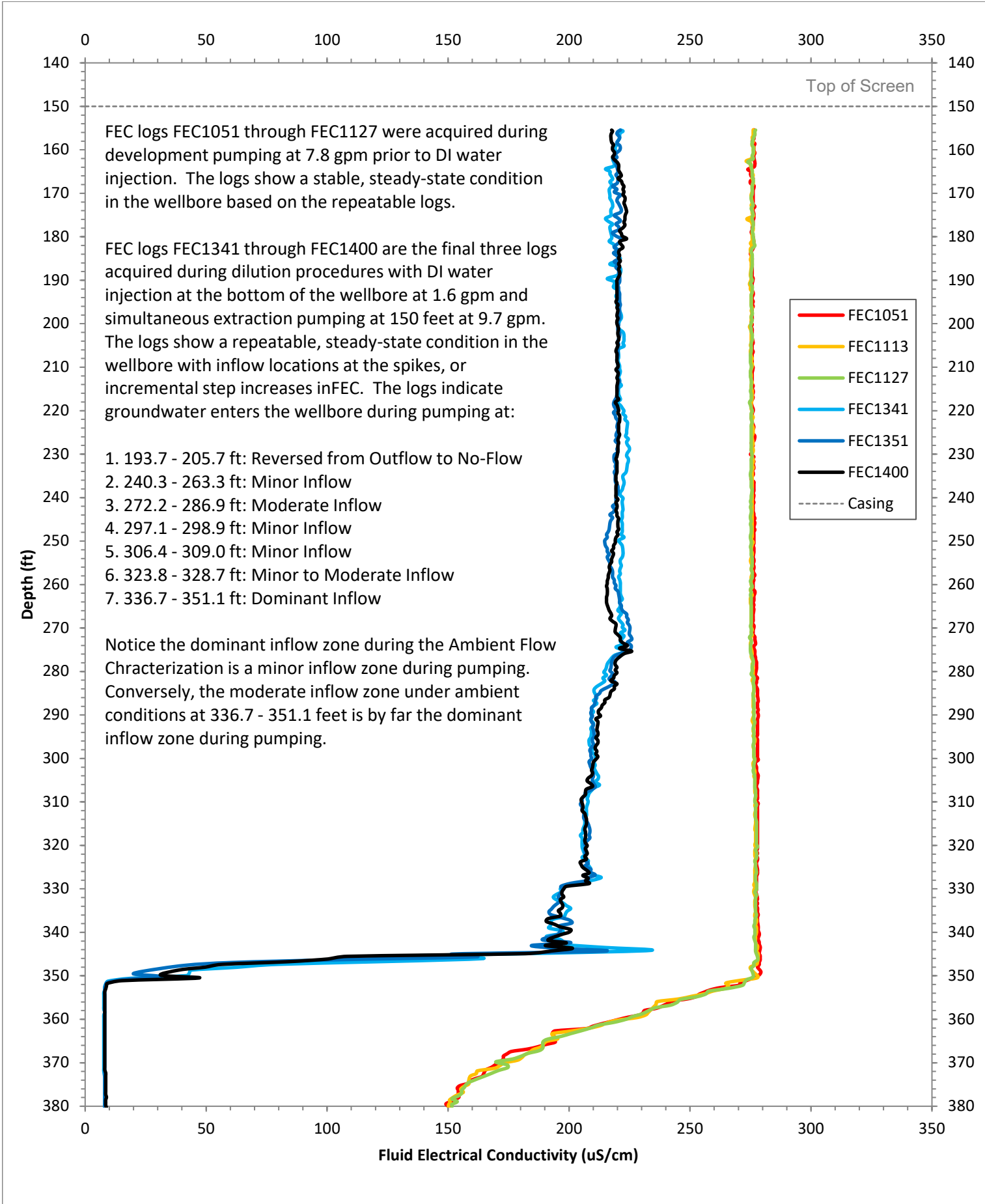
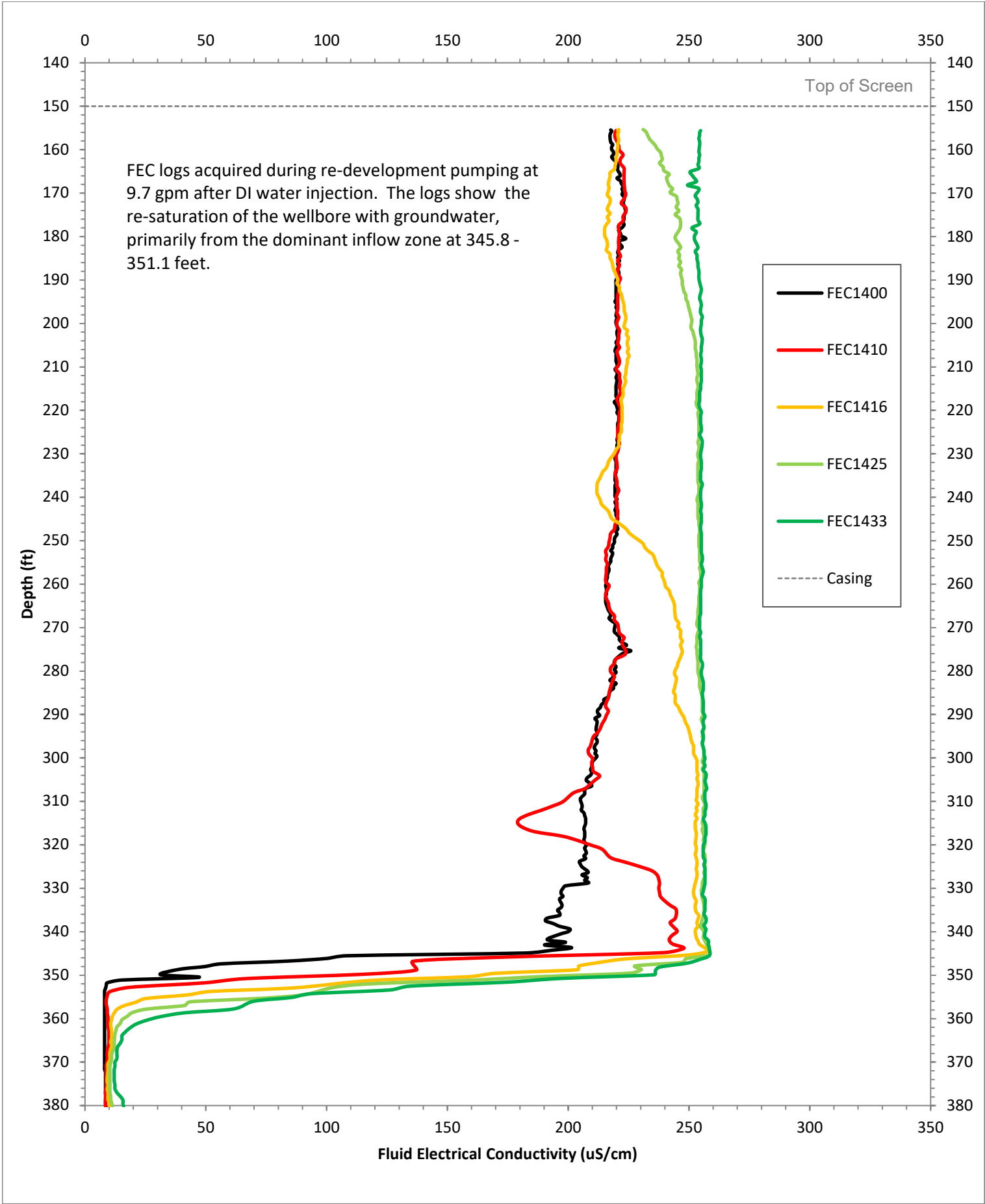


FIGURE MW-107:4B. Summary of Hydrophysical Logs During Re-Development Pumping at 9.7 GPM After DI Water Injection; URS Group; Atlas Missile Site 4; Cheyenne, WY; Wellbore: MW-107





FEC0923	DEPTH	TEMP	TIME	FEC0943	DEPTH	TEMP	TIME	FEC1001	DEPTH
278.2	155.43	13.48	9.388056	283.6	155.44	13.46	9.717222	281.8	155.54
278.2	155.73	13.48	9.388333	283.6	155.68	13.46	9.7175	281.8	155.9
278.2	156.14	13.49	9.388889	283.6	156.09	13.46	9.717778	282.2	156.3
278.2	156.64	13.49	9.389167	284	156.59	13.46	9.718056	282.2	156.79
277.9	157.16	13.49	9.389444	283.3	157.21	13.46	9.718611	282.2	157.33
278.2	157.69	13.49	9.389722	282.9	157.85	13.46	9.718889	282.2	157.91
277.9	158.22	13.49	9.39	284.4	158.5	13.46	9.719167	282.2	158.48
277.1	158.75	13.49	9.390278	283.3	159.16	13.46	9.719444	281.8	159.06
277.9	159.3	13.49	9.390556	284	159.83	13.46	9.719722	282.2	159.63
277.1	159.84	13.49	9.391111	284	160.47	13.46	9.72	282.2	160.22
277.1	160.9	13.49	9.391389	284	161.1	13.46	9.720278	281.8	160.77
277.1	161.42	13.49	9.391667	283.3	162.4	13.46	9.720833	281.8	161.9
276.8	161.95	13.49	9.391944	284	163.05	13.46	9.721111	281.8	162.48
276.8	162.48	13.5	9.392222	284	163.71	13.46	9.721389	282.2	163.05
276.8	163.01	13.5	9.3925	279.7	164.39	13.46	9.721667	281.8	163.62
275.3	163.55	13.5	9.392778	284	165.02	13.46	9.721944	282.2	164.22
276.1	164.1	13.5	9.393333	282.9	165.66	13.46	9.722222	278.6	164.79
276.4	164.64	13.5	9.393611	282.9	166.3	13.46	9.7225	281.8	165.35
276.1	165.15	13.5	9.393889	282.9	166.96	13.46	9.723056	281.1	165.91
275.3	165.68	13.5	9.394167	283.6	167.61	13.46	9.723333	282.2	166.48
275	166.2	13.51	9.394444	282.2	168.27	13.46	9.723611	282.2	167.05
275.3	166.74	13.51	9.394722	282.9	168.93	13.46	9.723889	281.8	167.63
275	167.27	13.51	9.395	283.3	170.21	13.46	9.724167	281.8	168.21
275.3	168.35	13.51	9.395556	282.9	170.86	13.46	9.724444	281.5	168.79
275	168.89	13.51	9.395833	283.3	171.51	13.46	9.725	281.8	169.36
274.6	169.42	13.51	9.396111	283.3	172.18	13.46	9.725278	281.5	170.48
274.6	169.93	13.51	9.396389	282.9	172.82	13.46	9.725556	281.5	171.05
274.6	170.47	13.51	9.396667	283.3	173.47	13.46	9.725833	281.8	171.62
274.3	171	13.51	9.396944	283.3	174.13	13.46	9.726111	281.5	172.21
274.3	171.53	13.51	9.397222	282.9	174.77	13.46	9.726389	281.5	172.76
274.3	172.07	13.51	9.397778	283.3	175.42	13.46	9.726667	281.5	173.35
273.9	172.61	13.51	9.398056	282.9	176.08	13.46	9.727222	281.5	173.92
273.9	173.13	13.51	9.398333	283.3	176.73	13.46	9.7275	281.8	174.5
273.9	173.68	13.51	9.398611	282.9	177.37	13.47	9.727778	281.8	175.06
273.9	174.21	13.51	9.398889	283.3	178.69	13.46	9.728056	282.2	175.63
274.3	175.25	13.51	9.399167	283.3	179.33	13.47	9.728333	281.8	176.2
273.9	175.8	13.51	9.399444	282.9	179.98	13.47	9.728611	282.2	176.77
274.3	176.33	13.51	9.4	282.9	180.63	13.47	9.728889	282.6	177.91
274.3	176.85	13.51	9.400278	283.3	181.28	13.47	9.729444	281.8	178.5
273.9	177.39	13.52	9.400556	282.9	181.92	13.47	9.729722	279.3	179.07
274.3	177.91	13.52	9.400833	283.3	182.57	13.47	9.73	282.9	179.63
274.6	178.46	13.52	9.401111	283.3	183.23	13.47	9.730278	282.6	180.21
275	178.99	13.52	9.401389	283.3	183.9	13.47	9.730556	281.5	180.78
275	179.52	13.52	9.401667	283.3	184.54	13.47	9.730833	281.5	181.34
275	180.05	13.52	9.401944	283.6	185.18	13.47	9.731111	281.5	181.9
275	180.59	13.52	9.4025	284	186.47	13.47	9.731667	281.8	182.48
275.7	181.11	13.52	9.402778	284	187.12	13.47	9.731944	281.8	183.06
275	181.64	13.52	9.403056	283.3	187.78	13.47	9.732222	281.8	183.64
275	182.71	13.52	9.403333	284.7	188.45	13.47	9.7325	281.8	184.21
275	183.3	13.52	9.403611	284	189.08	13.47	9.732778	281.8	184.78
275	183.91	13.52	9.403889	283.6	189.73	13.47	9.733056	281.5	185.9
275.7	184.49	13.52	9.404167	284	190.36	13.47	9.733333	281.8	186.48
274.6	185.08	13.52	9.404722	283.3	191.02	13.47	9.733889	281.8	187.04
275	185.66	13.52	9.405	283.6	191.67	13.47	9.734167	281.8	187.62
275.7	186.26	13.52	9.405278	283.3	192.32	13.47	9.734444	281.8	188.22
275.3	186.85	13.52	9.405556	282.9	192.95	13.47	9.734722	281.8	188.78
275.3	187.45	13.52	9.405833	283.3	193.59	13.47	9.735	281.8	189.35
275	188.05	13.52	9.406111	283.3	194.85	13.47	9.735278	281.8	189.91
274.6	188.66	13.52	9.406389	283.3	195.49	13.47	9.735556	281.8	190.47
275	189.24	13.52	9.406667	283.6	196.14	13.47	9.736111	281.8	191.04
275.3	189.81	13.52	9.407222	283.3	196.76	13.47	9.736389	281.8	191.62

TEMP	TIME	FEC1020	DEPTH	TEMP	TIME	FEC1030	DEPTH	TEMP	TIME
13.44	10.02333	282.2	155.44	13.43	10.34111	281.1	155.38	13.42	10.50444
13.44	10.02361	281.5	155.72	13.43	10.34139	280.8	156.06	13.42	10.505
13.44	10.02389	281.8	156.58	13.43	10.34167	281.1	156.58	13.42	10.50528
13.44	10.02417	280	157.1	13.43	10.34194	280.8	157.14	13.42	10.50556
13.44	10.02444	281.5	157.64	13.43	10.3425	280.8	157.71	13.42	10.50583
13.44	10.02472	280.4	158.2	13.42	10.34278	280.4	158.35	13.42	10.50611
13.44	10.025	281.8	158.75	13.43	10.34306	281.5	158.99	13.42	10.50639
13.44	10.02556	281.5	159.31	13.43	10.34333	281.1	159.69	13.42	10.50667
13.44	10.02583	281.5	159.88	13.42	10.34361	281.1	160.39	13.42	10.50722
13.44	10.02611	281.5	160.42	13.43	10.34389	281.1	161.08	13.42	10.5075
13.44	10.02639	281.5	160.97	13.42	10.34417	281.1	161.76	13.42	10.50778
13.44	10.02667	281.5	161.52	13.43	10.34472	281.5	162.47	13.42	10.50806
13.44	10.02694	281.5	162.06	13.43	10.345	280.8	163.16	13.42	10.50833
13.44	10.02722	281.5	162.62	13.43	10.34528	280.8	163.88	13.42	10.50861
13.44	10.02778	280.8	163.74	13.43	10.34556	281.5	165.27	13.42	10.50889
13.44	10.02806	279	164.31	13.43	10.34583	279.7	165.95	13.42	10.50944
13.44	10.02833	280	164.86	13.43	10.34611	279.3	166.66	13.42	10.50972
13.44	10.02861	279	165.39	13.43	10.34639	279.7	167.35	13.42	10.51
13.44	10.02889	281.1	165.95	13.43	10.34667	280	168.06	13.42	10.51028
13.44	10.02917	281.5	166.49	13.43	10.34722	279.3	168.76	13.42	10.51056
13.44	10.02944	281.1	167.05	13.43	10.3475	279.7	169.47	13.42	10.51083
13.44	10.02972	281.5	167.6	13.43	10.34778	279.7	170.15	13.42	10.51111
13.44	10.03028	281.5	168.16	13.43	10.34806	279.7	170.84	13.42	10.51167
13.44	10.03056	281.5	168.73	13.43	10.34833	279.3	171.53	13.43	10.51194
13.44	10.03083	281.1	169.28	13.43	10.34861	279.7	172.25	13.43	10.51222
13.44	10.03111	281.1	169.83	13.43	10.34889	279.3	172.94	13.43	10.5125
13.44	10.03139	281.1	170.92	13.43	10.34944	279.3	174.34	13.43	10.51278
13.44	10.03167	281.1	171.47	13.43	10.34972	279.3	175.02	13.43	10.51306
13.44	10.03194	281.1	172.05	13.43	10.35	279.7	175.73	13.43	10.51333
13.44	10.0325	281.1	172.6	13.43	10.35028	279.3	176.43	13.43	10.51361
13.44	10.03278	281.1	173.15	13.43	10.35056	279.7	177.12	13.43	10.51417
13.44	10.03306	281.1	173.71	13.43	10.35083	279.7	177.82	13.43	10.51444
13.44	10.03333	281.1	174.27	13.43	10.35111	279.7	178.53	13.43	10.51472
13.44	10.03361	281.1	174.81	13.43	10.35167	279.7	179.22	13.43	10.515
13.44	10.03389	281.1	175.36	13.43	10.35194	280	179.92	13.43	10.51528
13.44	10.03417	280.8	175.91	13.43	10.35222	279.7	180.61	13.43	10.51556
13.44	10.03472	281.1	176.47	13.43	10.3525	279.7	181.31	13.43	10.51583
13.44	10.035	281.1	177.02	13.43	10.35278	279.3	182	13.43	10.51639
13.45	10.03528	281.1	177.58	13.43	10.35306	279.3	182.69	13.43	10.51667
13.45	10.03556	281.5	178.68	13.43	10.35333	279.3	184.11	13.43	10.51694
13.45	10.03583	281.8	179.24	13.43	10.35389	279.3	184.79	13.43	10.51722
13.45	10.03611	280.4	179.79	13.43	10.35417	279.3	185.47	13.43	10.5175
13.45	10.03639	281.5	180.35	13.43	10.35444	279.3	186.18	13.43	10.51778
13.45	10.03667	281.1	180.89	13.43	10.35472	279.3	186.88	13.43	10.51806
13.45	10.03722	281.1	181.44	13.44	10.355	280.4	187.57	13.43	10.51861
13.45	10.0375	281.1	181.99	13.44	10.35528	280.4	188.29	13.43	10.51889
13.45	10.03778	281.5	182.55	13.44	10.35556	280.4	188.98	13.43	10.51917
13.45	10.03806	281.5	183.11	13.44	10.35611	280.8	189.67	13.43	10.51944
13.45	10.03833	281.1	183.66	13.44	10.35639	280	190.35	13.43	10.51972
13.45	10.03861	281.5	184.23	13.44	10.35667	279.7	191.04	13.43	10.52
13.45	10.03889	281.1	185.32	13.44	10.35694	279.3	192.43	13.43	10.52028
13.45	10.03944	281.1	185.86	13.44	10.35722	279.3	193.13	13.44	10.52083
13.45	10.03972	281.1	186.42	13.44	10.3575	280.4	193.8	13.44	10.52111
13.45	10.04	281.1	186.98	13.44	10.35778	280.4	194.47	13.44	10.52139
13.45	10.04028	281.5	187.53	13.44	10.35833	280	195.15	13.44	10.52167
13.45	10.04056	281.1	188.09	13.44	10.35861	279.7	195.84	13.44	10.52194
13.45	10.04083	281.1	188.65	13.44	10.35889	279.7	196.53	13.44	10.52222
13.45	10.04111	281.5	189.18	13.44	10.35917	279.3	197.21	13.44	10.5225
13.45	10.04139	281.5	189.74	13.44	10.35944	279.3	197.89	13.44	10.52306
13.45	10.04194	281.5	190.28	13.44	10.35972	279.3	198.57	13.44	10.52333
13.45	10.04222	281.1	190.84	13.44	10.36	279.3	199.25	13.44	10.52361

FEC1051	DEPTH	TEMP	TIME	FEC1113	DEPTH	TEMP	TIME	FEC1127	DEPTH
276.4	155.39	13.42	10.85694	276.1	155.4	13.41	11.21861	277.1	155.46
276.4	156.01	13.42	10.85722	276.1	155.63	13.41	11.21889	276.8	155.73
276.8	156.47	13.42	10.8575	276.1	155.98	13.41	11.21917	276.8	156.09
276.4	156.97	13.42	10.85778	276.1	156.37	13.41	11.21944	276.8	156.5
276.4	157.5	13.42	10.85806	276.1	156.78	13.41	11.22	276.4	156.98
275.7	158.03	13.42	10.85833	275.7	157.21	13.41	11.22028	276.1	157.56
276.8	158.56	13.42	10.85889	276.1	158.11	13.41	11.22056	275.7	158.19
276.4	159.11	13.42	10.85917	275.7	158.56	13.41	11.22083	275.7	158.82
276.4	159.66	13.42	10.85944	275.7	159.04	13.41	11.22111	276.1	159.47
276.4	160.19	13.42	10.85972	276.4	159.55	13.41	11.22139	276.1	160.76
276.8	160.72	13.42	10.86	276.1	160.06	13.41	11.22167	275.7	161.41
276.4	161.25	13.42	10.86028	276.4	160.57	13.41	11.22222	276.1	162.08
276.4	161.78	13.42	10.86056	276.1	161.06	13.41	11.2225	273.9	162.75
276.8	162.86	13.42	10.86083	275.7	161.57	13.41	11.22278	275.3	163.42
276.8	163.39	13.42	10.86139	275.3	162.07	13.41	11.22306	275.3	164.1
276.4	163.95	13.42	10.86167	273.2	162.58	13.41	11.22333	275.7	164.77
273.9	164.49	13.42	10.86194	275	163.09	13.41	11.22361	275.7	165.42
275.3	165.01	13.42	10.86222	275	163.61	13.41	11.22389	275.7	166.08
275	165.54	13.42	10.8625	275.7	164.69	13.41	11.22444	276.1	166.74
275.3	166.07	13.42	10.86278	275.7	165.26	13.41	11.22472	276.1	167.41
276.1	166.61	13.42	10.86306	276.1	165.88	13.41	11.225	275.7	168.09
275	167.14	13.42	10.86361	275.7	166.5	13.41	11.22528	275.7	168.77
275	167.69	13.42	10.86389	276.1	167.13	13.41	11.22556	275.7	170.08
276.4	168.22	13.42	10.86417	276.1	167.76	13.42	11.22583	275.3	170.74
276.4	168.77	13.42	10.86444	275.7	168.39	13.41	11.22611	275.3	171.41
276.1	169.31	13.42	10.86472	275.7	169.02	13.42	11.22667	275.7	172.08
276.1	170.36	13.42	10.865	275.7	169.65	13.42	11.22694	276.1	172.75
276.1	170.89	13.42	10.86528	275.3	170.25	13.42	11.22722	275.3	173.42
276.1	171.43	13.42	10.86583	275.3	170.88	13.42	11.2275	275.7	174.08
276.1	171.97	13.42	10.86611	275.7	172.14	13.42	11.22778	276.1	174.74
276.1	172.52	13.42	10.86639	275.3	172.76	13.42	11.22806	275.7	175.39
276.8	173.05	13.42	10.86667	275.7	173.4	13.42	11.22833	275.7	176.07
276.1	173.59	13.42	10.86694	275.7	174.02	13.42	11.22889	276.1	176.74
276.1	174.13	13.42	10.86722	275.7	174.64	13.42	11.22917	276.1	177.4
276.4	174.65	13.42	10.8675	276.1	175.26	13.42	11.22944	275.7	178.75
276.4	175.19	13.42	10.86778	273.5	175.89	13.42	11.22972	276.1	179.4
276.4	175.72	13.42	10.86833	275.3	176.51	13.42	11.23	276.1	180.07
276.1	176.27	13.42	10.86861	275.7	177.14	13.42	11.23028	276.4	180.73
276.1	177.33	13.42	10.86889	276.1	177.76	13.42	11.23056	276.4	181.4
275.7	177.86	13.42	10.86917	276.1	178.39	13.42	11.23111	276.8	182.06
275.7	178.41	13.42	10.86944	275.7	179.02	13.42	11.23139	275.7	182.73
275.3	178.95	13.42	10.86972	275.7	180.27	13.42	11.23167	275.3	183.4
275.7	179.48	13.42	10.87028	275.7	180.89	13.42	11.23194	275.7	184.08
276.1	180.02	13.42	10.87056	275	181.51	13.42	11.23222	275.7	184.73
276.1	180.55	13.42	10.87083	275.7	182.13	13.42	11.2325	275.7	185.39
276.4	181.09	13.42	10.87111	275	182.75	13.42	11.23278	275.7	186.05
276.1	181.62	13.42	10.87139	275	183.4	13.42	11.23333	275.7	186.72
276.4	182.15	13.42	10.87167	275.3	184.03	13.42	11.23361	275.3	188.07
276.1	182.68	13.42	10.87194	275.3	184.64	13.42	11.23389	275.3	188.73
275	183.78	13.42	10.8725	275	185.26	13.42	11.23417	275.3	189.39
275.3	184.31	13.42	10.87278	275.3	185.87	13.42	11.23444	275.7	190.04
275.7	184.84	13.42	10.87306	275.3	186.5	13.42	11.23472	275	190.71
275.7	185.37	13.42	10.87333	275.3	187.12	13.42	11.235	275.7	191.37
275.7	185.9	13.42	10.87361	275	188.39	13.42	11.23556	275.7	192.04
275.7	186.43	13.42	10.87389	275	189.01	13.42	11.23583	275.7	192.69
275.7	186.97	13.42	10.87417	275.3	189.62	13.42	11.23611	275.3	193.35
275.7	187.51	13.42	10.87444	275	190.24	13.42	11.23639	275.3	193.98
275.7	188.07	13.42	10.875	274.6	190.86	13.42	11.23667	275.3	194.63
275.7	188.6	13.42	10.87528	275	191.5	13.42	11.23694	275.3	195.28
275.7	189.12	13.42	10.87556	275	192.11	13.42	11.23722	275.3	195.94
276.1	189.65	13.42	10.87583	275.7	192.73	13.42	11.23778	275.7	197.24

TEMP	TIME	FEC1219	DEPTH	TEMP	TIME	FEC1235	DEPTH	TEMP	TIME
13.41	11.45444	277.9	155.47	13.65	12.32944	245.4	155.43	13.97	12.58639
13.41	11.45472	278.2	155.76	13.65	12.32972	245.8	155.73	13.97	12.58667
13.41	11.455	277.5	156.21	13.65	12.33	245.8	156.24	13.97	12.58694
13.41	11.45528	278.2	156.67	13.65	12.33028	245.8	156.83	13.96	12.58722
13.41	11.45556	277.9	157.14	13.65	12.33056	245.4	157.45	13.96	12.5875
13.41	11.45583	277.5	157.6	13.65	12.33111	245.4	158.09	13.95	12.58806
13.41	11.45611	274.6	158.08	13.65	12.33139	245.8	158.73	13.95	12.58833
13.41	11.45639	275.7	158.54	13.65	12.33167	246.1	160.03	13.95	12.58861
13.41	11.45694	276.1	159.02	13.65	12.33194	246.1	160.66	13.95	12.58889
13.41	11.45722	273.9	159.5	13.65	12.33222	246.1	161.29	13.94	12.58917
13.41	11.4575	275.3	159.98	13.65	12.3325	246.1	161.93	13.94	12.58944
13.41	11.45778	274.6	160.9	13.65	12.33306	246.1	162.57	13.94	12.58972
13.41	11.45806	272.1	161.37	13.65	12.33333	246.1	163.21	13.94	12.59028
13.41	11.45833	273.9	161.83	13.65	12.33361	245.8	163.87	13.93	12.59056
13.41	11.45861	267.1	162.3	13.65	12.33389	246.1	164.51	13.93	12.59083
13.41	11.45917	272.5	162.78	13.65	12.33417	245.8	165.14	13.93	12.59111
13.41	11.45944	271.4	163.25	13.65	12.33444	245.8	165.77	13.92	12.59139
13.41	11.45972	270.7	163.73	13.65	12.33472	244.7	166.41	13.93	12.59167
13.41	11.46	269.2	164.21	13.65	12.33528	245.1	167.04	13.92	12.59194
13.41	11.46028	268.5	164.68	13.65	12.33556	245.4	168.34	13.92	12.5925
13.41	11.46056	268.5	165.14	13.65	12.33583	245.8	168.99	13.91	12.59278
13.41	11.46083	266.7	165.6	13.65	12.33611	246.5	169.62	13.91	12.59306
13.41	11.46111	265.6	166.07	13.65	12.33639	246.1	170.25	13.9	12.59333
13.41	11.46167	264.2	167	13.66	12.33667	246.5	170.89	13.9	12.59361
13.41	11.46194	262.7	167.48	13.66	12.33694	245.4	171.53	13.9	12.59389
13.41	11.46222	261.3	167.96	13.66	12.33722	245.4	172.18	13.9	12.59417
13.41	11.4625	260.2	168.44	13.66	12.33778	245.8	172.81	13.89	12.59472
13.41	11.46278	258.4	168.91	13.66	12.33806	246.5	173.46	13.89	12.595
13.41	11.46306	257.3	169.38	13.67	12.33833	247.6	174.09	13.89	12.59528
13.41	11.46333	252.3	169.84	13.67	12.33861	245.4	174.73	13.89	12.59556
13.41	11.46389	251.5	170.3	13.68	12.33889	247.6	175.36	13.89	12.59583
13.41	11.46417	249.7	170.77	13.68	12.33917	246.5	176.65	13.88	12.59611
13.41	11.46444	248.3	171.25	13.68	12.33972	246.9	177.29	13.87	12.59639
13.41	11.46472	246.9	171.72	13.68	12.34	247.2	177.92	13.87	12.59694
13.41	11.465	243.6	172.66	13.68	12.34028	246.9	178.57	13.87	12.59722
13.41	11.46528	239.6	173.13	13.69	12.34056	247.6	179.21	13.86	12.5975
13.42	11.46556	239.6	173.61	13.69	12.34083	246.9	179.85	13.85	12.59778
13.42	11.46611	235.7	174.09	13.7	12.34111	245.8	180.48	13.85	12.59806
13.42	11.46639	233.1	174.55	13.7	12.34139	246.9	181.12	13.85	12.59833
13.42	11.46667	229.5	175.01	13.7	12.34194	246.5	181.75	13.84	12.59861
13.42	11.46694	226.3	175.48	13.71	12.34222	246.5	182.38	13.84	12.59917
13.42	11.46722	221.2	175.95	13.71	12.3425	246.5	183.04	13.84	12.59944
13.42	11.4675	218.7	176.43	13.71	12.34278	246.1	184.33	13.84	12.59972
13.42	11.46778	214.4	176.9	13.72	12.34306	245.1	184.95	13.84	12.6
13.42	11.46806	208.3	177.37	13.73	12.34333	246.1	185.59	13.84	12.60028
13.42	11.46861	207.5	177.84	13.73	12.34361	245.8	186.22	13.84	12.60056
13.42	11.46889	201.8	178.79	13.73	12.34417	244.7	186.86	13.84	12.60083
13.42	11.46917	199.6	179.26	13.74	12.34444	244.7	187.5	13.84	12.60139
13.42	11.46944	196.4	179.73	13.75	12.34472	243.6	188.16	13.84	12.60167
13.42	11.46972	194.2	180.19	13.75	12.345	243.6	188.8	13.84	12.60194
13.42	11.47	190.2	180.67	13.76	12.34528	243.6	189.43	13.84	12.60222
13.42	11.47028	187.3	181.13	13.77	12.34556	243.2	190.05	13.84	12.6025
13.42	11.47083	184.5	181.6	13.78	12.34583	242.2	190.7	13.84	12.60278
13.42	11.47111	182.7	182.07	13.78	12.34611	242.9	191.33	13.84	12.60306
13.42	11.47139	177.6	182.54	13.8	12.34667	242.2	192.61	13.84	12.60361
13.42	11.47167	174.7	183.02	13.81	12.34694	242.5	193.24	13.84	12.60389
13.42	11.47194	174	183.49	13.82	12.34722	242.2	193.85	13.84	12.60417
13.42	11.47222	171.5	183.98	13.83	12.3475	242.5	194.47	13.84	12.60444
13.42	11.4725	168.2	184.44	13.85	12.34778	242.2	195.09	13.84	12.60472
13.42	11.47306	165.3	185.36	13.87	12.34806	242.2	195.72	13.84	12.605
13.42	11.47333	163.9	185.82	13.89	12.34833	241.1	196.35	13.83	12.60528

FEC1253	DEPTH	TEMP	TIME	FEC1311	DEPTH	TEMP	TIME	FEC1323	DEPTH
228.5	155.61	14.02	12.89833	233.5	155.37	14.01	13.19389	229.2	155.7
228.8	156.14	14.02	12.89861	233.5	155.56	14.02	13.19417	229.2	156.14
227.4	156.8	14.02	12.89889	233.5	155.88	14.01	13.19444	229.9	156.68
229.5	157.51	14.01	12.89917	233.9	156.29	14.01	13.19472	229.9	157.28
229.9	159.1	14.01	12.89944	233.5	156.8	14.01	13.195	229.9	157.88
230.3	159.91	14.01	12.9	233.9	157.42	14.01	13.19528	229.5	158.5
230.6	160.69	14.01	12.90028	233.1	158.04	14.01	13.19556	229.5	159.11
230.6	161.47	14.01	12.90056	233.1	159.32	14.01	13.19583	229.5	159.73
231.7	162.27	14.01	12.90083	233.1	159.96	14.01	13.19639	229.9	160.34
231.3	163.06	14.01	12.90111	232.8	160.59	14.01	13.19667	229.5	160.93
232.1	163.88	14	12.90139	232.4	161.25	14.01	13.19694	229.2	161.57
232.1	164.68	14	12.90167	232.1	161.92	14.01	13.19722	229.2	162.2
232.4	165.46	14	12.90194	232.1	162.6	14.01	13.1975	229.5	162.84
230.3	166.25	14	12.9025	231.7	163.27	14.01	13.19778	227.7	164.15
232.4	167.04	14	12.90278	231.7	163.96	14.01	13.19806	229.2	164.78
233.5	167.85	13.99	12.90306	231.3	164.64	14.01	13.19861	229.2	165.4
233.9	169.45	13.99	12.90333	229.2	165.3	14.01	13.19889	229.9	166.04
234.2	170.22	13.99	12.90361	229.2	165.97	14.02	13.19917	228.8	166.68
233.9	170.98	13.99	12.90389	229.2	166.65	14.02	13.19944	229.2	167.32
235.3	171.75	13.99	12.90417	229.9	168.01	14.02	13.19972	229.2	167.97
236.4	172.51	13.98	12.90472	229.5	168.69	14.02	13.2	229.2	168.61
234.6	173.28	13.98	12.905	229.2	169.36	14.02	13.20028	228.8	169.25
235.7	174.04	13.97	12.90528	230.3	170.02	14.02	13.20083	229.2	169.88
235.7	174.81	13.97	12.90556	229.5	170.69	14.02	13.20111	229.2	170.51
236	175.56	13.97	12.90583	227.4	171.36	14.02	13.20139	229.5	171.79
235	176.34	13.97	12.90611	230.6	172.05	14.02	13.20167	226.3	172.44
236	177.09	13.96	12.90667	227.4	172.72	14.02	13.20194	224.5	173.07
236.4	178.55	13.96	12.90694	229.9	173.41	14.02	13.20222	229.5	173.72
235.7	179.26	13.96	12.90722	231	174.08	14.03	13.2025	226.3	174.36
235.7	179.97	13.95	12.9075	230.6	174.73	14.03	13.20306	229.2	174.99
235.3	180.66	13.95	12.90778	229.5	175.41	14.03	13.20333	229.9	175.62
235.7	181.37	13.95	12.90806	229.9	176.77	14.03	13.20361	227.7	176.28
236	182.07	13.95	12.90833	229.5	177.43	14.02	13.20389	229.2	176.91
236	182.79	13.95	12.90889	228.1	178.11	14.02	13.20417	229.2	177.55
236.4	183.52	13.95	12.90917	227.7	178.79	14.02	13.20444	229.2	178.19
236	184.22	13.95	12.90944	228.8	179.47	14.02	13.20472	228.8	178.84
235	184.92	13.95	12.90972	230.3	180.13	14.02	13.205	228.8	179.47
235.7	185.62	13.95	12.91	230.3	180.81	14.02	13.20556	229.2	180.74
236	186.33	13.95	12.91028	230.6	181.47	14.02	13.20583	229.2	181.38
235.3	187.74	13.95	12.91056	230.6	182.15	14.02	13.20611	227	182.01
234.6	188.47	13.95	12.91111	231.3	182.82	14.02	13.20639	227.4	182.66
235.7	189.16	13.95	12.91139	231.7	183.52	14.02	13.20667	227	183.3
235	189.86	13.95	12.91167	232.1	184.19	14.02	13.20694	228.8	183.96
234.2	190.56	13.95	12.91194	232.4	184.86	14.02	13.20722	228.8	184.58
233.9	191.28	13.95	12.91222	232.8	186.19	14.01	13.20778	228.8	185.21
233.5	191.98	13.95	12.9125	233.5	186.86	14.01	13.20806	229.2	185.84
234.2	192.69	13.95	12.91278	232.4	187.54	14.01	13.20833	228.5	186.48
233.9	193.37	13.95	12.91333	233.5	188.24	14	13.20861	229.9	187.12
234.6	194.06	13.95	12.91361	234.6	188.91	14	13.20889	229.9	187.76
234.2	194.74	13.95	12.91389	235	189.56	13.99	13.20917	228.8	188.43
233.5	195.44	13.95	12.91417	235	190.24	13.99	13.20944	229.2	189.68
233.9	196.84	13.95	12.91444	235.7	190.91	13.99	13.21	229.2	190.3
234.2	197.52	13.95	12.91472	236	191.59	13.99	13.21028	229.2	190.95
234.2	198.23	13.95	12.915	236.8	192.25	13.98	13.21056	229.5	191.58
233.9	198.9	13.96	12.91556	236.4	192.93	13.98	13.21083	229.9	192.22
233.9	199.61	13.96	12.91583	237.1	193.57	13.98	13.21111	230.3	192.85
233.1	200.3	13.96	12.91611	237.1	194.23	13.97	13.21139	229.5	193.48
233.1	200.99	13.97	12.91639	236.8	195.55	13.97	13.21167	230.6	194.09
232.8	201.68	13.96	12.91667	237.5	196.2	13.97	13.21222	230.3	194.71
233.5	202.39	13.96	12.91694	237.8	196.87	13.97	13.2125	230.3	195.33
233.5	203.08	13.96	12.9175	237.5	197.54	13.97	13.21278	230.3	195.98

TEMP	TIME	FEC1341	DEPTH	TEMP	TIME	FEC1351	DEPTH	TEMP	TIME
14.01	13.39694	221.2	155.43	14.02	13.68583	221.2	155.48	14.02	13.85278
14.01	13.39722	222.3	155.7	14.02	13.68611	220.2	155.8	14.02	13.85306
14	13.3975	221.2	156.12	14.02	13.68639	219.8	156.29	14.02	13.85333
14	13.39778	220.9	156.65	14.02	13.68694	220.5	156.79	14.02	13.85361
14	13.39806	220.9	157.18	14.02	13.68722	220.9	157.31	14.02	13.85389
14	13.39833	220.5	157.72	14.02	13.6875	219.8	158.42	14.02	13.85444
14	13.39861	219.8	158.26	14.02	13.68778	220.9	158.98	14.02	13.85472
14	13.39917	219.8	158.8	14.02	13.68806	221.2	159.54	14.02	13.855
13.99	13.39944	219.1	159.36	14.02	13.68833	220.9	160.1	14.02	13.85528
13.99	13.39972	219.1	159.91	14.02	13.68861	219.8	160.64	14.02	13.85556
13.99	13.4	219.1	160.45	14.02	13.68889	219.1	161.19	14.02	13.85583
13.99	13.40028	218.7	160.97	14.02	13.68944	219.8	161.74	14.02	13.85611
13.99	13.40056	218.7	161.51	14.02	13.68972	218.4	162.3	14.02	13.85667
13.99	13.40083	218	162.05	14.02	13.69	219.4	162.85	14.02	13.85694
13.99	13.40139	218.7	163.18	14.02	13.69028	219.4	163.4	14.02	13.85722
13.99	13.40167	218.4	163.78	14.02	13.69056	219.8	163.97	14.02	13.8575
13.99	13.40194	215.1	164.38	14.02	13.69083	220.2	165.15	14.02	13.85778
13.99	13.40222	216.9	164.97	14.02	13.69111	219.4	165.77	14.02	13.85806
13.99	13.4025	216.9	165.56	14.02	13.69167	220.2	166.42	14.02	13.85833
13.99	13.40278	217.6	166.16	14.02	13.69194	220.2	167.07	14.02	13.85889
13.99	13.40333	218	166.75	14.03	13.69222	219.8	167.73	14.02	13.85917
13.99	13.40361	216.9	167.35	14.03	13.6925	218	168.38	14.02	13.85944
13.99	13.40389	217.6	167.96	14.02	13.69278	219.8	169.06	14.02	13.85972
13.99	13.40417	217.3	168.58	14.03	13.69306	218.7	169.71	14.02	13.86
13.99	13.40444	216.6	169.19	14.03	13.69361	221.2	170.37	14.02	13.86028
13.99	13.40472	216.9	170.49	14.03	13.69389	220.2	171.03	14.02	13.86056
13.99	13.405	216.9	171.15	14.03	13.69417	219.8	171.71	14.02	13.86111
13.99	13.40556	217.6	171.81	14.03	13.69444	220.5	172.38	14.02	13.86139
13.99	13.40583	218	172.49	14.03	13.69472	221.6	173.72	14.02	13.86167
13.99	13.40611	218	173.13	14.03	13.695	221.2	174.39	14.02	13.86194
13.99	13.40639	217.3	173.81	14.03	13.69528	218.7	175.04	14.02	13.86222
13.99	13.40667	217.3	174.46	14.03	13.69583	220.2	175.7	14.01	13.8625
13.99	13.40694	217.3	175.12	14.03	13.69611	221.2	176.38	14.01	13.86306
13.99	13.40722	215.1	175.77	14.03	13.69639	219.4	177.04	14.01	13.86333
13.99	13.4075	216.2	176.44	14.03	13.69667	220.5	177.71	14.01	13.86361
13.99	13.40806	218	177.1	14.03	13.69694	220.5	178.38	14.01	13.86389
13.99	13.40833	216.9	177.76	14.02	13.69722	218	179.06	14.01	13.86417
13.99	13.40861	217.3	179.08	14.02	13.6975	219.1	179.71	14.01	13.86444
13.99	13.40889	217.6	179.74	14.02	13.69806	221.2	180.39	14.01	13.86472
13.98	13.40917	217.6	180.4	14.02	13.69833	221.2	181.04	14	13.86528
13.98	13.40944	216.6	181.05	14.02	13.69861	218.7	182.37	14	13.86556
13.97	13.40972	218.4	181.71	14.02	13.69889	220.2	183.05	14	13.86583
13.98	13.41028	218.7	182.37	14.02	13.69917	218.4	183.72	14	13.86611
13.98	13.41056	220.2	183.04	14.01	13.69944	219.8	184.39	14	13.86639
13.98	13.41083	218.7	183.71	14.01	13.69972	220.5	185.04	14	13.86667
13.98	13.41111	219.8	184.36	14.01	13.7	218.7	185.71	14	13.86694
13.98	13.41139	221.2	185.02	14.01	13.70056	220.2	186.37	14	13.8675
13.98	13.41167	219.1	185.67	14.01	13.70083	219.4	187.04	14	13.86778
13.98	13.41194	216.9	186.33	14.01	13.70111	220.5	187.71	14	13.86806
13.97	13.4125	220.9	186.99	14.01	13.70139	220.5	188.4	14	13.86833
13.98	13.41278	221.2	188.33	14	13.70167	220.9	189.05	14	13.86861
13.97	13.41306	219.4	188.99	14	13.70194	220.9	190.36	14	13.86889
13.97	13.41333	215.8	189.63	14	13.70222	220.2	191.04	14	13.86917
13.97	13.41361	218.7	190.29	14	13.70278	220.5	191.7	14	13.86972
13.97	13.41389	218.7	190.94	14	13.70306	220.5	192.37	13.99	13.87
13.97	13.41417	218.4	191.61	14	13.70333	220.9	193.02	13.99	13.87028
13.97	13.41444	220.2	192.26	14	13.70361	220.9	193.66	13.99	13.87056
13.97	13.415	220.2	192.92	14	13.70389	220.9	194.31	13.99	13.87083
13.97	13.41528	219.4	193.55	13.99	13.70417	220.9	194.95	13.99	13.87111
13.97	13.41556	219.8	194.18	13.99	13.70444	221.2	195.62	13.99	13.87139
13.97	13.41583	220.9	194.83	13.99	13.705	220.9	196.27	13.99	13.87194

FEC1400	DEPTH	TEMP	TIME	FEC1410	DEPTH	TEMP	TIME	FEC1416	DEPTH
217.6	155.46	14.06	14.00139	219.8	155.59	14.06	14.17472	220.9	155.37
218	155.73	14.06	14.00167	219.4	156.22	14.06	14.175	220.5	155.55
217.6	156.12	14.06	14.00194	219.4	157.1	14.05	14.17528	220.9	155.93
217.3	156.6	14.06	14.00222	220.2	158.11	14.05	14.17556	220.5	156.46
217.3	157.15	14.06	14.0025	220.9	159.12	14.05	14.17583	220.9	157.87
217.6	158.26	14.06	14.00278	221.2	160.15	14.04	14.17611	220.5	158.67
218.4	158.81	14.06	14.00306	222.7	161.15	14.04	14.17667	220.5	159.5
218	159.38	14.06	14.00361	221.6	162.17	14.04	14.17694	220.2	160.32
218	159.96	14.06	14.00389	221.6	163.17	14.04	14.17722	220.2	161.12
218.7	160.52	14.05	14.00417	223.1	164.22	14.03	14.1775	219.8	161.93
218.7	161.09	14.05	14.00444	223.1	165.2	14.03	14.17778	219.8	162.76
218	161.65	14.04	14.00472	223.1	166.23	14.02	14.17806	219.4	163.62
218.7	162.23	14.04	14.005	223.1	167.24	14.02	14.17833	219.1	164.48
219.8	162.8	14.04	14.00528	223.4	169.29	14.02	14.17861	217.3	165.32
220.5	163.43	14.04	14.00583	223.8	170.3	14.02	14.17917	217.3	166.16
220.5	164.08	14.04	14.00611	223.1	171.3	14.01	14.17944	216.6	167.87
220.5	164.7	14.03	14.00639	222	172.34	14.01	14.17972	216.9	168.73
221.6	165.93	14.03	14.00667	223.8	173.35	14.01	14.18	216.6	169.57
220.2	166.55	14.03	14.00694	223.8	174.37	14.01	14.18028	216.2	170.41
221.6	167.18	14.02	14.00722	222.7	175.37	14.01	14.18056	217.3	171.26
222	167.81	14.02	14.0075	222.7	176.4	14	14.18083	217.3	172.12
222.7	168.43	14.02	14.00806	220.9	177.4	14	14.18139	216.6	172.97
222.3	169.07	14.02	14.00833	220.9	178.44	13.99	14.18167	216.2	173.82
222.7	169.68	14.02	14.00861	221.2	179.44	13.99	14.18194	217.3	174.67
222.3	170.3	14.01	14.00889	220.9	180.47	13.99	14.18222	216.2	175.51
223.1	170.93	14.01	14.00917	220.9	182.49	13.99	14.1825	216.9	176.37
223.1	171.57	14.01	14.00944	220.9	183.51	13.99	14.18278	215.8	177.21
222.7	172.21	14.01	14.00972	221.6	184.53	13.99	14.18306	215.1	178.07
223.1	172.85	14.01	14.01028	220.5	185.53	13.99	14.18361	215.1	179.77
223.8	174.14	14.01	14.01056	221.2	186.55	13.99	14.18389	215.8	180.61
223.4	174.76	14.01	14.01083	220.5	187.56	13.99	14.18417	216.2	181.45
223.1	175.39	14.01	14.01111	220.5	188.6	13.99	14.18444	216.2	182.31
223.1	176.03	14	14.01139	221.6	189.59	13.99	14.18472	215.8	183.16
222.7	176.66	14	14.01167	220.9	190.59	13.99	14.185	217.3	184.03
223.1	177.3	14	14.01194	220.9	191.62	13.99	14.18528	217.3	184.86
222.3	177.92	14	14.0125	220.9	192.64	13.99	14.18583	218	185.69
220.9	178.58	14	14.01278	220.5	193.62	13.99	14.18611	218.4	186.55
221.6	179.21	14	14.01306	220.5	195.59	13.99	14.18639	218.7	187.39
222	179.85	13.99	14.01333	220.5	196.6	13.99	14.18667	219.4	188.27
223.8	180.48	13.99	14.01361	220.2	197.6	13.99	14.18694	220.5	189.94
220.9	181.11	13.99	14.01389	220.9	198.59	13.99	14.18722	220.2	190.78
222.3	182.38	13.99	14.01417	220.2	199.57	13.99	14.18778	221.2	191.65
220.9	183.02	13.99	14.01472	220.2	200.58	14	14.18806	221.2	192.48
220.5	183.67	13.99	14.015	221.2	201.57	14	14.18833	222	193.32
220.9	184.3	13.99	14.01528	220.9	202.58	13.99	14.18861	222.3	194.13
220.5	184.93	13.99	14.01556	220.9	203.56	14	14.18889	222.7	194.95
221.2	185.55	13.99	14.01583	220.5	204.56	13.99	14.18917	223.1	195.8
220.5	186.19	13.99	14.01611	221.2	205.54	13.99	14.18944	223.1	196.63
220.9	186.82	13.99	14.01639	220.2	206.55	13.99	14.18972	223.4	197.47
220.5	187.46	13.99	14.01694	221.2	208.54	13.99	14.19028	223.8	198.29
220.9	188.11	13.99	14.01722	220.9	209.52	13.99	14.19056	223.8	199.12
220.9	188.76	13.99	14.0175	219.8	210.53	13.99	14.19083	223.1	200.79
219.8	190	13.99	14.01778	221.2	211.53	13.99	14.19111	224.5	201.61
219.8	190.63	13.99	14.01806	221.2	212.53	13.99	14.19139	224.1	202.46
219.8	191.27	13.99	14.01833	221.6	213.5	13.99	14.19167	224.9	203.29
219.8	191.9	13.99	14.01861	221.2	214.5	13.99	14.19222	224.5	204.12
219.8	192.53	13.99	14.01917	221.6	215.51	13.99	14.1925	224.5	204.94
219.8	193.15	13.99	14.01944	221.2	216.51	13.99	14.19278	224.9	205.78
219.8	193.78	13.99	14.01972	220.2	217.49	13.99	14.19306	224.5	206.6
219.8	194.39	13.99	14.02	221.6	219.49	13.99	14.19333	225.2	207.46
219.4	195.01	13.99	14.02028	221.2	220.48	13.99	14.19361	224.5	208.28



TEMP	TIME	FEC1425	DEPTH	TEMP	TIME	FEC1433	DEPTH	TEMP	TIME
14.02	14.2825	231	155.37	13.85	14.41972	254.8	155.61	13.53	14.55278
14.02	14.28278	231.7	155.62	13.85	14.42	254.4	156.07	13.52	14.55306
14.02	14.28306	232.4	156.07	13.85	14.42028	254.4	156.69	13.52	14.55333
14.02	14.28333	233.5	157.4	13.84	14.42083	254.1	157.44	13.52	14.55361
14.02	14.28361	234.6	158.15	13.83	14.42111	254.4	158.17	13.52	14.55389
14.02	14.28389	236	158.97	13.82	14.42139	254.4	158.92	13.52	14.55417
14.02	14.28417	236.8	159.78	13.82	14.42167	254.1	160.41	13.52	14.55444
14.01	14.28472	238.2	160.6	13.8	14.42194	254.4	161.16	13.52	14.555
14.01	14.285	238.6	161.43	13.8	14.42222	254.1	161.93	13.52	14.55528
14.01	14.28528	238.9	162.28	13.79	14.4225	254.1	162.72	13.52	14.55556
14.01	14.28556	237.8	163.12	13.78	14.42306	253.7	163.49	13.52	14.55583
14.01	14.28583	239.3	163.99	13.77	14.42333	254.1	164.31	13.52	14.55611
14.01	14.28611	239.6	164.83	13.77	14.42361	250.5	165.06	13.51	14.55639
14.01	14.28639	241.8	165.64	13.76	14.42389	251.2	165.83	13.52	14.55667
14.02	14.28694	240.7	166.49	13.75	14.42417	252.3	166.61	13.52	14.55722
14.02	14.28722	241.8	168.19	13.75	14.42444	253	167.39	13.52	14.5575
14.02	14.2875	243.2	169.04	13.74	14.42472	249.4	168.18	13.51	14.55778
14.02	14.28778	242.2	169.88	13.73	14.42528	254.1	168.96	13.52	14.55806
14.02	14.28806	244.7	170.71	13.73	14.42556	252.6	170.51	13.51	14.55833
14.02	14.28833	245.1	171.56	13.72	14.42583	253.3	171.29	13.51	14.55861
14.02	14.28861	245.4	172.42	13.71	14.42611	253.7	172.07	13.52	14.55889
14.03	14.28917	244.7	173.25	13.71	14.42639	253	172.86	13.52	14.55944
14.03	14.28944	245.8	174.1	13.7	14.42667	253.7	173.64	13.52	14.55972
14.03	14.28972	244.3	174.94	13.7	14.42694	253.7	174.43	13.52	14.56
14.03	14.29	246.1	175.78	13.7	14.42722	253.7	175.32	13.52	14.56028
14.03	14.29028	246.5	176.63	13.69	14.42778	253.7	176.22	13.52	14.56056
14.03	14.29056	246.5	177.47	13.68	14.42806	254.4	177.1	13.51	14.56083
14.02	14.29083	246.1	178.33	13.68	14.42833	251.2	178	13.51	14.56111
14.02	14.29139	244.3	180.01	13.68	14.42861	253	178.9	13.51	14.56167
14.02	14.29167	244.7	180.85	13.67	14.42889	252.3	179.8	13.51	14.56194
14.02	14.29194	245.8	181.68	13.67	14.42917	252.3	180.7	13.51	14.56222
14.02	14.29222	246.5	182.52	13.66	14.42944	253.7	182.48	13.51	14.5625
14.02	14.2925	245.4	183.38	13.66	14.43	252.6	183.38	13.51	14.56278
14.01	14.29278	246.1	184.24	13.66	14.43028	253.3	184.29	13.51	14.56306
14.01	14.29306	245.8	185.07	13.66	14.43056	253.3	185.16	13.51	14.56333
14.01	14.29361	246.5	185.9	13.66	14.43083	253.7	186.06	13.51	14.56389
14	14.29389	245.8	186.74	13.65	14.43111	253.7	186.95	13.51	14.56417
13.99	14.29417	246.9	187.59	13.65	14.43139	254.1	187.85	13.51	14.56444
13.99	14.29444	246.5	188.45	13.65	14.43194	254.1	188.76	13.5	14.56472
13.99	14.29472	247.2	190.11	13.65	14.43222	254.1	189.63	13.5	14.565
13.98	14.295	247.2	190.96	13.64	14.4325	254.4	190.53	13.5	14.56528
13.98	14.29556	247.6	191.81	13.64	14.43278	254.8	191.42	13.5	14.56556
13.97	14.29583	247.9	192.65	13.63	14.43306	255.1	192.31	13.49	14.56611
13.97	14.29611	248.7	193.47	13.63	14.43333	254.4	194.06	13.49	14.56639
13.96	14.29639	248.7	194.28	13.63	14.43361	254.8	194.92	13.49	14.56667
13.96	14.29667	249.4	195.1	13.63	14.43417	255.1	195.81	13.49	14.56694
13.95	14.29694	249.7	195.94	13.62	14.43444	254.8	196.68	13.49	14.56722
13.95	14.29722	250.1	196.76	13.61	14.43472	254.8	197.55	13.49	14.5675
13.95	14.29778	250.5	197.6	13.61	14.435	255.5	198.44	13.49	14.56778
13.95	14.29806	250.8	198.41	13.61	14.43528	255.1	199.31	13.49	14.56833
13.95	14.29833	251.2	199.24	13.61	14.43556	255.1	200.19	13.49	14.56861
13.94	14.29861	250.8	200.9	13.6	14.43583	254.8	201.05	13.49	14.56889
13.94	14.29889	251.5	201.71	13.6	14.43639	254.8	201.93	13.49	14.56917
13.94	14.29917	251.9	202.56	13.59	14.43667	255.1	202.82	13.48	14.56944
13.94	14.29944	252.3	203.37	13.59	14.43694	255.5	203.69	13.48	14.56972
13.93	14.29972	252.6	204.21	13.59	14.43722	255.1	205.44	13.48	14.57
13.92	14.30028	252.6	205.02	13.58	14.4375	255.1	206.31	13.48	14.57056
13.92	14.30056	252.6	205.85	13.58	14.43778	254.8	207.21	13.48	14.57083
13.92	14.30083	253	206.68	13.58	14.43806	255.1	208.08	13.48	14.57111
13.92	14.30111	253	207.51	13.57	14.43861	255.1	208.95	13.48	14.57139
13.92	14.30139	253.3	208.33	13.57	14.43889	254.8	209.81	13.48	14.57167

275	191	13.52	9.4075	283.3	197.41	13.47	9.736667	282.2	192.19
275.3	191.6	13.53	9.407778	283.3	198.04	13.47	9.736944	282.2	192.75
275.3	192.19	13.53	9.408056	283.3	198.68	13.47	9.737222	281.8	193.86
275.3	192.78	13.53	9.408333	283.3	199.31	13.47	9.7375	281.8	194.4
275.3	193.36	13.53	9.408611	283.6	199.95	13.47	9.738056	281.8	194.96
275.3	193.93	13.53	9.408889	282.6	200.59	13.47	9.738333	282.2	195.52
275.7	194.5	13.53	9.409444	283.3	201.22	13.47	9.738611	282.2	196.1
275.7	195.08	13.53	9.409722	283.3	201.85	13.47	9.738889	282.2	196.65
275.7	195.67	13.53	9.41	283.3	203.14	13.47	9.739167	282.2	197.21
276.1	196.25	13.53	9.410278	283.3	203.77	13.47	9.739444	282.2	197.77
276.1	196.84	13.53	9.410556	283.6	204.41	13.47	9.739722	282.2	198.34
276.1	197.42	13.53	9.410833	283.6	205.04	13.47	9.74	282.2	198.88
276.4	198.58	13.53	9.411111	283.3	205.68	13.47	9.740556	282.2	199.44
276.1	199.15	13.53	9.411667	283.6	206.31	13.47	9.740833	281.1	200.01
276.4	199.74	13.53	9.411944	283.3	206.97	13.47	9.741111	281.5	200.56
276.8	200.33	13.53	9.412222	283.3	207.61	13.47	9.741389	281.8	201.67
276.1	200.91	13.53	9.4125	283.6	208.24	13.47	9.741667	281.8	202.25
276.4	201.48	13.53	9.412778	283.6	208.87	13.47	9.741944	281.8	202.81
276.8	202.07	13.53	9.413056	283.6	210.13	13.47	9.7425	281.8	203.36
277.1	202.65	13.53	9.413333	283.3	210.75	13.47	9.742778	281.8	203.93
277.1	203.24	13.53	9.413611	283.3	211.42	13.47	9.743056	282.2	204.48
277.1	203.82	13.53	9.414167	283.3	212.07	13.47	9.743333	281.8	205.04
277.5	204.4	13.53	9.414444	283.6	212.7	13.47	9.743611	281.8	205.59
277.5	204.97	13.52	9.414722	283.6	213.32	13.47	9.743889	281.8	206.14
277.9	205.55	13.53	9.415	283.6	213.96	13.47	9.744167	281.8	206.72
277.9	206.14	13.53	9.415278	283.6	214.59	13.47	9.744722	281.8	207.28
277.9	207.32	13.53	9.415556	283.6	215.23	13.47	9.745	281.8	207.85
277.9	207.9	13.53	9.415833	283.3	215.88	13.47	9.745278	281.8	208.95
277.9	208.47	13.53	9.416111	283.6	216.52	13.47	9.745556	282.2	209.51
277.9	209.05	13.52	9.416667	283.6	217.16	13.47	9.745833	281.8	210.06
278.2	209.62	13.52	9.416944	282.9	217.78	13.47	9.746111	281.8	210.62
278.6	210.21	13.52	9.417222	283.3	219.06	13.47	9.746389	281.8	211.18
277.9	210.79	13.52	9.4175	283.3	219.7	13.47	9.746944	281.8	211.76
278.2	211.38	13.52	9.417778	282.9	220.33	13.47	9.747222	281.8	212.32
278.6	211.97	13.52	9.418056	283.3	220.98	13.47	9.7475	281.8	212.87
278.6	212.56	13.52	9.418333	283.6	221.62	13.47	9.747778	281.8	213.42
278.6	213.12	13.53	9.418889	283.3	222.25	13.47	9.748056	282.2	213.98
278.6	213.69	13.52	9.419167	283.6	222.88	13.47	9.748333	281.8	214.53
279	214.28	13.52	9.419444	283.6	223.52	13.47	9.748611	282.2	215.66
279	215.45	13.52	9.419722	283.6	224.16	13.47	9.749167	281.8	216.24
279	216.03	13.52	9.42	283.6	224.79	13.47	9.749444	282.2	216.8
279.3	216.63	13.52	9.420278	283.6	225.43	13.47	9.749722	282.2	217.35
279.3	217.2	13.52	9.420556	283.6	226.08	13.47	9.75	281.8	217.89
279	217.78	13.52	9.420833	283.3	227.35	13.47	9.750278	282.2	218.45
278.2	218.35	13.52	9.421389	283.6	227.99	13.47	9.750556	282.6	219.01
279	218.94	13.52	9.421667	283.6	228.61	13.47	9.750833	281.5	219.58
279.3	219.52	13.52	9.421944	283.6	229.26	13.47	9.751389	282.6	220.14
279.3	220.11	13.52	9.422222	283.3	229.89	13.47	9.751667	282.2	220.7
279	220.68	13.52	9.4225	283.6	230.54	13.47	9.751944	282.2	221.27
279.3	221.27	13.52	9.422778	283.6	231.19	13.47	9.752222	282.2	221.82
279.7	221.86	13.52	9.423056	283.6	231.82	13.47	9.7525	282.2	222.38
279.7	222.43	13.52	9.423333	283.6	232.44	13.47	9.752778	282.2	222.93
279.7	223.01	13.52	9.423889	283.6	233.08	13.47	9.753056	282.6	224.06
279.7	223.6	13.52	9.424167	283.6	233.71	13.47	9.753611	282.2	224.62
280	224.76	13.52	9.424444	283.3	235	13.47	9.753889	281.8	225.17
279.7	225.34	13.52	9.424722	283.3	235.65	13.47	9.754167	282.6	225.73
279.7	225.93	13.52	9.425	283.6	236.28	13.47	9.754444	282.2	226.31
279.7	226.52	13.52	9.425278	283.3	236.9	13.47	9.754722	282.2	226.86
279.7	227.1	13.52	9.425556	283.6	237.54	13.47	9.755	282.2	227.42
280	227.68	13.52	9.426111	283.6	238.17	13.47	9.755556	282.2	227.97
280	228.26	13.52	9.426389	283.3	238.82	13.47	9.755833	282.6	228.53
280	228.84	13.52	9.426667	283.6	239.46	13.47	9.756111	282.2	229.09

13.45	10.0425	281.5	191.39	13.44	10.36056	279.7	199.94	13.44	10.52389
13.45	10.04278	281.1	191.94	13.44	10.36083	279.3	200.62	13.44	10.52417
13.45	10.04306	281.1	193.08	13.44	10.36111	279.7	201.98	13.44	10.52444
13.45	10.04333	281.5	193.68	13.44	10.36139	279.3	202.68	13.44	10.52472
13.45	10.04361	281.1	194.28	13.44	10.36167	279.7	203.35	13.44	10.525
13.45	10.04417	281.1	194.92	13.44	10.36194	279.7	204.04	13.44	10.52556
13.45	10.04444	281.5	195.55	13.44	10.36222	279.3	204.71	13.44	10.52583
13.45	10.04472	281.5	196.19	13.44	10.36278	279.7	205.4	13.44	10.52611
13.45	10.045	281.1	196.82	13.44	10.36306	279.7	206.07	13.44	10.52639
13.45	10.04528	281.1	197.45	13.44	10.36333	280.8	206.77	13.44	10.52667
13.45	10.04556	281.5	198.09	13.44	10.36361	280.8	207.46	13.44	10.52694
13.45	10.04583	281.1	198.71	13.44	10.36389	280.8	208.15	13.44	10.52722
13.45	10.04639	281.1	199.33	13.44	10.36417	280.8	208.81	13.44	10.52778
13.45	10.04667	281.5	200.61	13.44	10.36444	280.4	209.49	13.44	10.52806
13.45	10.04694	281.1	201.24	13.44	10.365	280.4	210.17	13.44	10.52833
13.45	10.04722	281.1	201.86	13.44	10.36528	280.8	211.55	13.44	10.52861
13.45	10.0475	281.5	202.51	13.44	10.36556	280.4	212.24	13.44	10.52889
13.45	10.04778	281.5	203.13	13.44	10.36583	280.8	212.92	13.44	10.52917
13.45	10.04806	281.5	203.76	13.44	10.36611	280.4	213.58	13.44	10.52944
13.45	10.04833	281.1	204.4	13.44	10.36639	280.4	214.27	13.44	10.53
13.45	10.04889	281.1	205.02	13.44	10.36667	280	214.95	13.44	10.53028
13.45	10.04917	281.5	205.65	13.44	10.36722	280.4	215.65	13.44	10.53056
13.45	10.04944	281.5	206.28	13.44	10.3675	280.4	216.33	13.44	10.53083
13.45	10.04972	281.1	206.93	13.44	10.36778	280	217.02	13.44	10.53111
13.45	10.05	281.5	207.56	13.44	10.36806	280.4	217.68	13.44	10.53139
13.45	10.05028	281.5	208.82	13.44	10.36833	280.4	218.36	13.44	10.53167
13.45	10.05056	281.5	209.44	13.44	10.36861	280.4	219.74	13.44	10.53222
13.45	10.05111	281.1	210.07	13.44	10.36889	280.4	220.42	13.44	10.5325
13.45	10.05139	281.1	210.71	13.44	10.36944	280.4	221.11	13.44	10.53278
13.45	10.05167	281.1	211.34	13.44	10.36972	280.4	221.79	13.44	10.53306
13.45	10.05194	281.1	212	13.44	10.37	280.4	222.47	13.44	10.53333
13.46	10.05222	281.1	212.62	13.44	10.37028	280	223.15	13.44	10.53361
13.46	10.0525	281.1	213.23	13.44	10.37056	280	223.84	13.44	10.53389
13.46	10.05278	281.5	213.86	13.44	10.37083	280	224.52	13.44	10.53444
13.46	10.05333	281.1	214.49	13.44	10.37111	280.4	225.2	13.44	10.53472
13.46	10.05361	281.5	215.13	13.44	10.37167	279.7	225.89	13.44	10.535
13.46	10.05389	281.5	215.76	13.44	10.37194	280.4	226.58	13.44	10.53528
13.46	10.05417	281.5	217.04	13.44	10.37222	280.4	227.25	13.44	10.53556
13.46	10.05444	281.8	217.66	13.44	10.3725	280.4	227.94	13.44	10.53583
13.46	10.05472	281.1	218.28	13.44	10.37278	280.4	229.29	13.44	10.53611
13.46	10.055	281.5	218.91	13.44	10.37306	280	229.97	13.44	10.53667
13.46	10.05556	281.1	219.55	13.44	10.37333	280.4	230.68	13.44	10.53694
13.46	10.05583	281.1	220.19	13.44	10.37389	280.4	231.36	13.44	10.53722
13.46	10.05611	281.5	220.81	13.44	10.37417	279	232.04	13.44	10.5375
13.46	10.05639	281.5	221.46	13.44	10.37444	279	232.71	13.44	10.53778
13.45	10.05667	281.5	222.08	13.44	10.37472	279	233.39	13.44	10.53806
13.45	10.05694	281.5	222.7	13.44	10.375	277.5	234.07	13.44	10.53833
13.46	10.05722	282.2	223.97	13.44	10.37528	278.2	234.76	13.44	10.53861
13.46	10.05778	281.8	224.61	13.44	10.37583	278.2	235.46	13.44	10.53917
13.46	10.05806	281.8	225.23	13.44	10.37611	278.2	236.14	13.44	10.53944
13.46	10.05833	281.8	225.88	13.44	10.37639	278.2	236.81	13.44	10.53972
13.46	10.05861	281.5	226.51	13.44	10.37667	278.6	237.49	13.44	10.54
13.46	10.05889	281.8	227.14	13.44	10.37694	278.2	238.17	13.44	10.54028
13.46	10.05917	281.8	227.77	13.44	10.37722	278.2	239.55	13.44	10.54056
13.46	10.05944	281.8	228.4	13.44	10.3775	277.9	240.24	13.44	10.54083
13.46	10.06	281.8	229.02	13.44	10.37806	277.9	240.91	13.44	10.54139
13.46	10.06028	281.8	229.66	13.45	10.37833	277.9	241.59	13.44	10.54167
13.46	10.06056	281.5	230.29	13.44	10.37861	278.2	242.27	13.44	10.54194
13.46	10.06083	281.1	230.94	13.44	10.37889	277.9	242.96	13.44	10.54222
13.46	10.06111	281.5	231.57	13.45	10.37917	278.2	243.64	13.44	10.5425
13.46	10.06139	281.8	232.81	13.44	10.37944	278.2	244.32	13.44	10.54278
13.46	10.06167	281.5	233.45	13.45	10.37972	278.2	245.02	13.44	10.54306

275.7	190.72	13.42	10.87611	275.3	193.34	13.42	11.23806	275.7	197.9
275.7	191.25	13.42	10.87639	275.3	193.94	13.42	11.23833	275.3	198.54
275.7	191.79	13.42	10.87694	275.3	194.54	13.42	11.23861	275.7	199.19
275.7	192.32	13.42	10.87722	275.3	195.77	13.42	11.23889	275.3	199.84
276.1	192.84	13.42	10.8775	275.7	196.38	13.42	11.23917	275	200.5
276.1	193.37	13.42	10.87778	275.3	196.99	13.42	11.23972	275.3	201.14
275.7	193.88	13.42	10.87806	275.7	197.61	13.42	11.24	275.3	201.79
275.7	194.4	13.43	10.87833	275.3	198.22	13.42	11.24028	275.7	202.45
276.1	194.92	13.43	10.87861	275.3	198.82	13.42	11.24056	275.7	203.11
275.7	195.45	13.43	10.87917	275.3	199.44	13.42	11.24083	275.7	203.75
276.1	195.98	13.43	10.87944	275.3	200.05	13.42	11.24111	275.3	204.41
275.7	196.5	13.43	10.87972	274.6	200.66	13.42	11.24139	275.3	205.7
275.7	197.55	13.43	10.88	275	201.27	13.42	11.24194	275.3	206.35
275.7	198.08	13.43	10.88028	275.3	201.88	13.42	11.24222	275	207.02
275.7	198.59	13.43	10.88056	275.3	202.5	13.42	11.2425	275	207.67
275.7	199.11	13.43	10.88083	275.3	203.72	13.42	11.24278	275	208.32
275.3	199.64	13.43	10.88139	275.3	204.33	13.42	11.24306	275	208.96
275.7	200.17	13.43	10.88167	275	204.94	13.42	11.24333	275.3	209.6
275.3	200.69	13.43	10.88194	275.3	205.56	13.42	11.24361	275.3	210.26
275.7	201.21	13.43	10.88222	275	206.16	13.42	11.24417	275	210.91
275.7	201.74	13.43	10.8825	275	206.78	13.42	11.24444	275	211.58
275.7	202.27	13.43	10.88278	275.3	207.41	13.42	11.24472	275	212.24
275.7	202.8	13.43	10.88306	275.7	208.01	13.43	11.245	275.3	212.87
275.7	203.31	13.43	10.88333	275.3	208.62	13.43	11.24528	275.3	214.17
276.1	204.36	13.43	10.88389	275.7	209.22	13.43	11.24556	275.3	214.82
275.7	204.89	13.43	10.88417	275.7	209.82	13.43	11.24611	275	215.48
275.7	205.41	13.43	10.88444	275	211.06	13.43	11.24639	275.3	216.13
275.7	205.93	13.43	10.88472	275.3	211.69	13.43	11.24667	275.3	216.79
276.1	206.45	13.43	10.885	275.3	212.31	13.43	11.24694	275.3	217.43
275.7	206.99	13.43	10.88528	275.3	212.89	13.43	11.24722	274.6	218.08
275.7	207.53	13.43	10.88583	275.7	213.5	13.43	11.2475	275	218.72
275.7	208.05	13.43	10.88611	275.3	214.11	13.43	11.24778	275.3	219.39
275.7	208.57	13.43	10.88639	275.3	214.73	13.43	11.24833	275.7	220.04
275.7	209.08	13.43	10.88667	275.7	215.34	13.43	11.24861	275.3	220.69
275.7	209.61	13.43	10.88694	275.7	215.96	13.43	11.24889	275.3	222
276.1	210.12	13.43	10.88722	275.7	216.58	13.43	11.24917	275.7	222.64
275.7	211.18	13.43	10.8875	275.7	217.19	13.43	11.24944	275.3	223.3
275.7	211.72	13.43	10.88778	275.3	218.4	13.43	11.24972	275.3	223.94
275.7	212.25	13.43	10.88833	275.3	219.01	13.43	11.25	275.3	224.6
275.7	212.76	13.43	10.88861	275.3	219.63	13.43	11.25056	275.3	225.24
275.7	213.27	13.43	10.88889	275.7	220.24	13.43	11.25083	275.3	225.9
275.7	213.79	13.43	10.88917	275.3	220.86	13.43	11.25111	275.3	226.56
276.1	214.32	13.43	10.88944	276.1	221.47	13.43	11.25139	275.3	227.2
275.7	214.84	13.43	10.88972	275.7	222.08	13.43	11.25167	275.3	227.86
276.1	215.38	13.43	10.89	275.7	222.68	13.43	11.25194	275.3	228.5
276.1	215.9	13.43	10.89056	275.7	223.3	13.43	11.25222	275.3	229.15
275.7	216.44	13.43	10.89083	276.1	223.91	13.43	11.2525	275.7	230.47
276.1	216.96	13.43	10.89111	276.1	224.53	13.43	11.25306	275.3	231.13
275.7	217.48	13.43	10.89139	276.1	225.13	13.43	11.25333	275.3	231.78
275.3	217.99	13.43	10.89167	275.7	225.75	13.43	11.25361	275.3	232.41
275.7	219.04	13.44	10.89194	275.7	226.37	13.43	11.25389	275.3	233.06
276.1	219.58	13.43	10.89222	276.1	227.59	13.43	11.25417	275.3	233.71
276.1	220.1	13.44	10.8925	275.7	228.19	13.43	11.25444	275	234.37
275.7	220.62	13.43	10.89306	276.1	228.8	13.43	11.25472	275	235.03
275.7	221.16	13.43	10.89333	276.1	229.41	13.43	11.25528	275.3	235.7
275.3	221.67	13.43	10.89361	275.7	230.02	13.43	11.25556	275.3	236.33
275.7	222.2	13.43	10.89389	275.7	230.64	13.43	11.25583	275.3	236.98
275.7	222.71	13.44	10.89417	276.1	231.27	13.43	11.25611	275.3	237.62
276.1	223.25	13.43	10.89444	276.1	231.87	13.43	11.25639	275.7	238.28
276.4	223.77	13.44	10.89472	275.7	232.47	13.43	11.25667	275.3	239.59
276.1	224.3	13.43	10.895	276.1	233.08	13.43	11.25694	275.3	240.25
275.7	224.81	13.44	10.89556	275.7	233.69	13.43	11.2575	275	240.89

13.42	11.47361	161	186.3	13.9	12.34889	242.5	196.97	13.83	12.60583
13.42	11.47389	160.3	186.76	13.92	12.34917	242.2	197.61	13.83	12.60611
13.42	11.47417	157.4	187.24	13.94	12.34944	242.5	198.23	13.83	12.60639
13.42	11.47444	155.6	187.71	13.95	12.34972	242.5	198.85	13.83	12.60667
13.42	11.47472	155.2	188.2	13.97	12.35	242.2	199.47	13.83	12.60694
13.42	11.47528	152.7	188.68	13.99	12.35028	242.5	200.73	13.83	12.60722
13.42	11.47556	152.7	189.18	14.01	12.35056	242.9	201.35	13.83	12.6075
13.42	11.47583	151.6	189.72	14.03	12.35083	242.9	201.98	13.83	12.60806
13.42	11.47611	149.5	190.27	14.06	12.35139	243.2	202.62	13.83	12.60833
13.42	11.47639	151.3	190.85	14.08	12.35167	243.2	203.23	13.83	12.60861
13.42	11.47667	151.3	191.45	14.1	12.35194	242.9	203.87	13.83	12.60889
13.42	11.47694	155.2	192.64	14.12	12.35222	243.6	204.48	13.83	12.60917
13.42	11.4775	153.8	193.23	14.13	12.3525	242.9	205.1	13.83	12.60944
13.42	11.47778	154.5	193.8	14.14	12.35278	242.9	205.73	13.83	12.60972
13.42	11.47806	156.7	194.37	14.16	12.35333	243.2	206.35	13.83	12.61028
13.42	11.47833	158.1	194.96	14.18	12.35361	243.2	207	13.83	12.61056
13.42	11.47861	161.7	195.55	14.19	12.35389	243.2	207.62	13.83	12.61083
13.42	11.47889	164.3	196.15	14.19	12.35417	242.9	208.25	13.82	12.61111
13.42	11.47917	170.8	196.75	14.21	12.35444	242.9	209.49	13.82	12.61139
13.42	11.47972	170.4	197.36	14.22	12.35472	242.9	210.11	13.82	12.61167
13.42	11.48	174	197.96	14.23	12.355	242.9	210.73	13.82	12.61194
13.42	11.48028	176.2	198.58	14.24	12.35528	242.5	211.37	13.83	12.6125
13.42	11.48056	180.9	199.83	14.24	12.35583	242.9	212.01	13.83	12.61278
13.42	11.48083	183	200.46	14.25	12.35611	243.2	212.63	13.83	12.61306
13.42	11.48111	185.5	201.08	14.25	12.35639	243.2	213.24	13.83	12.61333
13.42	11.48139	188.1	201.7	14.25	12.35667	242.5	213.86	13.83	12.61361
13.42	11.48194	192.4	202.34	14.25	12.35694	243.2	214.49	13.83	12.61389
13.42	11.48222	194.6	202.96	14.25	12.35722	242.9	215.13	13.83	12.61417
13.42	11.4825	197.8	203.58	14.25	12.3575	242.5	215.75	13.83	12.61444
13.42	11.48278	200.3	204.21	14.24	12.35806	242.9	216.39	13.83	12.615
13.42	11.48306	204.3	204.83	14.24	12.35833	242.5	217.01	13.82	12.61528
13.42	11.48333	205.7	205.45	14.23	12.35861	242.2	218.24	13.82	12.61556
13.43	11.48361	209.7	206.08	14.23	12.35889	242.9	218.88	13.82	12.61583
13.42	11.48417	213	206.72	14.22	12.35917	242.5	219.51	13.82	12.61611
13.43	11.48444	215.5	207.35	14.21	12.35944	243.2	220.14	13.82	12.61639
13.43	11.48472	217.6	208.59	14.2	12.35972	242.5	220.76	13.82	12.61667
13.43	11.485	220.9	209.2	14.19	12.36028	242.9	221.39	13.82	12.61722
13.43	11.48528	223.8	209.83	14.18	12.36056	242.9	222.02	13.82	12.6175
13.43	11.48556	225.9	210.45	14.16	12.36083	242.5	222.63	13.82	12.61778
13.43	11.48583	227.7	211.09	14.15	12.36111	242.5	223.27	13.82	12.61806
13.43	11.48639	229.2	211.73	14.14	12.36139	242.2	223.89	13.82	12.61833
13.43	11.48667	232.4	212.36	14.13	12.36167	241.8	224.52	13.82	12.61861
13.43	11.48694	234.2	212.96	14.11	12.36194	241.8	225.14	13.82	12.61889
13.43	11.48722	235.7	213.59	14.1	12.3625	241.1	226.4	13.82	12.61944
13.43	11.4875	238.9	214.21	14.09	12.36278	240.4	227.03	13.83	12.61972
13.43	11.48778	239.6	214.84	14.07	12.36306	240	227.66	13.83	12.62
13.43	11.48806	241.1	215.47	14.06	12.36333	240.4	228.28	13.83	12.62028
13.43	11.48861	243.6	216.73	14.04	12.36361	238.2	228.9	13.83	12.62056
13.43	11.48889	244.3	217.35	14.03	12.36389	239.3	229.53	13.83	12.62083
13.43	11.48917	244.3	217.96	14.02	12.36417	238.9	230.15	13.83	12.62111
13.43	11.48944	246.1	218.59	14.01	12.36472	238.6	230.79	13.83	12.62167
13.43	11.48972	247.2	219.22	14	12.365	238.6	231.42	13.83	12.62194
13.43	11.49	247.6	219.86	13.99	12.36528	238.2	232.03	13.83	12.62222
13.43	11.49028	247.9	220.47	13.99	12.36556	237.8	232.66	13.83	12.6225
13.43	11.49083	248.3	221.11	13.98	12.36583	237.8	233.27	13.84	12.62278
13.43	11.49111	249	221.73	13.97	12.36611	237.8	234.53	13.84	12.62306
13.43	11.49139	249	222.35	13.97	12.36639	237.5	235.18	13.84	12.62333
13.43	11.49167	248.7	222.98	13.96	12.36694	237.5	235.81	13.84	12.62389
13.43	11.49194	249.4	223.61	13.96	12.36722	237.5	236.43	13.84	12.62417
13.43	11.49222	249.4	224.86	13.96	12.3675	237.5	237.04	13.84	12.62444
13.43	11.4925	248.3	225.48	13.96	12.36778	236.4	237.67	13.84	12.62472
13.43	11.49306	248.3	226.12	13.96	12.36806	236.8	238.28	13.84	12.625

233.1	204.46	13.96	12.91778	237.8	198.2	13.97	13.21306	230.6	196.59
233.1	205.16	13.96	12.91806	237.8	198.85	13.96	13.21333	230.6	197.22
232.4	205.84	13.96	12.91833	237.5	199.5	13.96	13.21361	230.3	198.47
233.1	206.53	13.96	12.91861	238.2	200.18	13.96	13.21389	229.9	199.09
232.4	207.25	13.96	12.91889	237.5	200.84	13.96	13.21444	229.9	199.72
232.8	207.94	13.96	12.91917	238.2	201.49	13.95	13.21472	230.3	200.35
232.1	208.63	13.96	12.91972	238.2	202.15	13.95	13.215	229.2	200.97
231.7	209.31	13.96	12.92	237.5	202.82	13.95	13.21528	229.9	201.59
232.8	210	13.96	12.92028	237.8	203.48	13.95	13.21556	229.9	202.23
232.1	210.69	13.96	12.92056	237.8	204.79	13.95	13.21583	229.9	202.84
232.1	211.41	13.97	12.92083	237.5	205.45	13.95	13.21611	230.3	203.47
232.4	212.1	13.97	12.92111	236.8	206.11	13.95	13.21639	229.5	204.1
232.4	213.47	13.97	12.92139	236.8	206.79	13.95	13.21694	229.9	204.72
232.4	214.16	13.97	12.92194	236.8	207.45	13.95	13.21722	229.5	205.34
232.4	214.86	13.97	12.92222	236.4	208.11	13.95	13.2175	229.9	206.59
232.4	215.57	13.97	12.9225	235.7	208.76	13.95	13.21778	229.5	207.23
232.8	216.26	13.97	12.92278	235.3	209.42	13.95	13.21806	230.3	207.86
232.8	216.96	13.97	12.92306	236	210.07	13.95	13.21833	230.3	208.48
232.4	217.63	13.97	12.92333	234.2	210.73	13.95	13.21861	229.9	209.09
232.4	218.32	13.97	12.92361	235.3	211.41	13.95	13.21917	229.9	209.71
232.8	219.02	13.97	12.92417	235.3	212.08	13.96	13.21944	229.5	210.35
233.1	219.73	13.97	12.92444	236.4	213.37	13.96	13.21972	229.5	210.97
232.4	220.41	13.96	12.92472	236	214.04	13.96	13.22	229.2	211.61
232.8	221.12	13.96	12.925	236.4	214.7	13.95	13.22028	229.2	212.24
232.4	221.81	13.97	12.92528	235.7	215.37	13.96	13.22056	229.2	212.86
233.1	223.19	13.97	12.92556	235.3	216.02	13.96	13.22083	228.8	213.47
232.4	223.89	13.97	12.92583	235.3	216.7	13.96	13.22139	228.8	214.09
232.4	224.58	13.97	12.92639	235.7	217.35	13.95	13.22167	228.1	214.72
232.1	225.27	13.96	12.92667	235.3	218.01	13.95	13.22194	227.7	215.98
231.7	225.97	13.96	12.92694	235	218.66	13.95	13.22222	227.4	216.62
232.4	226.67	13.97	12.92722	236.4	219.33	13.95	13.2225	227	217.23
232.1	227.36	13.96	12.9275	236.4	219.99	13.95	13.22278	226.3	217.85
232.1	228.05	13.96	12.92778	235.3	220.65	13.95	13.22306	225.6	218.47
232.4	228.73	13.96	12.92806	235.7	221.98	13.95	13.22361	225.6	219.1
232.8	229.43	13.96	12.92861	236	222.63	13.95	13.22389	225.9	219.73
232.1	230.12	13.95	12.92889	235.7	223.29	13.95	13.22417	224.9	220.36
232.4	231.53	13.95	12.92917	235.7	223.95	13.95	13.22444	224.9	220.99
232.1	232.22	13.95	12.92944	236.4	224.61	13.95	13.22472	224.9	221.62
232.1	232.9	13.95	12.92972	236	225.27	13.95	13.225	224.9	222.23
231.3	233.6	13.95	12.93	235.3	225.94	13.95	13.22528	224.5	222.86
232.1	234.29	13.95	12.93028	235.3	226.61	13.95	13.22583	224.9	224.11
232.1	235.01	13.95	12.93083	235	227.26	13.95	13.22611	224.9	224.73
232.1	235.7	13.95	12.93111	235.3	227.92	13.95	13.22639	224.5	225.36
231.7	236.38	13.95	12.93139	235.3	228.58	13.95	13.22667	224.5	225.99
231.7	237.06	13.95	12.93167	235.7	229.24	13.95	13.22694	224.5	226.62
231.3	237.76	13.95	12.93194	236.4	230.57	13.95	13.22722	225.2	227.24
231.3	238.45	13.95	12.93222	237.5	231.24	13.94	13.2275	224.5	227.87
231.7	239.16	13.95	12.9325	237.1	231.89	13.94	13.22778	224.9	228.48
232.1	239.86	13.95	12.93278	233.1	232.54	13.94	13.22833	224.9	229.1
232.1	240.56	13.95	12.93333	231	233.19	13.94	13.22861	224.9	229.74
231.3	241.93	13.95	12.93361	230.6	233.86	13.94	13.22889	224.9	230.36
231.7	242.62	13.95	12.93389	230.3	234.52	13.94	13.22917	225.2	231.01
232.1	243.33	13.95	12.93417	229.9	235.21	13.94	13.22944	225.6	231.62
232.4	244.01	13.95	12.93444	230.6	235.86	13.94	13.22972	225.9	232.85
233.1	244.72	13.95	12.93472	229.5	236.51	13.94	13.23	225.9	233.49
232.8	245.41	13.94	12.935	230.6	237.16	13.94	13.23056	225.6	234.11
232.4	246.1	13.94	12.93556	229.5	237.82	13.94	13.23083	225.6	234.73
233.1	246.79	13.94	12.93583	230.3	238.48	13.94	13.23111	225.6	235.39
233.1	247.49	13.94	12.93611	229.2	239.82	13.94	13.23139	225.9	236
232.8	248.18	13.94	12.93639	229.9	240.49	13.94	13.23167	225.6	236.62
232.4	248.87	13.94	12.93667	228.5	241.13	13.94	13.23194	226.7	237.23
232.4	250.26	13.94	12.93694	229.5	241.79	13.94	13.23222	227	237.86

13.97	13.41611	219.8	195.47	13.99	13.70528	220.9	196.92	13.99	13.87222
13.97	13.41639	220.2	196.14	13.99	13.70556	220.9	197.58	13.99	13.8725
13.97	13.41667	221.2	197.43	13.99	13.70583	220.9	198.87	13.99	13.87278
13.97	13.41722	221.6	198.07	13.99	13.70611	219.8	199.53	13.99	13.87306
13.97	13.4175	221.6	198.71	13.99	13.70639	220.5	200.19	13.99	13.87333
13.97	13.41778	220.9	199.36	13.99	13.70667	220.2	200.83	13.99	13.87361
13.97	13.41806	220.5	200.01	13.99	13.70694	220.2	201.48	13.99	13.87417
13.97	13.41833	220.2	200.65	13.99	13.7075	220.9	202.14	13.99	13.87444
13.97	13.41861	220.9	201.3	13.99	13.70778	220.9	202.81	13.99	13.87472
13.97	13.41889	222.3	201.94	13.99	13.70806	220.5	203.45	13.99	13.875
13.97	13.41944	222.7	202.61	13.99	13.70833	220.2	204.11	13.99	13.87528
13.97	13.41972	222.7	203.24	13.99	13.70861	220.5	204.75	13.99	13.87556
13.97	13.42	222.7	203.9	13.99	13.70889	220.2	205.4	13.99	13.87583
13.97	13.42028	222.3	204.53	13.99	13.70917	220.2	206.7	13.99	13.87639
13.97	13.42056	222.7	205.17	13.99	13.70944	220.2	207.37	13.99	13.87667
13.97	13.42083	220.5	205.82	13.99	13.71	219.8	208.02	13.99	13.87694
13.97	13.42111	220.5	207.13	13.99	13.71028	219.8	208.67	13.99	13.87722
13.97	13.42139	220.5	207.79	13.99	13.71056	220.2	209.31	13.99	13.8775
13.97	13.42194	220.2	208.41	13.99	13.71083	220.2	209.97	13.99	13.87778
13.96	13.42222	220.5	209.05	13.99	13.71111	220.2	210.62	13.99	13.87833
13.96	13.4225	220.9	209.7	13.99	13.71139	220.5	211.28	13.98	13.87861
13.96	13.42278	220.9	210.34	13.99	13.71167	220.2	211.95	13.99	13.87889
13.96	13.42306	221.2	210.99	13.99	13.71222	220.2	212.59	13.99	13.87917
13.96	13.42333	220.9	211.66	13.99	13.7125	220.9	213.23	13.99	13.87944
13.97	13.42361	220.5	212.31	13.99	13.71278	220.2	213.88	13.99	13.87972
13.97	13.42417	220.9	212.93	13.99	13.71306	220.2	215.2	13.99	13.88
13.97	13.42444	220.9	213.57	13.98	13.71333	219.8	215.85	13.98	13.88056
13.97	13.42472	221.6	214.21	13.98	13.71361	219.8	216.5	13.98	13.88083
13.97	13.425	220.5	214.87	13.98	13.71389	219.4	217.16	13.98	13.88111
13.97	13.42528	220.5	216.18	13.98	13.71444	218.7	217.8	13.99	13.88139
13.98	13.42556	220.9	216.82	13.98	13.71472	218.4	218.45	13.99	13.88167
13.98	13.42583	221.2	217.47	13.98	13.715	218.7	219.1	13.99	13.88194
13.98	13.42639	219.8	218.1	13.98	13.71528	219.4	219.76	13.99	13.88222
13.98	13.42667	221.2	218.75	13.98	13.71556	218.4	220.41	13.99	13.88278
13.98	13.42694	222	219.4	13.97	13.71583	219.1	221.08	13.98	13.88306
13.99	13.42722	222.7	220.05	13.97	13.71611	219.4	221.73	13.98	13.88333
13.99	13.4275	222.3	220.69	13.97	13.71667	220.2	222.38	13.98	13.88361
13.99	13.42778	223.4	221.35	13.97	13.71694	219.8	223.69	13.98	13.88389
13.99	13.42806	223.1	221.99	13.97	13.71722	220.2	224.33	13.98	13.88417
13.99	13.42861	224.1	222.63	13.96	13.7175	219.8	224.98	13.98	13.88444
13.99	13.42889	224.1	223.29	13.96	13.71778	219.4	225.64	13.98	13.885
13.99	13.42917	223.8	224.58	13.95	13.71806	219.8	226.31	13.98	13.88528
13.99	13.42944	223.8	225.21	13.95	13.71833	219.1	226.95	13.97	13.88556
13.99	13.42972	223.4	225.88	13.95	13.71861	220.2	227.61	13.97	13.88583
13.99	13.43	224.5	226.52	13.95	13.71917	220.2	228.25	13.97	13.88611
13.99	13.43028	223.8	227.17	13.95	13.71944	219.8	228.9	13.97	13.88639
13.99	13.43056	224.1	227.81	13.94	13.71972	220.2	229.55	13.97	13.88667
13.99	13.43111	224.9	228.45	13.94	13.72	218.7	230.21	13.98	13.88722
13.99	13.43139	224.9	229.09	13.94	13.72028	218.7	231.54	13.98	13.8875
13.99	13.43167	224.1	229.74	13.94	13.72056	219.4	232.17	13.98	13.88778
13.99	13.43194	223.8	230.4	13.94	13.72083	219.1	232.81	13.97	13.88806
13.99	13.43222	224.5	231.05	13.94	13.72139	219.4	233.47	13.98	13.88833
13.99	13.4325	224.5	231.7	13.94	13.72167	218.7	234.12	13.97	13.88861
13.99	13.43278	224.1	232.33	13.94	13.72194	219.1	234.78	13.97	13.88917
13.99	13.43333	223.8	233.62	13.93	13.72222	219.1	235.45	13.97	13.88944
13.99	13.43361	223.4	234.27	13.93	13.7225	219.1	236.1	13.97	13.88972
13.98	13.43389	222.3	234.92	13.93	13.72278	219.4	236.74	13.97	13.89
13.98	13.43417	222.3	235.59	13.94	13.72306	220.2	237.39	13.97	13.89028
13.98	13.43444	222.7	236.22	13.94	13.72333	220.2	238.7	13.97	13.89056
13.98	13.43472	222.7	236.86	13.94	13.72389	219.8	239.35	13.97	13.89083
13.97	13.435	222.3	237.5	13.94	13.72417	219.4	240.02	13.97	13.89139
13.97	13.43556	222	238.15	13.94	13.72444	219.4	240.67	13.97	13.89167



220.2	195.63	13.99	14.02056	221.2	221.48	13.99	14.19389	224.5	209.11
219.8	196.27	13.99	14.02083	221.2	222.47	13.99	14.19444	224.1	209.93
220.2	196.88	13.99	14.02139	220.9	223.46	13.99	14.19472	223.8	211.61
219.8	198.14	13.99	14.02167	220.5	224.47	13.99	14.195	223.4	212.44
220.2	198.75	13.99	14.02194	220.5	225.45	13.99	14.19528	223.8	213.26
219.8	199.37	13.99	14.02222	220.5	226.46	13.99	14.19556	223.4	214.08
219.8	200	14	14.02225	221.2	227.45	13.99	14.19583	222.7	214.92
220.2	200.62	14	14.02278	220.9	228.44	13.99	14.19611	222.7	215.76
220.5	201.24	14	14.02306	220.5	229.43	13.99	14.19667	222.7	216.61
220.2	201.85	14	14.02361	219.8	230.44	13.99	14.19694	222	217.42
220.2	202.49	13.99	14.02389	220.2	232.42	13.98	14.19722	222	218.24
220.5	203.1	13.99	14.02417	220.2	233.42	13.98	14.1975	222.3	219.08
220.5	203.73	13.99	14.02444	219.4	234.41	13.98	14.19778	222.3	219.92
219.8	204.35	13.99	14.02472	219.8	235.44	13.98	14.19806	222.3	220.75
220.2	204.97	14	14.025	220.2	236.41	13.97	14.19833	222.3	222.41
219.4	206.21	13.99	14.02528	220.2	237.4	13.97	14.19889	222	223.24
219.8	206.85	13.99	14.02583	220.9	238.38	13.97	14.19917	222	224.08
219.8	207.48	13.99	14.02611	220.2	239.4	13.97	14.19944	222	224.9
219.8	208.1	13.99	14.02639	219.8	240.4	13.97	14.19972	221.2	225.73
219.8	208.71	13.99	14.02667	220.2	241.38	13.97	14.2	221.2	226.57
220.2	209.33	13.99	14.02694	220.2	242.37	13.97	14.20028	220.9	227.4
220.2	209.94	13.99	14.02722	220.5	243.38	13.97	14.20083	220.9	228.23
219.4	210.57	13.99	14.0275	220.2	245.38	13.97	14.20111	219.8	229.05
220.2	211.2	13.99	14.02806	219.4	246.35	13.97	14.20139	219.1	229.88
220.2	211.84	13.99	14.02833	219.1	247.37	13.98	14.20167	218	230.73
219.8	212.45	13.99	14.02861	217.6	248.35	13.99	14.20194	216.9	231.56
220.2	213.07	13.99	14.02889	217.3	249.36	13.99	14.20222	215.8	233.2
219.8	214.3	13.99	14.02917	216.9	250.35	14	14.2025	214.4	234.05
219.8	214.92	13.99	14.02944	216.6	251.35	14.01	14.20278	213.7	234.88
219.8	215.56	13.99	14.02972	215.5	252.34	14.01	14.20333	213	235.73
219.8	216.19	13.99	14.03028	215.8	253.33	14.01	14.20361	212.2	236.54
219.8	216.81	13.99	14.03056	215.5	254.35	14.01	14.20389	211.9	237.37
220.5	217.42	13.99	14.03083	216.2	255.34	14.01	14.20417	211.9	238.2
219.1	218.04	13.99	14.03111	215.8	256.33	14	14.20444	211.9	239.03
219.8	218.66	13.99	14.03139	215.8	257.31	14	14.20472	212.6	239.88
220.2	219.3	13.99	14.03167	215.5	259.33	14	14.205	213.3	240.7
220.5	219.92	13.99	14.03194	216.9	260.31	13.99	14.20556	213.7	241.53
220.2	220.54	13.99	14.0325	216.2	261.29	13.99	14.20583	215.1	242.35
220.9	221.16	13.99	14.03278	215.5	262.3	13.99	14.20611	216.6	243.2
220.9	222.4	13.99	14.03306	215.8	263.3	13.99	14.20639	218	244.87
220.5	223.03	13.99	14.03333	216.6	264.3	13.99	14.20667	220.2	245.69
220.5	223.65	13.99	14.03361	216.9	265.27	13.99	14.20694	222.3	246.52
220.5	224.27	13.99	14.03389	217.6	266.28	13.98	14.20722	224.1	247.36
220.5	224.89	13.99	14.03417	219.1	267.27	13.97	14.20778	225.2	248.19
220.9	225.51	13.99	14.03472	219.1	268.28	13.96	14.20806	227	249.01
220.5	226.15	13.99	14.035	220.5	269.26	13.95	14.20833	229.2	249.87
220.2	226.75	13.99	14.03528	221.2	271.24	13.94	14.20861	231	250.69
220.5	227.39	13.99	14.03556	223.1	272.25	13.93	14.20889	231.7	251.52
220.2	228	13.99	14.03583	222.3	273.25	13.91	14.20917	233.1	252.34
220.2	228.63	13.98	14.03611	222.7	274.25	13.92	14.20944	235	253.18
220.2	229.24	13.98	14.03639	223.8	275.23	13.9	14.21	235.7	254.02
219.8	230.5	13.98	14.03694	223.4	276.23	13.89	14.21028	236.8	255.68
219.4	231.14	13.98	14.03722	219.8	277.22	13.91	14.21056	237.8	256.5
219.8	231.74	13.98	14.0375	219.1	278.25	13.96	14.21083	238.9	257.33
219.8	232.37	13.98	14.03778	217.6	279.22	14	14.21111	238.9	258.16
219.8	232.97	13.98	14.03806	217.6	280.21	14.02	14.21139	239.6	259.02
219.8	233.6	13.98	14.03833	219.1	281.2	14.02	14.21167	240	259.84
219.8	234.22	13.98	14.03861	218.4	282.23	14.02	14.21222	240.4	260.66
219.4	234.85	13.98	14.03917	217.3	284.19	14.02	14.2125	241.8	261.48
219.4	235.49	13.97	14.03944	216.9	285.18	14.03	14.21278	242.2	262.33
219.4	236.1	13.97	14.03972	216.6	286.2	14.03	14.21306	242.9	263.16
219.8	236.71	13.97	14.04	215.8	287.19	14.04	14.21333	243.6	264.01

13.91	14.30167	253.3	209.14	13.56	14.43917	255.1	210.69	13.47	14.57194
13.91	14.30194	253.3	209.98	13.56	14.43944	255.1	211.59	13.47	14.57222
13.91	14.3025	253.7	211.65	13.56	14.43972	255.1	212.46	13.47	14.5725
13.91	14.30278	253.3	212.47	13.56	14.44	255.1	213.32	13.47	14.57306
13.91	14.30306	253.3	213.27	13.56	14.44028	254.8	214.18	13.47	14.57333
13.9	14.30333	253.7	214.1	13.55	14.44056	254.8	215.08	13.47	14.57361
13.9	14.30361	253.7	214.92	13.55	14.44111	254.4	215.96	13.47	14.57389
13.9	14.30389	253.3	215.77	13.55	14.44139	254.4	217.69	13.47	14.57417
13.91	14.30417	253.3	216.6	13.54	14.44167	254.1	218.58	13.47	14.57444
13.91	14.30472	253.3	217.41	13.54	14.44194	254.4	219.46	13.47	14.57472
13.91	14.305	253	218.22	13.54	14.44222	255.1	220.33	13.47	14.57528
13.91	14.30528	253.3	219.06	13.54	14.4425	254.8	221.22	13.47	14.57556
13.91	14.30556	254.1	219.89	13.54	14.44278	254.8	222.09	13.47	14.57583
13.91	14.30583	253.7	220.72	13.54	14.44333	254.8	222.96	13.47	14.57611
13.91	14.30611	254.1	222.37	13.53	14.44361	255.1	223.85	13.47	14.57639
13.91	14.30639	254.1	223.19	13.53	14.44389	255.1	224.71	13.47	14.57667
13.91	14.30694	254.1	224.03	13.53	14.44417	254.4	225.6	13.47	14.57694
13.91	14.30722	254.1	224.84	13.53	14.44444	255.1	226.48	13.47	14.5775
13.91	14.3075	254.1	225.69	13.53	14.44472	255.5	227.35	13.47	14.57778
13.91	14.30778	254.1	226.51	13.53	14.445	255.1	229.09	13.47	14.57806
13.9	14.30806	253.7	227.33	13.53	14.44556	254.8	229.97	13.47	14.57833
13.9	14.30833	254.1	228.16	13.53	14.44583	254.8	230.86	13.47	14.57861
13.9	14.30861	254.1	228.97	13.53	14.44611	255.1	231.74	13.47	14.57889
13.91	14.30917	253.7	229.8	13.53	14.44639	255.1	232.59	13.46	14.57917
13.92	14.30944	253.7	230.64	13.53	14.44667	255.1	233.48	13.46	14.57972
13.92	14.30972	254.1	231.48	13.53	14.44694	254.8	234.35	13.46	14.58
13.93	14.31	253.7	232.28	13.52	14.44722	254.8	235.26	13.46	14.58028
13.93	14.31028	253.7	233.93	13.52	14.44778	254.8	236.12	13.46	14.58056
13.94	14.31056	253.7	234.77	13.52	14.44806	255.5	236.98	13.46	14.58083
13.94	14.31083	253.7	235.61	13.52	14.44833	255.1	237.85	13.46	14.58111
13.95	14.31139	253.7	236.43	13.52	14.44861	254.8	238.73	13.46	14.58139
13.95	14.31167	254.1	237.24	13.52	14.44889	254.8	240.49	13.46	14.58167
13.96	14.31194	254.1	238.07	13.51	14.44917	255.1	241.36	13.46	14.58222
13.96	14.31222	254.1	238.9	13.51	14.44944	255.1	242.23	13.46	14.5825
13.96	14.3125	253.7	239.73	13.51	14.45	254.8	243.12	13.46	14.58278
13.96	14.31278	253.3	240.56	13.51	14.45028	255.1	243.99	13.46	14.58306
13.95	14.31306	253.7	241.36	13.51	14.45056	255.1	244.87	13.46	14.58333
13.95	14.31333	253.7	242.2	13.51	14.45083	255.1	245.75	13.46	14.58361
13.95	14.31389	253.7	243.86	13.51	14.45111	254.8	246.61	13.46	14.58389
13.94	14.31417	253.7	244.68	13.51	14.45139	254.8	247.5	13.46	14.58444
13.93	14.31444	254.1	245.52	13.51	14.45167	255.1	248.36	13.46	14.58472
13.92	14.31472	254.1	246.33	13.51	14.45222	255.1	249.26	13.46	14.585
13.9	14.315	254.4	247.17	13.51	14.4525	255.1	250.13	13.46	14.58528
13.89	14.31528	254.4	247.98	13.51	14.45278	255.1	251.87	13.46	14.58556
13.88	14.31556	254.1	248.82	13.51	14.45306	255.1	252.74	13.46	14.58583
13.86	14.31611	254.1	249.63	13.51	14.45333	255.5	253.62	13.46	14.58611
13.85	14.31639	254.1	250.46	13.5	14.45361	255.5	254.53	13.46	14.58667
13.83	14.31667	254.1	251.3	13.5	14.45389	255.1	255.39	13.46	14.58694
13.82	14.31694	254.4	252.11	13.5	14.45444	255.5	256.25	13.46	14.58722
13.8	14.31722	254.4	252.94	13.5	14.45472	255.9	257.13	13.46	14.5875
13.79	14.3175	254.4	254.62	13.5	14.455	255.5	258	13.46	14.58778
13.78	14.31778	254.8	255.43	13.5	14.45528	255.1	258.91	13.46	14.58806
13.77	14.31833	254.4	256.25	13.49	14.45556	255.1	259.77	13.46	14.58833
13.75	14.31861	254.8	257.06	13.49	14.45583	255.1	260.63	13.45	14.58889
13.74	14.31889	254.8	257.91	13.49	14.45611	254.8	261.5	13.45	14.58917
13.73	14.31917	254.8	258.75	13.49	14.45667	254.8	263.28	13.45	14.58944
13.73	14.31944	254.1	259.57	13.49	14.45694	254.8	264.16	13.45	14.58972
13.71	14.31972	254.4	260.38	13.49	14.45722	254.8	265.02	13.45	14.59
13.7	14.32	254.4	261.18	13.49	14.4575	254.8	265.88	13.45	14.59028
13.7	14.32056	254.4	262.03	13.49	14.45778	254.8	266.78	13.45	14.59056
13.68	14.32083	254.1	262.87	13.49	14.45806	254.4	267.64	13.45	14.59111
13.68	14.32111	254.1	263.7	13.49	14.45833	254.4	268.54	13.45	14.59139

280.4	229.41	13.52	9.426944	281.8	240.11	13.47	9.756389	281.1	229.65
280	229.99	13.52	9.427222	282.9	240.74	13.47	9.756667	282.9	230.78
279.7	230.6	13.52	9.4275	282.9	241.36	13.47	9.756944	282.6	231.35
280	231.19	13.52	9.427778	283.6	242.64	13.47	9.757222	282.6	231.9
280.4	232.33	13.52	9.428333	283.3	243.28	13.47	9.7575	282.6	232.45
280.4	232.91	13.52	9.428611	283.6	243.92	13.47	9.758056	282.6	233.01
280.4	233.49	13.52	9.428889	283.6	244.56	13.47	9.758333	281.5	233.57
280.4	234.07	13.52	9.429167	283.3	245.2	13.47	9.758611	282.6	234.12
280.4	234.66	13.52	9.429444	283.3	245.83	13.47	9.758889	282.6	234.69
280	235.26	13.52	9.429722	283.3	246.46	13.47	9.759167	282.2	235.27
280.4	235.84	13.52	9.43	284.7	247.11	13.47	9.759444	282.6	235.83
280.8	236.42	13.52	9.430556	282.6	247.74	13.47	9.759722	282.6	236.38
280.8	236.99	13.51	9.430833	282.2	248.37	13.47	9.760278	282.6	236.93
280.8	237.57	13.52	9.431111	284.4	249.01	13.47	9.760556	282.6	238.05
281.1	238.15	13.51	9.431389	283.6	249.66	13.47	9.760833	282.2	238.61
281.1	238.73	13.51	9.431667	284	250.3	13.47	9.761111	282.6	239.17
281.1	239.33	13.51	9.431944	282.9	251.57	13.47	9.761389	282.6	239.74
281.5	240.5	13.52	9.432222	284	252.2	13.47	9.761667	282.2	240.31
280.8	241.06	13.51	9.4325	283.3	252.84	13.47	9.761944	280.8	240.86
281.1	241.65	13.51	9.433056	283.3	253.47	13.47	9.7625	282.2	241.4
281.5	242.22	13.51	9.433333	284	254.13	13.47	9.762778	282.6	241.96
281.1	242.82	13.51	9.433611	284.4	254.77	13.47	9.763056	281.5	242.52
281.5	243.4	13.51	9.433889	284.4	255.4	13.47	9.763333	281.1	243.09
281.5	243.98	13.51	9.434167	284.4	256.02	13.47	9.763611	282.2	243.65
281.5	244.57	13.51	9.434444	284.4	256.66	13.47	9.763889	281.5	244.21
281.5	245.15	13.51	9.434722	284	257.3	13.46	9.764167	281.1	245.34
281.5	245.73	13.51	9.435	284	257.94	13.46	9.764722	281.1	245.89
281.5	246.3	13.51	9.435556	284.4	258.58	13.46	9.765	281.8	246.44
281.8	246.88	13.51	9.435833	284.4	259.24	13.46	9.765278	282.2	247.01
281.8	247.47	13.51	9.436111	284	260.49	13.46	9.765556	282.6	247.57
281.5	248.05	13.51	9.436389	284.4	261.12	13.46	9.765833	282.2	248.13
281.5	249.22	13.51	9.436667	284.4	261.75	13.46	9.766111	282.6	248.68
281.5	249.81	13.51	9.436944	284	262.4	13.46	9.766389	282.2	249.25
281.8	250.39	13.51	9.437222	284	263.04	13.46	9.766944	282.6	249.82
281.5	250.97	13.51	9.4375	284.4	263.69	13.46	9.767222	282.6	250.38
281.5	251.55	13.51	9.438056	284.4	264.32	13.46	9.7675	282.6	250.93
281.8	252.13	13.51	9.438333	284	264.94	13.46	9.767778	282.6	251.48
281.8	252.71	13.51	9.438611	284.4	265.58	13.46	9.768056	282.6	252.04
281.8	253.29	13.51	9.438889	284.4	266.22	13.46	9.768333	282.6	252.6
281.8	253.88	13.51	9.439167	284	266.86	13.46	9.768611	282.6	253.71
281.8	254.48	13.51	9.439444	284.4	267.5	13.46	9.769167	282.9	254.3
282.2	255.06	13.51	9.439722	284.4	268.78	13.46	9.769444	282.6	254.86
282.2	255.63	13.51	9.440278	284	269.41	13.46	9.769722	282.6	255.41
282.2	256.2	13.51	9.440556	284	270.04	13.45	9.77	282.6	255.96
282.2	257.37	13.51	9.440833	284	270.68	13.46	9.770278	282.6	256.51
282.6	257.95	13.51	9.441111	284.4	271.32	13.46	9.770556	282.6	257.08
282.2	258.54	13.51	9.441389	284	271.95	13.46	9.770833	282.6	257.63
282.2	259.14	13.5	9.441667	284	272.59	13.45	9.771389	281.8	258.2
282.2	259.71	13.5	9.441944	284	273.23	13.44	9.771667	282.6	258.78
282.6	260.28	13.51	9.4425	284	273.88	13.45	9.771944	282.6	259.34
282.2	260.86	13.51	9.442778	284	274.51	13.46	9.772222	282.6	259.89
282.6	261.44	13.5	9.443056	284	275.15	13.44	9.7725	282.6	260.43
282.2	262.03	13.5	9.443333	283.6	275.77	13.41	9.772778	282.6	260.99
282.2	262.61	13.5	9.443611	284.4	277.05	13.42	9.773056	282.2	262.11
282.6	263.2	13.5	9.443889	284.4	277.69	13.46	9.773333	282.6	262.69
282.6	263.79	13.5	9.444167	284.7	278.35	13.49	9.773889	282.6	263.25
282.2	264.37	13.5	9.444444	284.4	278.97	13.5	9.774167	282.6	263.82
282.2	265.51	13.5	9.445	284.7	279.6	13.51	9.774444	282.2	264.37
282.6	266.1	13.5	9.445278	284.7	280.23	13.51	9.774722	282.6	264.91
282.6	266.69	13.5	9.445556	284.4	280.87	13.51	9.775	282.6	265.47
282.6	267.27	13.5	9.445833	284.7	281.5	13.51	9.775278	282.6	266.03
282.6	267.85	13.5	9.446111	284.7	282.16	13.51	9.775556	282.6	266.6

13.46	10.06222	281.5	234.08	13.45	10.38	278.2	245.7	13.44	10.54333
13.46	10.0625	281.5	234.72	13.45	10.38056	278.2	246.37	13.44	10.54389
13.46	10.06278	280.8	235.36	13.45	10.38083	278.2	247.06	13.44	10.54417
13.46	10.06306	281.1	236	13.45	10.38111	278.6	247.74	13.44	10.54444
13.46	10.06333	281.8	236.61	13.45	10.38139	278.2	249.09	13.44	10.54472
13.46	10.06361	281.5	237.24	13.45	10.38167	278.2	249.8	13.44	10.545
13.46	10.06389	281.5	237.87	13.45	10.38194	278.6	250.48	13.44	10.54528
13.46	10.06444	281.5	238.51	13.45	10.38222	277.9	251.17	13.44	10.54556
13.46	10.06472	281.5	239.14	13.45	10.3825	278.2	251.84	13.44	10.54611
13.46	10.065	281.1	239.79	13.44	10.38306	277.9	252.52	13.44	10.54639
13.46	10.06528	281.1	240.42	13.44	10.38333	278.2	253.2	13.44	10.54667
13.46	10.06556	281.1	241.04	13.44	10.38361	278.6	253.89	13.44	10.54694
13.46	10.06583	280.8	241.66	13.44	10.38389	278.6	254.59	13.44	10.54722
13.46	10.06611	281.5	242.94	13.44	10.38417	278.6	255.26	13.44	10.5475
13.46	10.06667	281.5	243.57	13.44	10.38444	278.6	255.94	13.44	10.54778
13.46	10.06694	281.5	244.2	13.44	10.38472	278.2	256.62	13.44	10.54833
13.46	10.06722	281.1	244.84	13.44	10.385	278.2	257.98	13.44	10.54861
13.46	10.0675	281.5	245.47	13.44	10.38556	277.9	258.68	13.44	10.54889
13.46	10.06778	281.8	246.1	13.44	10.38583	277.9	259.38	13.44	10.54917
13.46	10.06806	281.8	246.73	13.44	10.38611	277.9	260.03	13.44	10.54944
13.46	10.06833	281.5	247.36	13.44	10.38639	278.2	260.71	13.44	10.54972
13.46	10.06889	281.5	247.99	13.44	10.38667	278.2	261.39	13.44	10.55
13.46	10.06917	281.5	248.61	13.44	10.38694	278.2	262.08	13.44	10.55056
13.45	10.06944	281.5	249.26	13.44	10.38722	278.6	262.77	13.44	10.55083
13.46	10.06972	281.5	249.89	13.44	10.3875	278.2	263.46	13.44	10.55111
13.46	10.07	281.5	250.52	13.44	10.38806	278.2	264.14	13.44	10.55139
13.46	10.07028	281.5	251.15	13.44	10.38833	278.6	264.81	13.44	10.55167
13.46	10.07056	281.5	251.78	13.44	10.38861	278.6	265.49	13.44	10.55194
13.46	10.07111	281.5	253.04	13.44	10.38889	278.6	266.18	13.44	10.55222
13.46	10.07139	281.1	253.67	13.44	10.38917	278.6	267.55	13.44	10.55278
13.46	10.07167	281.1	254.32	13.44	10.38944	278.6	268.23	13.44	10.55306
13.46	10.07194	281.5	254.96	13.44	10.38972	278.2	268.91	13.44	10.55333
13.46	10.07222	281.5	255.57	13.44	10.39028	278.6	269.59	13.44	10.55361
13.46	10.0725	281.5	256.2	13.44	10.39056	279	270.28	13.44	10.55389
13.45	10.07278	281.5	256.82	13.44	10.39083	278.2	270.96	13.44	10.55417
13.45	10.07306	281.5	257.46	13.44	10.39111	278.2	271.65	13.43	10.55444
13.46	10.07361	281.5	258.09	13.44	10.39139	278.6	272.32	13.43	10.55472
13.45	10.07389	281.5	258.75	13.44	10.39167	278.6	273.02	13.44	10.55528
13.45	10.07417	281.5	259.38	13.44	10.39194	278.6	273.7	13.44	10.55556
13.45	10.07444	281.5	260	13.44	10.3925	278.6	274.38	13.43	10.55583
13.45	10.07472	281.1	261.25	13.44	10.39278	278.6	275.06	13.42	10.55611
13.45	10.075	281.5	261.88	13.44	10.39306	278.2	276.41	13.42	10.55639
13.45	10.07528	281.5	262.52	13.44	10.39333	279	277.09	13.45	10.55667
13.45	10.07556	281.5	263.15	13.44	10.39361	279.3	277.8	13.46	10.55694
13.45	10.07611	281.5	263.8	13.44	10.39389	279.3	278.48	13.47	10.5575
13.45	10.07639	281.1	264.42	13.43	10.39417	279.3	279.16	13.48	10.55778
13.45	10.07667	281.1	265.04	13.43	10.39444	279.3	279.83	13.49	10.55806
13.45	10.07694	281.5	265.67	13.44	10.395	279.3	280.51	13.49	10.55833
13.45	10.07722	281.5	266.3	13.44	10.39528	279.3	281.19	13.49	10.55861
13.45	10.0775	281.5	266.95	13.44	10.39556	279.3	281.88	13.49	10.55889
13.45	10.07778	281.1	267.57	13.44	10.39583	279.3	282.58	13.49	10.55917
13.45	10.07806	281.5	268.21	13.43	10.39611	279	283.26	13.49	10.55972
13.44	10.07861	281.5	268.84	13.43	10.39639	279.3	283.93	13.5	10.56
13.44	10.07889	281.5	270.09	13.44	10.39667	279.7	284.61	13.5	10.56028
13.45	10.07917	282.2	270.74	13.44	10.39722	279.7	285.98	13.51	10.56056
13.45	10.07944	281.5	271.36	13.44	10.3975	279.3	286.66	13.51	10.56083
13.45	10.07972	281.5	271.99	13.44	10.39778	279.7	287.36	13.51	10.56111
13.44	10.08	281.1	272.61	13.44	10.39806	279.7	288.03	13.52	10.56139
13.44	10.08028	281.1	273.26	13.42	10.39833	279.3	288.71	13.52	10.56194
13.44	10.08056	281.1	273.89	13.42	10.39861	279.7	289.38	13.52	10.56222
13.44	10.08111	281.1	274.53	13.42	10.39889	279.7	290.08	13.52	10.5625
13.44	10.08139	280.8	275.15	13.41	10.39917	279.3	290.76	13.52	10.56278

276.1	225.34	13.44	10.89583	275.7	234.3	13.43	11.25778	275.3	241.54
276.8	225.88	13.44	10.89611	275.7	235.55	13.43	11.25806	275	242.18
276.4	226.92	13.44	10.89639	275.7	236.16	13.43	11.25833	275.3	242.84
275.3	227.44	13.44	10.89667	275.7	236.76	13.43	11.25861	275.3	243.5
276.1	227.97	13.44	10.89694	275.7	237.37	13.43	11.25889	275	244.15
275.7	228.48	13.44	10.89722	275.7	237.97	13.43	11.25917	275	244.8
275.3	229.01	13.44	10.89778	275.7	238.6	13.43	11.25972	275.3	245.46
275.7	229.53	13.44	10.89806	275.7	239.21	13.43	11.26	275	246.1
275	230.06	13.44	10.89833	275.7	239.82	13.43	11.26028	275.3	246.76
276.4	230.6	13.44	10.89861	275.7	240.44	13.43	11.26056	275.3	248.06
275.7	231.13	13.44	10.89889	275.7	241.04	13.43	11.26083	275	248.71
276.4	231.65	13.44	10.89917	275.7	241.65	13.43	11.26111	275	249.37
276.1	232.17	13.44	10.89944	275.7	242.26	13.43	11.26139	275.3	250.02
276.4	233.21	13.44	10.9	275.7	243.49	13.43	11.26194	275.3	250.67
275.7	233.73	13.44	10.90028	275.7	244.1	13.43	11.26222	275	251.32
276.1	234.26	13.44	10.90056	275.7	244.72	13.43	11.2625	275.3	251.97
276.1	234.79	13.44	10.90083	275.7	245.34	13.43	11.26278	275.3	252.62
275.3	235.34	13.43	10.90111	275.7	245.94	13.43	11.26306	275.3	253.26
275.3	235.85	13.44	10.90139	275.7	246.55	13.43	11.26333	275.7	253.93
276.4	236.37	13.44	10.90167	275.7	247.17	13.43	11.26361	275.7	254.59
276.4	236.88	13.44	10.90222	275.7	247.78	13.43	11.26389	275.7	255.24
276.4	237.4	13.44	10.9025	275.7	248.39	13.43	11.26444	275.3	256.53
276.4	237.93	13.44	10.90278	275.7	248.99	13.43	11.26472	275.7	257.18
276.4	238.45	13.44	10.90306	275.3	249.62	13.43	11.265	275.7	257.82
276.1	238.99	13.44	10.90333	276.1	250.23	13.43	11.26528	275.7	258.49
276.4	239.51	13.44	10.90361	275.7	250.84	13.43	11.26556	275	259.15
276.1	240.57	13.44	10.90389	275.3	252.06	13.43	11.26583	275.3	259.79
276.4	241.09	13.44	10.90444	275.7	252.66	13.43	11.26611	275.7	260.43
276.1	241.6	13.44	10.90472	275.7	253.28	13.43	11.26667	275	261.08
276.1	242.12	13.44	10.905	275.3	253.89	13.43	11.26694	275.3	261.74
276.1	242.65	13.44	10.90528	275	254.52	13.43	11.26722	275	262.4
276.1	243.18	13.44	10.90556	275.3	255.13	13.42	11.2675	275.3	263.06
276.4	243.71	13.44	10.90583	275.7	255.73	13.42	11.26778	275.3	263.71
276.4	244.23	13.44	10.90611	275.3	256.33	13.42	11.26806	275.3	264.35
276.8	244.77	13.44	10.90667	275.7	256.95	13.42	11.26833	275.3	265
276.4	245.29	13.44	10.90694	275.7	257.56	13.43	11.26889	275.3	266.31
276.8	245.81	13.44	10.90722	275.3	258.18	13.42	11.26917	275.3	266.96
276.4	246.86	13.44	10.9075	275.3	258.8	13.42	11.26944	275.3	267.61
276.8	247.38	13.44	10.90778	275.3	260.02	13.42	11.26972	275.3	268.26
276.4	247.91	13.44	10.90806	275.7	260.62	13.42	11.27	275.3	268.92
276.4	248.42	13.44	10.90833	275	261.23	13.42	11.27028	275	269.56
276.4	248.94	13.44	10.90889	275.3	261.85	13.42	11.27056	275.3	270.21
276.4	249.48	13.43	10.90917	275.7	262.46	13.43	11.27111	275.3	270.87
276.4	250.01	13.43	10.90944	275	263.08	13.43	11.27139	275.3	271.52
276.4	250.54	13.43	10.90972	275	263.7	13.42	11.27167	274.6	272.16
276.1	251.06	13.43	10.91	275	264.3	13.42	11.27194	275.3	272.83
276.4	251.58	13.43	10.91028	275.3	264.91	13.42	11.27222	275.3	273.48
276.4	252.1	13.43	10.91056	275.3	265.51	13.42	11.2725	275	274.12
276.4	252.63	13.43	10.91111	275.3	266.13	13.42	11.27278	275	275.42
276.1	253.67	13.43	10.91139	275.3	266.75	13.42	11.27333	275.3	276.07
276.4	254.21	13.43	10.91167	275.3	267.97	13.42	11.27361	275.7	276.72
276.4	254.75	13.43	10.91194	275.3	268.59	13.42	11.27389	276.1	277.38
276.1	255.26	13.43	10.91222	275.3	269.19	13.42	11.27417	276.1	278.04
276.4	255.78	13.43	10.9125	275.3	269.8	13.42	11.27444	275.7	278.7
276.4	256.29	13.43	10.91278	275.7	270.42	13.42	11.27472	275.7	279.33
276.1	256.82	13.43	10.91333	275.3	271.03	13.42	11.275	275.7	279.98
276.4	257.35	13.43	10.91361	275.7	271.63	13.42	11.27556	275.3	280.63
276.8	257.86	13.43	10.91389	275	272.24	13.42	11.27583	276.4	281.29
276.1	258.4	13.43	10.91417	275.3	272.86	13.41	11.27611	276.4	281.94
276.4	258.94	13.43	10.91444	275	273.47	13.41	11.27639	276.1	282.61
276.1	259.47	13.43	10.91472	275	274.09	13.41	11.27667	276.4	283.26
276.1	260.49	13.43	10.915	275.3	274.7	13.41	11.27694	276.4	284.54

13.43	11.49333	247.9	226.74	13.96	12.36833	237.1	238.93	13.84	12.62528
13.43	11.49361	247.2	227.37	13.96	12.36861	236.4	239.56	13.84	12.62556
13.43	11.49389	247.2	227.99	13.96	12.36917	236.8	240.2	13.85	12.62611
13.43	11.49417	246.9	228.6	13.96	12.36944	235.3	240.81	13.85	12.62639
13.43	11.49444	245.8	229.24	13.96	12.36972	235.7	241.43	13.85	12.62667
13.43	11.49472	244.3	229.86	13.97	12.37	235	242.69	13.85	12.62694
13.43	11.49528	244	230.5	13.97	12.37028	235	243.32	13.85	12.62722
13.43	11.49556	244.3	231.13	13.98	12.37056	235	243.95	13.86	12.6275
13.43	11.49583	243.6	231.76	13.98	12.37083	234.2	244.57	13.86	12.62778
13.43	11.49611	243.2	232.99	13.99	12.37139	234.6	245.2	13.87	12.62833
13.42	11.49639	242.2	233.61	13.99	12.37167	234.2	245.82	13.87	12.62861
13.42	11.49667	242.2	234.24	14	12.37194	234.2	246.44	13.87	12.62889
13.43	11.49694	241.4	234.87	14.01	12.37222	234.6	247.08	13.87	12.62917
13.43	11.4975	241.4	235.52	14.01	12.3725	233.9	247.7	13.87	12.62944
13.43	11.49778	241.4	236.13	14.02	12.37278	234.6	248.33	13.87	12.62972
13.43	11.49806	241.1	236.75	14.02	12.37306	234.6	248.95	13.86	12.63
13.42	11.49833	240.7	237.37	14.02	12.37361	235	249.58	13.86	12.63028
13.42	11.49861	240.7	238	14.02	12.37389	234.6	250.85	13.86	12.63083
13.42	11.49889	241.1	238.63	14.03	12.37417	234.6	251.46	13.86	12.63111
13.42	11.49917	240.4	239.26	14.03	12.37444	235	252.09	13.86	12.63139
13.42	11.49972	240	240.52	14.04	12.37472	234.6	252.71	13.86	12.63167
13.42	11.5	240	241.13	14.04	12.375	234.6	253.34	13.86	12.63194
13.42	11.50028	240.7	241.76	14.04	12.37528	234.6	253.98	13.86	12.63222
13.42	11.50056	240.7	242.38	14.04	12.37583	233.5	254.61	13.87	12.6325
13.42	11.50083	240.7	243.02	14.04	12.37611	233.9	255.23	13.87	12.63306
13.42	11.50111	240.7	243.64	14.04	12.37639	232.8	255.85	13.87	12.63333
13.42	11.50139	241.1	244.26	14.04	12.37667	233.5	256.47	13.87	12.63361
13.42	11.50167	241.1	244.9	14.04	12.37694	232.8	257.1	13.87	12.63389
13.42	11.50222	241.1	245.53	14.04	12.37722	232.8	257.72	13.87	12.63417
13.42	11.5025	241.4	246.14	14.04	12.3775	231.7	258.36	13.87	12.63444
13.42	11.50278	241.4	246.77	14.03	12.37806	231.7	259.63	13.88	12.63472
13.42	11.50306	241.4	247.4	14.03	12.37833	231.7	260.23	13.89	12.63528
13.42	11.50333	241.8	248.03	14.03	12.37861	231	260.86	13.89	12.63556
13.42	11.50361	241.8	248.65	14.02	12.37889	232.1	261.48	13.89	12.63583
13.42	11.50389	242.2	249.91	14.02	12.37917	231.7	262.11	13.88	12.63611
13.42	11.50417	242.5	250.53	14.02	12.37944	232.1	262.75	13.88	12.63639
13.42	11.50472	242.2	251.16	14.02	12.37972	233.1	263.38	13.88	12.63667
13.42	11.505	242.9	251.78	14.01	12.38	232.1	264.01	13.87	12.63694
13.42	11.50528	243.2	252.4	14.01	12.38056	232.4	264.62	13.87	12.6375
13.42	11.50556	243.2	253.02	14.01	12.38083	232.4	265.24	13.87	12.63778
13.42	11.50583	243.6	253.65	14	12.38111	232.8	265.86	13.88	12.63806
13.41	11.50611	242.9	254.3	14	12.38139	233.5	266.5	13.87	12.63833
13.42	11.50639	243.6	254.93	14	12.38167	232.4	267.13	13.87	12.63861
13.42	11.50694	242.9	255.54	14	12.38194	232.8	268.38	13.87	12.63889
13.41	11.50722	242.9	256.16	14	12.38222	233.5	269.02	13.87	12.63917
13.41	11.5075	242.5	256.78	14	12.38278	233.9	269.63	13.86	12.63972
13.41	11.50778	241.4	258.04	14.01	12.38306	232.8	270.26	13.86	12.64
13.42	11.50806	241.8	258.69	14.01	12.38333	231.3	270.88	13.87	12.64028
13.41	11.50833	241.4	259.31	14.01	12.38361	233.5	271.51	13.86	12.64056
13.41	11.50861	241.1	259.93	14.01	12.38389	232.8	272.14	13.85	12.64083
13.39	11.50889	241.1	260.54	14.01	12.38417	232.8	272.77	13.85	12.64111
13.41	11.50944	240.4	261.17	14.02	12.38444	232.1	273.4	13.86	12.64139
13.44	11.50972	240.4	261.79	14.02	12.385	231.7	274.03	13.85	12.64167
13.45	11.51	240	262.42	14.02	12.38528	233.5	274.65	13.84	12.64222
13.46	11.51028	240	263.06	14.02	12.38556	233.1	275.89	13.83	12.6425
13.46	11.51056	240	263.69	14.02	12.38583	228.1	276.52	13.8	12.64278
13.46	11.51083	240	264.31	14.02	12.38611	227	277.14	13.82	12.64306
13.47	11.51111	239.6	264.92	14.03	12.38639	224.1	277.8	13.89	12.64333
13.47	11.51167	238.9	265.55	14.04	12.38667	223.8	278.43	13.94	12.64361
13.47	11.51194	240	266.81	14.04	12.38694	223.8	279.04	13.98	12.64417
13.47	11.51222	240	267.43	14.04	12.3875	222.3	279.66	13.99	12.64444
13.48	11.5125	239.6	268.07	14.04	12.38778	221.6	280.28	14	12.64472

232.4	250.97	13.94	12.93722	229.2	242.45	13.94	13.23278	228.1	238.48
231.3	251.65	13.94	12.93778	228.8	243.13	13.94	13.23306	227.7	239.13
231.7	252.34	13.94	12.93806	228.1	243.78	13.94	13.23333	228.1	239.76
232.4	253.03	13.94	12.93833	228.5	244.45	13.94	13.23361	228.1	240.99
231	253.73	13.94	12.93861	229.2	245.11	13.94	13.23389	229.2	241.62
231.7	254.44	13.94	12.93889	229.2	245.77	13.94	13.23417	229.5	242.24
231	255.14	13.94	12.93917	228.8	246.42	13.94	13.23444	230.6	242.87
231.7	255.81	13.94	12.93944	228.5	247.08	13.94	13.235	231	243.5
231.7	256.5	13.94	12.94	229.5	247.75	13.94	13.23528	231.3	244.12
231.3	257.19	13.94	12.94028	229.5	249.07	13.94	13.23556	231.7	244.76
232.1	257.9	13.94	12.94056	229.9	249.73	13.94	13.23583	232.1	245.38
232.1	258.6	13.93	12.94083	229.5	250.4	13.94	13.23611	232.8	246
231.7	259.98	13.94	12.94111	229.5	251.05	13.94	13.23639	232.8	246.62
231.7	260.67	13.94	12.94139	229.2	251.71	13.94	13.23667	232.1	247.26
232.1	261.35	13.94	12.94167	229.5	252.36	13.94	13.23694	232.4	248.51
231.7	262.05	13.94	12.94194	230.3	253.03	13.93	13.2375	232.1	249.13
231.7	262.76	13.94	12.9425	229.5	253.69	13.93	13.23778	232.1	249.77
231.7	263.46	13.94	12.94278	229.2	254.37	13.92	13.23806	232.1	250.38
231.7	264.15	13.94	12.94306	230.3	255.03	13.92	13.23833	231.3	251.02
231	264.82	13.94	12.94333	229.2	255.68	13.92	13.23861	231.7	251.64
231	265.52	13.94	12.94361	230.3	256.33	13.93	13.23889	231.3	252.26
230.6	266.21	13.94	12.94389	230.6	257	13.92	13.23917	231.7	252.88
231	266.92	13.94	12.94417	231	258.33	13.92	13.23944	232.1	253.51
230.6	267.6	13.94	12.94472	230.6	259	13.92	13.24	232.1	254.14
230.6	268.31	13.94	12.945	230.3	259.66	13.92	13.24028	231.3	254.79
231	269.69	13.93	12.94528	230.6	260.3	13.92	13.24056	231	255.4
231.7	270.39	13.92	12.94556	229.5	260.96	13.92	13.24083	231.7	256.63
231.7	271.08	13.92	12.94583	229.5	261.62	13.91	13.24111	231	257.26
232.4	271.78	13.92	12.94611	230.6	262.29	13.91	13.24139	231.3	257.88
231.3	272.46	13.92	12.94639	231	262.95	13.92	13.24167	230.6	258.53
230.3	273.17	13.92	12.94667	229.5	263.63	13.91	13.24222	229.9	259.16
231.7	273.86	13.91	12.94722	230.6	264.27	13.92	13.2425	229.5	259.77
230.3	274.56	13.91	12.9475	230.3	264.93	13.91	13.24278	228.8	260.39
233.1	275.24	13.9	12.94778	229.9	265.58	13.91	13.24306	229.5	261.01
227.4	275.93	13.89	12.94806	229.5	266.26	13.91	13.24333	229.5	261.64
228.1	276.63	13.89	12.94833	229.5	266.91	13.91	13.24361	229.2	262.27
224.9	277.32	13.92	12.94861	229.9	268.24	13.91	13.24389	228.5	262.9
223.1	278.04	13.98	12.94889	229.5	268.9	13.9	13.24444	228.5	263.53
222.3	279.41	14.02	12.94944	229.9	269.56	13.9	13.24472	228.5	264.76
222.3	280.1	14.04	12.94972	231	270.21	13.9	13.245	229.5	265.39
225.9	280.79	14.03	12.95	230.3	270.88	13.9	13.24528	230.3	266.02
224.5	281.49	14.02	12.95028	231.3	271.53	13.9	13.24556	229.9	266.65
223.8	282.2	14	12.95056	230.3	272.2	13.9	13.24583	227.7	267.27
221.2	282.9	14.01	12.95083	229.9	272.86	13.9	13.24611	228.8	267.91
221.6	283.58	14.03	12.95111	232.1	273.53	13.89	13.24639	229.5	268.53
221.2	284.26	14.05	12.95139	231.3	274.19	13.88	13.24694	230.6	269.16
220.5	284.95	14.07	12.95194	230.3	274.85	13.86	13.24722	229.5	269.77
219.8	285.66	14.08	12.95222	228.8	275.5	13.84	13.2475	229.2	270.41
219.4	286.35	14.1	12.9525	229.9	276.16	13.83	13.24778	230.6	271.03
218.4	287.06	14.11	12.95278	225.9	276.82	13.85	13.24806	229.2	271.66
217.6	287.75	14.11	12.95306	223.1	278.16	13.93	13.24833	229.5	272.27
216.2	288.43	14.13	12.95333	223.4	278.82	13.99	13.24861	228.5	272.91
216.9	289.82	14.13	12.95361	224.1	279.47	14.01	13.24917	227.4	274.17
216.2	290.52	14.13	12.95417	223.4	280.13	14.01	13.24944	227	274.79
216.6	291.21	14.13	12.95444	224.9	280.79	14.02	13.24972	226.3	275.4
216.9	291.91	14.13	12.95472	224.5	281.44	14.01	13.25	230.6	276.03
216.9	292.61	14.13	12.955	225.9	282.12	14	13.25028	226.3	276.65
217.6	293.28	14.13	12.95528	223.8	282.79	14.01	13.25056	223.8	277.28
218	293.99	14.12	12.95556	223.8	283.44	14.01	13.25083	223.4	277.92
218.4	294.68	14.12	12.95583	223.4	284.09	14.01	13.25111	222.3	278.55
219.1	295.37	14.11	12.95639	223.1	284.75	14.02	13.25167	222.3	279.16
219.8	296.06	14.11	12.95667	222.3	285.41	14.02	13.25194	222.7	279.78



13.97	13.43583	221.2	238.8	13.94	13.72472	219.4	241.31	13.97	13.89194
13.96	13.43611	221.2	239.46	13.94	13.725	218	241.95	13.98	13.89222
13.96	13.43639	222.3	240.11	13.94	13.72528	218.7	242.6	13.98	13.8925
13.95	13.43667	222	240.75	13.94	13.72556	218.4	243.27	13.98	13.89278
13.95	13.43694	222	241.38	13.94	13.72611	216.9	243.92	13.98	13.89306
13.94	13.43722	222.3	242.68	13.94	13.72639	218	244.58	13.99	13.89361
13.94	13.43778	222	243.34	13.94	13.72667	217.3	245.23	13.99	13.89389
13.94	13.43806	222	243.98	13.94	13.72694	216.9	245.88	13.99	13.89417
13.94	13.43833	222	244.63	13.94	13.72722	216.6	247.19	13.99	13.89444
13.93	13.43861	221.6	245.28	13.94	13.7275	216.2	247.84	13.99	13.89472
13.92	13.43889	222	245.91	13.94	13.72778	215.5	248.49	13.99	13.895
13.92	13.43917	222	246.56	13.94	13.72806	215.8	249.15	13.99	13.89528
13.92	13.43944	222	247.21	13.94	13.72861	214.8	249.81	14	13.89583
13.92	13.44	222	247.86	13.94	13.72889	214.8	250.45	14	13.89611
13.91	13.44028	221.6	248.5	13.94	13.72917	215.1	251.11	14	13.89639
13.91	13.44056	222.7	249.16	13.94	13.72944	215.8	251.75	14	13.89667
13.91	13.44083	220.5	249.81	13.94	13.72972	215.8	252.41	13.99	13.89694
13.91	13.44111	221.2	250.45	13.94	13.73	216.6	253.06	13.99	13.89722
13.9	13.44139	222	251.1	13.94	13.73028	215.8	253.71	13.99	13.8975
13.9	13.44167	222.3	252.38	13.94	13.73083	216.9	255.04	13.99	13.89806
13.9	13.44222	222.3	253.03	13.94	13.73111	216.9	255.68	13.99	13.89833
13.9	13.4425	222	253.68	13.94	13.73139	217.6	256.33	13.99	13.89861
13.9	13.44278	221.2	254.35	13.94	13.73167	218	256.98	13.99	13.89889
13.9	13.44306	221.2	254.99	13.94	13.73194	218	257.62	13.98	13.89917
13.9	13.44333	221.6	255.63	13.94	13.73222	218	258.29	13.98	13.89944
13.9	13.44361	221.2	256.26	13.94	13.7325	218.7	258.96	13.97	13.9
13.9	13.44389	220.9	256.91	13.94	13.73278	218.7	259.6	13.97	13.90028
13.9	13.44444	221.2	257.55	13.93	13.73333	219.4	260.24	13.97	13.90056
13.91	13.44472	220.5	258.21	13.93	13.73361	219.1	260.89	13.97	13.90083
13.91	13.445	220.9	258.87	13.93	13.73389	220.2	261.54	13.97	13.90111
13.91	13.44528	221.2	259.52	13.93	13.73417	220.5	262.2	13.96	13.90139
13.92	13.44556	221.2	260.15	13.93	13.73444	220.9	263.52	13.95	13.90167
13.92	13.44583	221.2	261.43	13.93	13.73472	220.9	264.17	13.95	13.90222
13.92	13.44611	221.2	262.08	13.93	13.735	221.6	264.81	13.95	13.9025
13.92	13.44667	221.6	262.75	13.92	13.73556	221.6	265.46	13.94	13.90278
13.92	13.44694	222	263.39	13.92	13.73583	222.3	266.11	13.94	13.90306
13.92	13.44722	220.9	264.04	13.92	13.73611	223.8	266.78	13.93	13.90333
13.92	13.4475	221.2	264.67	13.92	13.73639	223.8	267.42	13.92	13.90361
13.92	13.44778	220.9	265.31	13.93	13.73667	224.5	268.09	13.92	13.90389
13.91	13.44806	220.2	265.96	13.93	13.73694	224.1	268.73	13.92	13.90444
13.9	13.44833	221.6	266.63	13.93	13.73722	224.9	269.38	13.91	13.90472
13.9	13.44889	220.9	267.26	13.92	13.73778	225.2	270.03	13.9	13.905
13.9	13.44917	220.5	267.92	13.92	13.73806	224.9	271.34	13.89	13.90528
13.91	13.44944	222.3	269.21	13.92	13.73833	225.6	271.99	13.89	13.90556
13.91	13.44972	222	269.84	13.9	13.73861	225.9	272.64	13.88	13.90583
13.91	13.45	223.1	270.5	13.9	13.73889	224.1	273.31	13.89	13.90611
13.9	13.45028	221.2	271.14	13.9	13.73917	225.6	273.95	13.88	13.90667
13.9	13.45056	222.7	271.77	13.9	13.73944	225.6	274.61	13.87	13.90694
13.9	13.45111	222	272.43	13.9	13.74	224.5	275.24	13.84	13.90722
13.89	13.45139	221.2	273.09	13.89	13.74028	220.9	275.91	13.86	13.9075
13.9	13.45167	222.3	273.74	13.89	13.74056	218.7	276.56	13.89	13.90778
13.9	13.45194	219.4	274.38	13.89	13.74083	218	277.21	13.92	13.90806
13.9	13.45222	222	275.03	13.89	13.74111	217.6	277.88	13.97	13.90861
13.9	13.4525	222	275.66	13.85	13.74139	217.3	279.18	14	13.90889
13.9	13.45278	218.7	276.32	13.85	13.74167	216.9	279.83	14.01	13.90917
13.89	13.45306	216.6	277.62	13.87	13.74222	218	280.47	14.01	13.90944
13.86	13.45361	215.8	278.28	13.92	13.7425	217.3	281.13	14.01	13.90972
13.9	13.45389	215.5	278.92	13.99	13.74278	216.6	281.79	14	13.91
13.94	13.45417	215.1	279.55	14.01	13.74306	219.1	282.46	13.99	13.91028
13.98	13.45444	214.4	280.2	14.02	13.74333	217.6	283.11	13.99	13.91083
14	13.45472	215.5	280.84	14.02	13.74361	215.5	283.74	14.01	13.91111
14.01	13.455	214	281.49	14.02	13.74389	213.3	284.39	14.02	13.91139

219.4	237.33	13.97	14.04028	215.5	288.18	14.05	14.21361	244	264.82
219.4	238.58	13.97	14.04056	216.6	289.16	14.06	14.21389	244	265.64
219.4	239.21	13.97	14.04083	215.8	290.18	14.07	14.21444	244.3	267.31
219.4	239.83	13.97	14.04139	215.1	291.16	14.07	14.21472	244.7	268.16
220.2	240.45	13.97	14.04167	214	292.17	14.07	14.215	245.8	268.98
219.4	241.07	13.97	14.04194	213.3	293.15	14.07	14.21528	245.4	269.81
219.8	241.68	13.97	14.04222	212.2	294.16	14.07	14.21556	246.5	270.64
219.8	242.3	13.97	14.0425	210.4	295.14	14.08	14.21583	246.5	271.48
219.4	242.93	13.97	14.04278	209.3	297.14	14.09	14.21611	246.5	272.3
219.8	243.56	13.97	14.04306	208.3	298.14	14.1	14.21667	247.2	273.15
219.8	244.18	13.97	14.04361	208.6	299.12	14.11	14.21694	246.5	273.98
220.5	244.81	13.97	14.04389	210.1	300.12	14.1	14.21722	246.9	274.81
220.2	245.43	13.97	14.04417	209.7	301.12	14.1	14.2175	247.2	275.63
220.2	246.67	13.97	14.04444	210.1	302.13	14.1	14.21778	246.1	277.29
220.5	247.3	13.97	14.04472	210.4	303.1	14.09	14.21806	245.4	278.16
219.8	247.91	13.97	14.045	213	304.1	14.08	14.21833	245.1	278.97
220.2	248.54	13.97	14.04528	211.1	305.09	14.07	14.21889	244.3	279.78
219.4	249.16	13.97	14.04583	209	306.1	14.07	14.21917	244	280.62
219.1	249.8	13.97	14.04611	206.8	307.09	14.09	14.21944	244.7	281.45
219.1	250.41	13.97	14.04639	202.1	308.07	14.13	14.21972	244.7	282.31
218.4	251.04	13.98	14.04667	197.8	310.07	14.16	14.22	244.3	283.13
218.4	251.65	13.98	14.04694	193.5	311.08	14.2	14.22028	244	283.95
217.6	252.27	13.98	14.04722	188.8	312.05	14.25	14.22056	243.6	284.78
218.4	252.89	13.98	14.0475	183.4	313.06	14.29	14.22111	244.3	285.62
217.6	254.15	13.98	14.04806	179.8	314.04	14.33	14.22139	244.3	287.28
217.6	254.79	13.99	14.04833	179.1	315.02	14.37	14.22167	245.4	288.11
216.9	255.39	13.99	14.04861	181.2	315.99	14.38	14.22194	246.1	288.93
216.6	256.01	13.99	14.04889	186.3	316.99	14.37	14.22222	246.9	289.77
216.9	256.63	13.99	14.04917	197.4	317.98	14.33	14.2225	247.9	290.61
216.6	257.25	13.99	14.04944	203.9	318.98	14.26	14.22278	248.3	291.44
216.2	257.87	13.99	14.04972	209	319.98	14.19	14.22333	249	292.28
216.2	258.5	13.99	14.05028	214	320.99	14.14	14.22361	249.7	293.09
215.8	259.14	13.99	14.05056	217.6	322.96	14.09	14.22389	250.1	293.93
215.8	259.75	13.99	14.05083	223.4	323.95	14.04	14.22417	250.5	294.76
215.5	260.37	13.99	14.05111	229.5	324.97	13.99	14.22444	250.8	295.59
215.8	260.98	13.99	14.05139	234.6	325.95	13.92	14.22472	251.2	296.42
215.8	262.23	13.99	14.05167	236.8	326.94	13.87	14.225	251.9	297.27
215.5	262.87	13.99	14.05194	237.5	327.93	13.82	14.22556	251.9	298.92
215.5	263.49	13.99	14.0525	237.8	328.94	13.78	14.22583	252.6	299.74
215.5	264.11	13.99	14.05278	237.5	329.94	13.81	14.22611	253.3	300.57
215.8	264.72	13.99	14.05306	237.8	330.93	13.82	14.22639	253.3	301.43
216.2	265.34	13.99	14.05333	238.2	331.9	13.82	14.22667	253.3	302.25
216.6	265.96	13.99	14.05361	240	332.92	13.81	14.22694	253.3	303.08
217.3	266.6	13.98	14.05389	242.2	333.91	13.78	14.22722	253.7	303.9
217.6	267.21	13.98	14.05417	244.7	334.92	13.75	14.22778	253.3	304.74
216.9	267.83	13.98	14.05472	244.3	336.9	13.72	14.22806	253.7	305.56
218	268.46	13.97	14.055	242.2	337.88	13.72	14.22833	253.7	306.41
219.4	269.09	13.96	14.05528	243.6	338.89	13.72	14.22861	253.3	307.23
219.1	270.33	13.95	14.05556	245.1	339.89	13.71	14.22889	253.3	308.89
219.1	270.95	13.95	14.05583	242.9	340.88	13.7	14.22917	253	309.73
220.2	271.57	13.94	14.05611	241.8	341.86	13.69	14.22944	253.7	310.58
221.2	272.18	13.94	14.05667	243.2	342.82	13.68	14.23	253	311.4
221.2	272.82	13.94	14.05694	247.9	343.82	13.66	14.23028	253.3	312.22
222.3	273.44	13.92	14.05722	239.3	344.81	13.65	14.23056	252.6	313.05
224.1	274.07	13.91	14.0575	175.4	345.8	13.83	14.23083	253.3	313.88
220.9	274.69	13.9	14.05778	135.8	346.79	14.26	14.23111	252.6	314.69
225.9	275.31	13.9	14.05806	137.2	348.8	14.61	14.23139	252.6	315.51
222.7	275.92	13.85	14.05833	114.9	349.79	14.82	14.23167	252.6	316.33
219.8	277.17	13.83	14.05889	66.9	350.77	15.1	14.23222	253	317.16
219.1	277.81	13.9	14.05917	49.2	351.77	15.39	14.2325	253	318
219.1	278.44	13.96	14.05944	18.6	352.78	15.59	14.23278	252.6	319.65
219.8	279.05	13.99	14.05972	10.3	353.78	15.79	14.23306	253	320.5

13.66	14.32139	254.1	264.51	13.49	14.45889	254.4	269.41	13.44	14.59167
13.66	14.32167	253.7	266.16	13.49	14.45917	254.4	270.28	13.44	14.59194
13.65	14.32194	253.7	266.99	13.49	14.45944	254.8	271.15	13.44	14.59222
13.65	14.32222	253.7	267.82	13.49	14.45972	254.4	272.03	13.44	14.5925
13.63	14.32278	253.3	268.65	13.49	14.46	254.8	272.92	13.44	14.59278
13.62	14.32306	253.3	269.47	13.49	14.46028	254.8	273.79	13.44	14.59333
13.62	14.32333	254.1	270.3	13.49	14.46056	254.8	275.54	13.44	14.59361
13.61	14.32361	253.7	271.13	13.49	14.46111	254.8	276.4	13.42	14.59389
13.61	14.32389	253.3	271.94	13.49	14.46139	254.8	277.28	13.42	14.59417
13.59	14.32417	253.3	272.77	13.49	14.46167	255.5	278.18	13.46	14.59444
13.59	14.32444	253.3	273.61	13.49	14.46194	255.5	279.05	13.48	14.59472
13.58	14.325	253	274.43	13.47	14.46222	255.1	279.91	13.5	14.595
13.58	14.32528	253.3	275.25	13.47	14.4625	255.1	280.8	13.51	14.59556
13.58	14.32556	253.3	276.07	13.44	14.46278	255.5	281.67	13.51	14.59583
13.59	14.32583	253.7	277.74	13.47	14.46306	255.9	282.58	13.5	14.59611
13.65	14.32611	253.7	278.56	13.51	14.46361	255.9	283.43	13.51	14.59639
13.68	14.32639	253.7	279.38	13.53	14.46389	255.9	284.29	13.51	14.59667
13.68	14.32667	253.7	280.2	13.54	14.46417	255.5	285.17	13.52	14.59694
13.68	14.32722	254.1	281.03	13.54	14.46444	255.9	286.94	13.53	14.59722
13.68	14.3275	254.4	281.86	13.54	14.46472	255.9	287.81	13.53	14.59778
13.69	14.32778	254.4	282.7	13.53	14.465	255.9	288.68	13.53	14.59806
13.7	14.32806	254.4	283.52	13.53	14.46528	255.9	289.55	13.54	14.59833
13.7	14.32833	254.8	284.33	13.54	14.46583	256.6	290.44	13.54	14.59861
13.71	14.32861	255.1	285.16	13.54	14.46611	255.9	291.31	13.54	14.59889
13.71	14.32889	255.5	285.99	13.54	14.46639	255.9	292.2	13.53	14.59917
13.72	14.32944	255.5	286.83	13.55	14.46667	256.2	293.06	13.53	14.59944
13.72	14.32972	255.5	288.47	13.56	14.46694	255.5	293.94	13.53	14.6
13.72	14.33	255.5	289.29	13.56	14.46722	255.9	294.82	13.53	14.60028
13.71	14.33028	255.9	290.12	13.56	14.4675	255.9	295.68	13.53	14.60056
13.7	14.33056	255.1	290.95	13.56	14.46806	255.5	296.58	13.52	14.60083
13.69	14.33083	255.5	291.78	13.56	14.46833	256.2	298.33	13.52	14.60111
13.68	14.33111	256.2	292.61	13.55	14.46861	256.2	299.19	13.52	14.60139
13.67	14.33167	255.9	293.42	13.55	14.46889	256.6	300.07	13.51	14.60167
13.66	14.33194	255.9	294.26	13.55	14.46917	256.2	300.94	13.51	14.60194
13.65	14.33222	255.5	295.07	13.54	14.46944	256.6	301.84	13.51	14.6025
13.64	14.3325	255.9	295.9	13.54	14.46972	255.9	302.71	13.51	14.60278
13.63	14.33278	255.5	296.73	13.54	14.47028	257	303.58	13.51	14.60306
13.62	14.33306	255.9	297.57	13.54	14.47056	257	304.45	13.51	14.60333
13.61	14.33333	256.2	299.21	13.54	14.47083	256.6	305.32	13.51	14.60361
13.61	14.33389	255.9	300.03	13.54	14.47111	257	306.22	13.51	14.60389
13.6	14.33417	255.5	300.87	13.54	14.47139	257.3	307.08	13.51	14.60417
13.59	14.33444	256.2	301.71	13.54	14.47167	256.6	307.95	13.51	14.60472
13.59	14.33472	255.5	302.53	13.54	14.47194	256.6	309.72	13.52	14.605
13.59	14.335	256.2	303.34	13.54	14.4725	257	310.59	13.53	14.60528
13.58	14.33528	256.2	304.16	13.54	14.47278	257	311.48	13.53	14.60556
13.58	14.33556	256.2	305	13.53	14.47306	256.6	312.34	13.53	14.60583
13.58	14.33611	256.2	305.84	13.53	14.47333	256.6	313.21	13.53	14.60611
13.58	14.33639	256.2	306.67	13.53	14.47361	255.9	314.08	13.53	14.60639
13.59	14.33667	256.2	307.47	13.53	14.47389	256.6	314.94	13.53	14.60694
13.59	14.33694	256.2	308.3	13.54	14.47417	257	315.8	13.53	14.60722
13.59	14.33722	255.5	309.12	13.54	14.47444	257	316.67	13.53	14.6075
13.59	14.3375	256.6	310.8	13.55	14.475	257	317.55	13.53	14.60778
13.59	14.33778	255.9	311.61	13.55	14.47528	256.6	318.42	13.52	14.60806
13.59	14.33833	255.9	312.43	13.55	14.47556	256.6	319.29	13.53	14.60833
13.59	14.33861	255.9	313.26	13.55	14.47583	255.9	320.18	13.53	14.60861
13.59	14.33889	255.9	314.08	13.55	14.47611	255.9	321.93	13.53	14.60917
13.59	14.33917	255.5	314.88	13.55	14.47639	255.9	322.8	13.53	14.60944
13.59	14.33944	255.9	315.71	13.55	14.47667	256.6	323.67	13.53	14.60972
13.59	14.33972	255.5	316.51	13.55	14.47722	256.2	324.57	13.53	14.61
13.59	14.34	255.9	317.35	13.54	14.4775	256.6	325.45	13.52	14.61028
13.59	14.34056	256.2	318.17	13.54	14.47778	256.6	326.31	13.52	14.61056
13.59	14.34083	255.9	319	13.54	14.47806	256.6	327.17	13.52	14.61083

282.6	268.44	13.49	9.446389	284.7	282.8	13.51	9.775833	282.6	267.16
282.6	269.02	13.5	9.446667	284.7	283.44	13.51	9.776389	282.2	267.72
282.6	269.6	13.49	9.447222	284.7	284.06	13.52	9.776667	282.2	268.28
283.3	270.18	13.49	9.4475	284.7	284.68	13.52	9.776944	282.2	268.85
282.6	270.76	13.49	9.447778	284.7	285.32	13.53	9.777222	282.6	269.4
282.9	271.35	13.49	9.448056	284.7	285.97	13.54	9.7775	282.6	270.52
282.6	271.92	13.49	9.448333	284.7	286.62	13.54	9.777778	282.6	271.08
282.6	273.09	13.48	9.448611	284.7	287.89	13.54	9.778056	282.6	271.63
282.9	273.68	13.47	9.449167	284.4	288.51	13.54	9.778333	282.2	272.18
282.9	274.26	13.47	9.449444	285.1	289.15	13.55	9.778611	282.6	272.76
282.6	274.84	13.48	9.449722	284.7	289.79	13.55	9.779167	282.6	273.32
282.9	275.42	13.49	9.45	284.7	290.44	13.55	9.779444	282.6	273.88
282.9	276	13.47	9.450278	284.4	291.07	13.55	9.779722	282.6	274.44
282.9	276.58	13.48	9.450556	284.4	291.72	13.55	9.78	282.6	275
282.9	277.17	13.51	9.450833	284.4	292.35	13.55	9.780278	282.6	275.55
283.3	277.76	13.53	9.451111	284.4	292.98	13.55	9.780556	282.9	276.11
283.3	278.36	13.54	9.451667	284.4	293.61	13.54	9.780833	282.9	276.66
282.9	278.92	13.55	9.451944	284.7	294.25	13.55	9.781389	282.9	277.22
282.9	279.49	13.55	9.452222	284.4	294.89	13.54	9.781667	282.9	278.37
283.3	280.07	13.55	9.4525	284.4	295.52	13.54	9.781944	282.9	278.92
282.9	281.24	13.55	9.452778	284.4	296.16	13.55	9.782222	282.9	279.46
283.3	281.82	13.55	9.453056	284.7	296.81	13.55	9.7825	282.9	280.02
282.9	282.43	13.56	9.453333	284.4	298.08	13.55	9.782778	283.3	280.58
283.3	283	13.55	9.453889	284.4	298.72	13.54	9.783056	283.3	281.14
283.3	283.58	13.56	9.454167	284.7	299.34	13.54	9.783333	282.9	281.7
282.9	284.15	13.56	9.454444	284.7	299.98	13.54	9.783889	283.3	282.29
282.9	284.73	13.56	9.454722	284.4	300.62	13.54	9.784167	283.3	282.84
283.3	285.31	13.57	9.455	284	301.27	13.54	9.784444	282.9	283.4
282.9	285.9	13.58	9.455278	284.4	301.92	13.54	9.784722	283.3	283.94
283.3	286.49	13.58	9.455556	284	302.54	13.54	9.785	283.3	284.49
283.3	287.07	13.58	9.455833	284	303.17	13.54	9.785278	283.3	285.06
283.3	287.66	13.58	9.456389	284.4	303.8	13.54	9.785556	283.3	286.19
282.9	288.81	13.59	9.456667	284.4	304.44	13.55	9.785833	283.3	286.75
282.9	289.39	13.59	9.456944	284.4	305.07	13.55	9.786111	283.3	287.31
283.3	289.98	13.59	9.457222	284	305.73	13.55	9.786667	283.3	287.87
283.6	290.56	13.59	9.4575	284.4	306.37	13.55	9.786944	283.3	288.42
282.9	291.14	13.59	9.457778	284	307.01	13.56	9.787222	283.3	288.97
283.3	291.73	13.59	9.458056	284.4	308.25	13.56	9.7875	283.6	289.54
283.3	292.32	13.59	9.458611	284.4	308.9	13.56	9.787778	282.9	290.1
283.3	292.89	13.59	9.458889	284	309.54	13.56	9.788056	282.9	290.66
282.9	293.46	13.59	9.459167	284.4	310.19	13.56	9.788611	283.3	291.22
282.9	294.06	13.59	9.459444	284	310.83	13.56	9.788889	283.3	291.78
283.3	294.63	13.59	9.459722	284.4	311.46	13.56	9.789167	282.9	292.35
283.3	295.22	13.59	9.46	284	312.09	13.56	9.789444	283.3	293.46
282.9	295.79	13.59	9.460278	284	312.72	13.56	9.789722	283.3	294.02
283.3	296.97	13.59	9.460833	284.4	313.36	13.56	9.79	283.3	294.58
283.3	297.56	13.59	9.461111	284	314	13.56	9.790278	283.3	295.13
283.3	298.13	13.59	9.461389	284.4	314.62	13.56	9.790833	283.3	295.68
283.3	298.72	13.59	9.461667	284.4	315.87	13.56	9.791111	283.3	296.25
283.6	299.29	13.59	9.461944	284	316.5	13.56	9.791389	283.3	296.82
283.6	299.88	13.58	9.462222	284	317.14	13.56	9.791667	283.3	297.38
284	300.45	13.58	9.4625	284.4	317.78	13.56	9.791944	283.3	297.94
283.3	301.03	13.59	9.463056	284.7	318.41	13.56	9.792222	282.9	298.5
283.6	301.64	13.58	9.463333	284.4	319.05	13.56	9.7925	283.3	299.05
283.3	302.22	13.58	9.463611	284.7	319.68	13.56	9.793056	283.3	299.6
283.3	302.79	13.58	9.463889	285.1	320.34	13.56	9.793333	283.6	300.72
283.6	303.36	13.58	9.464167	284.4	320.97	13.56	9.793611	282.9	301.3
283.6	304.52	13.59	9.464444	284.4	321.61	13.56	9.793889	283.3	301.87
283.6	305.11	13.59	9.464722	284.4	322.24	13.56	9.794167	283.3	302.42
283.6	305.71	13.59	9.465	284.7	322.87	13.56	9.794444	282.9	302.97
283.3	306.29	13.59	9.465556	284.7	324.15	13.56	9.794722	282.9	303.52
283.6	306.87	13.59	9.465833	284.4	324.8	13.56	9.795	282.9	304.08

13.45	10.08167	281.5	275.78	13.39	10.39972	279.3	291.44	13.51	10.56306
13.45	10.08194	281.5	276.41	13.41	10.4	279.7	292.13	13.51	10.56333
13.45	10.08222	281.8	277.05	13.43	10.40028	279.7	292.81	13.51	10.56361
13.44	10.0825	282.2	277.68	13.46	10.40056	279.7	293.48	13.51	10.56389
13.44	10.08278	282.2	278.33	13.47	10.40083	279.7	294.85	13.51	10.56444
13.44	10.08333	281.8	279.57	13.48	10.40111	279.3	295.54	13.51	10.56472
13.44	10.08361	281.8	280.2	13.49	10.40139	279.3	296.21	13.51	10.565
13.44	10.08389	281.8	280.82	13.48	10.40194	279.3	296.91	13.51	10.56528
13.43	10.08417	282.2	281.46	13.48	10.40222	279.7	297.59	13.51	10.56556
13.43	10.08444	282.2	282.1	13.49	10.4025	279	298.27	13.51	10.56583
13.44	10.08472	282.2	282.75	13.49	10.40278	279.3	298.95	13.51	10.56639
13.44	10.085	282.2	283.37	13.49	10.40306	279.3	299.63	13.51	10.56667
13.44	10.08528	282.2	283.99	13.5	10.40333	279.3	300.31	13.51	10.56694
13.43	10.08583	281.8	284.62	13.49	10.40361	279	301	13.51	10.56722
13.42	10.08611	282.2	285.25	13.5	10.40417	279	301.7	13.51	10.5675
13.42	10.08639	282.6	285.89	13.51	10.40444	279.3	302.38	13.51	10.56778
13.45	10.08667	282.6	286.53	13.51	10.40472	279.3	303.73	13.51	10.56806
13.47	10.08694	282.2	287.8	13.52	10.405	279.3	304.4	13.51	10.56861
13.49	10.08722	282.2	288.41	13.52	10.40528	279.7	305.1	13.51	10.56889
13.49	10.0875	282.6	289.04	13.52	10.40556	279.7	305.79	13.52	10.56917
13.49	10.08806	282.2	289.67	13.52	10.40583	279.7	306.48	13.52	10.56944
13.49	10.08833	282.6	290.32	13.52	10.40611	280	307.15	13.53	10.56972
13.49	10.08861	282.2	290.94	13.52	10.40667	280	307.82	13.53	10.57
13.49	10.08889	282.2	291.58	13.52	10.40694	279.7	308.5	13.53	10.57028
13.49	10.08917	282.6	292.21	13.52	10.40722	279.7	309.19	13.53	10.57083
13.5	10.08944	282.6	292.84	13.52	10.4075	280	309.88	13.53	10.57111
13.5	10.08972	282.6	293.46	13.52	10.40778	279.7	310.57	13.53	10.57139
13.5	10.09	282.2	294.11	13.52	10.40806	280	311.25	13.53	10.57167
13.51	10.09056	282.6	294.73	13.52	10.40833	280	312.6	13.53	10.57194
13.51	10.09083	282.6	295.99	13.52	10.40889	280	313.28	13.53	10.57222
13.51	10.09111	282.6	296.64	13.52	10.40917	279.7	313.97	13.53	10.5725
13.52	10.09139	282.2	297.27	13.52	10.40944	280	314.63	13.53	10.57306
13.53	10.09167	282.6	297.9	13.52	10.40972	279.7	315.31	13.53	10.57333
13.53	10.09194	282.6	298.53	13.52	10.41	279	315.97	13.53	10.57361
13.53	10.09222	282.6	299.16	13.52	10.41028	279.7	316.65	13.53	10.57389
13.53	10.09278	282.6	299.78	13.52	10.41056	279.3	317.33	13.53	10.57417
13.53	10.09306	282.9	300.42	13.52	10.41111	279.7	318.02	13.53	10.57444
13.53	10.09333	282.6	301.05	13.52	10.41139	279.7	318.69	13.53	10.57472
13.53	10.09361	282.6	301.7	13.52	10.41167	280	319.38	13.53	10.575
13.53	10.09389	282.2	302.33	13.52	10.41194	280.4	320.07	13.53	10.57556
13.53	10.09417	282.9	302.95	13.52	10.41222	279.7	321.44	13.53	10.57583
13.53	10.09444	282.9	304.2	13.52	10.4125	279.7	322.11	13.53	10.57611
13.53	10.095	282.6	304.84	13.52	10.41278	279.7	322.79	13.53	10.57639
13.53	10.09528	282.9	305.47	13.52	10.41333	279.7	323.48	13.53	10.57667
13.53	10.09556	282.6	306.13	13.52	10.41361	279.7	324.15	13.53	10.57694
13.53	10.09583	282.9	306.75	13.53	10.41389	279	324.86	13.53	10.5775
13.53	10.09611	282.9	307.36	13.53	10.41417	279.7	325.55	13.53	10.57778
13.53	10.09639	283.3	307.99	13.53	10.41444	279.7	326.22	13.53	10.57806
13.53	10.09667	283.3	308.63	13.53	10.41472	279.3	326.89	13.53	10.57833
13.53	10.09722	282.6	309.26	13.53	10.41528	279.7	327.57	13.53	10.57861
13.53	10.0975	282.9	309.9	13.53	10.41556	279.7	328.25	13.53	10.57889
13.53	10.09778	282.6	310.54	13.53	10.41583	279.7	328.94	13.53	10.57917
13.53	10.09806	282.9	311.18	13.53	10.41611	279.7	330.32	13.53	10.57972
13.53	10.09833	282.9	312.42	13.54	10.41639	279.3	330.98	13.53	10.58
13.53	10.09861	282.9	313.05	13.53	10.41667	279.7	331.67	13.53	10.58028
13.53	10.09889	282.9	313.7	13.53	10.41694	280	332.35	13.53	10.58056
13.53	10.09944	282.9	314.31	13.53	10.4175	279.3	333.04	13.52	10.58083
13.53	10.09972	282.9	314.93	13.53	10.41778	279.7	333.72	13.53	10.58111
13.53	10.1	282.9	315.55	13.53	10.41806	280	334.41	13.53	10.58139
13.53	10.10028	282.6	316.17	13.53	10.41833	280	335.08	13.53	10.58194
13.53	10.10056	282.9	316.79	13.53	10.41861	280	335.76	13.53	10.58222
13.53	10.10083	282.9	317.44	13.53	10.41889	280.4	336.44	13.53	10.5825

276.1	261.02	13.43	10.91556	275.7	275.91	13.41	11.27722	276.1	285.19
276.8	261.54	13.43	10.91583	275.3	276.53	13.38	11.27778	276.1	285.85
276.8	262.05	13.43	10.91611	275.7	277.13	13.39	11.27806	276.4	286.51
276.4	262.6	13.43	10.91639	276.1	277.76	13.42	11.27833	276.4	287.16
276.4	263.12	13.43	10.91667	275.7	278.38	13.45	11.27861	276.4	287.82
276.4	263.65	13.43	10.91694	276.1	278.99	13.46	11.27889	276.4	288.45
276.1	264.18	13.43	10.9175	276.1	279.59	13.47	11.27917	276.4	289.11
276.4	264.69	13.43	10.91778	276.1	280.2	13.47	11.27944	276.4	289.76
276.1	265.21	13.43	10.91806	276.1	280.81	13.47	11.28	276.4	290.42
276.4	265.73	13.44	10.91833	276.1	281.42	13.47	11.28028	276.4	291.07
276.1	266.8	13.44	10.91861	275.7	282.04	13.47	11.28056	276.8	291.73
276.1	267.32	13.43	10.91889	276.1	282.66	13.47	11.28083	276.1	293.02
276.1	267.83	13.42	10.91917	276.4	283.87	13.47	11.28111	276.4	293.67
276.1	268.37	13.42	10.91972	276.4	284.48	13.48	11.28139	276.4	294.33
275.7	268.9	13.42	10.92	276.1	285.09	13.49	11.28167	276.4	294.98
276.4	269.41	13.43	10.92028	276.4	285.71	13.49	11.28222	276.4	295.63
276.4	269.93	13.44	10.92056	276.1	286.32	13.49	11.2825	276.4	296.28
276.1	270.46	13.43	10.92083	276.1	286.94	13.49	11.28278	276.1	296.94
276.1	270.99	13.42	10.92111	276.1	287.55	13.5	11.28306	276.4	297.59
276.1	271.51	13.42	10.92139	276.1	288.16	13.5	11.28333	276.4	298.24
276.8	272.03	13.42	10.92167	276.4	288.76	13.5	11.28361	276.4	298.88
276.8	272.55	13.42	10.92222	276.1	289.37	13.51	11.28389	276.4	299.54
277.1	273.62	13.42	10.9225	276.4	289.99	13.51	11.28444	276.8	300.18
276.4	274.14	13.42	10.92278	275.7	291.21	13.51	11.28472	276.4	301.51
276.4	274.67	13.41	10.92306	276.1	291.84	13.51	11.285	276.4	302.16
276.8	275.18	13.41	10.92333	276.4	292.44	13.51	11.28528	276.1	302.8
276.8	275.71	13.42	10.92361	276.4	293.05	13.51	11.28556	276.4	303.44
276.8	276.22	13.42	10.92417	276.1	293.66	13.51	11.28583	276.8	304.09
277.1	276.76	13.44	10.92444	276.4	294.27	13.51	11.28611	276.8	304.74
277.1	277.27	13.46	10.92472	276.1	294.88	13.5	11.28667	276.8	305.41
277.5	277.82	13.47	10.925	276.8	295.49	13.5	11.28694	276.8	306.06
277.5	278.35	13.47	10.92528	276.8	296.1	13.5	11.28722	276.8	306.72
277.5	278.86	13.47	10.92556	276.4	296.72	13.5	11.2875	277.1	307.35
277.5	279.38	13.47	10.92583	276.1	297.34	13.51	11.28778	277.1	308
277.1	280.43	13.47	10.92639	276.4	297.94	13.51	11.28806	277.1	308.65
277.1	280.94	13.47	10.92667	276.4	299.16	13.51	11.28833	276.8	309.97
277.9	281.48	13.47	10.92694	276.4	299.76	13.5	11.28889	277.5	310.62
277.5	282	13.47	10.92722	276.8	300.38	13.5	11.28917	277.1	311.28
277.5	282.55	13.49	10.9275	276.1	300.99	13.5	11.28944	277.1	311.91
277.1	283.07	13.49	10.92778	276.1	301.62	13.5	11.28972	277.1	312.56
277.5	283.58	13.49	10.92806	276.4	302.23	13.5	11.29	277.1	313.21
277.9	284.09	13.49	10.92861	276.8	302.84	13.51	11.29028	277.1	313.87
277.9	284.62	13.5	10.92889	276.8	303.44	13.51	11.29056	277.5	314.5
277.9	285.14	13.5	10.92917	276.4	304.04	13.5	11.29111	277.5	315.14
277.9	285.67	13.5	10.92944	276.8	304.66	13.5	11.29139	277.5	315.78
278.2	286.73	13.5	10.92972	276.8	305.27	13.5	11.29167	277.5	316.42
277.9	287.26	13.51	10.93	276.8	305.91	13.51	11.29194	277.5	317.72
277.9	287.79	13.51	10.93028	276.8	306.52	13.51	11.29222	277.5	318.38
277.9	288.3	13.51	10.93083	276.8	307.71	13.51	11.2925	277.5	319.02
278.2	288.81	13.51	10.93111	277.1	308.33	13.51	11.29278	277.5	319.67
277.9	289.34	13.51	10.93139	277.1	308.94	13.52	11.29306	277.9	320.34
278.2	289.86	13.51	10.93167	276.8	309.55	13.52	11.29361	277.1	321
278.2	290.4	13.51	10.93194	277.1	310.17	13.52	11.29389	277.5	321.64
277.9	290.92	13.51	10.93222	276.8	310.79	13.52	11.29417	277.5	322.29
277.9	291.44	13.51	10.93278	277.1	311.39	13.52	11.29444	277.5	322.93
277.9	291.98	13.51	10.93306	277.1	312	13.52	11.29472	276.8	323.59
277.9	293.02	13.51	10.93333	276.8	312.6	13.52	11.295	277.1	324.24
277.9	293.54	13.51	10.93361	276.8	313.22	13.52	11.29528	277.1	324.9
277.9	294.07	13.51	10.93389	277.1	313.83	13.52	11.29583	277.5	326.21
277.9	294.6	13.51	10.93417	277.1	314.43	13.52	11.29611	277.1	326.84
277.5	295.11	13.51	10.93444	277.1	315.02	13.52	11.29639	277.1	327.5
277.9	295.64	13.51	10.935	276.8	316.23	13.52	11.29667	277.1	328.14

13.47	11.51278	240	268.69	14.03	12.38806	221.2	280.91	14.01	12.645
13.49	11.51306	240.4	269.32	14.02	12.38833	219.8	281.54	14.01	12.64528
13.49	11.51333	239.6	269.93	14.02	12.38861	219.1	282.18	14.01	12.64556
13.49	11.51389	239.3	270.57	14.02	12.38889	220.9	282.82	14.02	12.64583
13.49	11.51417	239.6	271.19	14.02	12.38917	221.6	284.04	14.01	12.64611
13.5	11.51444	238.6	271.81	14.02	12.38972	218.4	284.67	13.99	12.64667
13.5	11.51472	238.6	272.43	14.03	12.39	218	285.3	14.01	12.64694
13.5	11.51515	239.3	273.08	14.02	12.39028	216.9	285.93	14.02	12.64722
13.5	11.51528	238.9	273.7	14.01	12.39056	215.8	286.57	14.04	12.6475
13.5	11.51556	239.6	274.33	13.99	12.39083	215.8	287.2	14.07	12.64778
13.5	11.51611	238.6	275.57	13.98	12.39111	215.8	287.81	14.08	12.64806
13.5	11.51639	237.1	276.19	13.97	12.39139	216.9	288.43	14.09	12.64861
13.5	11.51667	238.2	276.82	13.97	12.39194	218	289.05	14.09	12.64889
13.5	11.51694	233.5	277.45	13.99	12.39222	218.4	289.69	14.09	12.64917
13.5	11.51722	232.1	278.1	14.05	12.3925	218.4	290.32	14.09	12.64944
13.5	11.5175	231.3	278.72	14.12	12.39278	218.7	290.94	14.09	12.64972
13.5	11.51778	231	279.33	14.15	12.39306	218.7	292.21	14.09	12.65
13.5	11.51833	231.3	279.95	14.16	12.39333	219.1	292.81	14.08	12.65028
13.5	11.51861	232.1	280.58	14.16	12.39361	218	293.45	14.09	12.65083
13.5	11.51889	231.7	281.2	14.14	12.39417	217.6	294.07	14.09	12.65111
13.5	11.51917	231.7	281.84	14.14	12.39444	218	294.7	14.09	12.65139
13.5	11.51944	231.7	282.48	14.14	12.39472	217.6	295.32	14.09	12.65167
13.5	11.51972	229.5	283.71	14.15	12.395	217.6	295.95	14.08	12.65194
13.5	11.52	229.2	284.34	14.16	12.39528	217.6	296.58	14.08	12.65222
13.5	11.52056	229.9	284.95	14.16	12.39556	218	297.22	14.08	12.6525
13.5	11.52083	227.4	285.59	14.16	12.39583	218.4	297.84	14.07	12.65306
13.5	11.52111	226.7	286.22	14.18	12.39639	219.1	298.47	14.07	12.65333
13.5	11.52139	227.4	286.86	14.19	12.39667	220.2	299.71	14.07	12.65361
13.5	11.52167	225.9	287.48	14.21	12.39694	221.2	300.33	14.06	12.65389
13.5	11.52194	225.2	288.11	14.23	12.39722	221.2	300.97	14.06	12.65417
13.51	11.52222	224.5	288.72	14.24	12.3975	222.3	301.61	14.05	12.65444
13.51	11.52278	224.5	289.35	14.25	12.39778	222.3	302.24	14.04	12.655
13.51	11.52306	223.1	289.98	14.25	12.39806	222	302.85	14.05	12.65528
13.51	11.52333	222.3	290.61	14.26	12.39861	221.6	303.46	14.05	12.65556
13.51	11.52361	222.3	291.86	14.26	12.39889	220.5	304.09	14.05	12.65583
13.51	11.52389	223.4	292.49	14.26	12.39917	220.9	304.71	14.05	12.65611
13.51	11.52417	222	293.11	14.26	12.39944	220.2	305.35	14.04	12.65639
13.51	11.52444	221.6	293.74	14.26	12.39972	218.4	305.99	14.05	12.65667
13.51	11.525	221.2	294.37	14.26	12.4	219.4	307.23	14.06	12.65722
13.51	11.52528	221.2	294.99	14.26	12.40028	216.9	307.86	14.07	12.6575
13.51	11.52556	221.2	295.61	14.26	12.40083	215.1	308.48	14.09	12.65778
13.51	11.52583	220.9	296.23	14.26	12.40111	215.1	309.1	14.09	12.65806
13.51	11.52611	220.9	296.88	14.26	12.40139	215.1	309.74	14.1	12.65833
13.51	11.52639	220.5	297.5	14.26	12.40167	216.6	310.38	14.11	12.65861
13.51	11.52667	220.9	298.13	14.25	12.40194	215.5	311	14.11	12.65889
13.51	11.52722	221.2	298.74	14.25	12.40222	214.8	311.62	14.11	12.65917
13.51	11.5275	221.6	299.99	14.24	12.4025	214.8	312.24	14.11	12.65972
13.51	11.52778	222.7	300.62	14.23	12.40306	213.7	312.86	14.11	12.66
13.51	11.52806	222	301.26	14.23	12.40333	214	313.5	14.12	12.66028
13.51	11.52833	222.3	301.9	14.23	12.40361	213.7	314.11	14.12	12.66056
13.51	11.52861	223.4	302.51	14.22	12.40389	214.4	314.73	14.12	12.66083
13.51	11.52889	223.4	303.12	14.21	12.40417	215.1	315.96	14.12	12.66111
13.51	11.52944	224.1	303.75	14.2	12.40444	215.5	316.57	14.12	12.66139
13.51	11.52972	224.9	304.37	14.19	12.40472	216.6	317.21	14.11	12.66194
13.51	11.53	225.6	305	14.18	12.40528	217.3	317.83	14.11	12.66222
13.51	11.53028	221.2	305.63	14.18	12.40556	218	318.46	14.11	12.6625
13.51	11.53056	224.5	306.28	14.16	12.40583	218.7	319.07	14.1	12.66278
13.51	11.53083	225.2	306.9	14.16	12.40611	218.7	319.71	14.1	12.66306
13.51	11.53111	220.9	308.14	14.16	12.40639	218.4	320.34	14.1	12.66333
13.51	11.53167	221.6	308.76	14.18	12.40667	218.4	320.97	14.09	12.66389
13.51	11.53194	223.8	309.39	14.18	12.40694	220.2	321.59	14.09	12.66417
13.51	11.53222	223.8	310.02	14.18	12.40722	219.8	322.84	14.09	12.66444



219.8	296.77	14.1	12.95694	221.6	286.74	14.03	13.25222	222	280.4
220.2	297.46	14.1	12.95722	221.2	287.42	14.05	13.2525	223.4	281.03
220.2	298.16	14.09	12.9575	220.9	288.06	14.06	13.25278	223.4	282.31
219.8	299.54	14.09	12.95778	220.5	288.72	14.08	13.25306	222	282.94
219.1	300.21	14.09	12.95806	220.5	289.36	14.09	13.25333	222.3	283.55
217.6	300.93	14.1	12.95861	219.8	290.04	14.09	13.25389	222	284.17
218.4	301.63	14.11	12.95889	217.3	290.71	14.09	13.25417	220.5	284.77
218.4	302.33	14.11	12.95917	218.4	291.37	14.09	13.25444	219.1	285.41
218.7	303.01	14.11	12.95944	218.7	292.03	14.09	13.25472	217.3	286.04
218.7	303.7	14.1	12.95972	218.4	292.7	14.09	13.255	216.6	286.66
218.4	304.39	14.09	12.96	218.4	293.34	14.09	13.25528	216.2	287.31
217.6	305.09	14.09	12.96028	219.1	294.02	14.09	13.25556	216.2	287.93
220.5	305.8	14.09	12.96056	219.1	294.67	14.09	13.25583	216.6	288.54
219.1	306.5	14.08	12.96111	218.7	295.99	14.09	13.25639	216.9	289.17
217.3	307.18	14.09	12.96139	218.4	296.66	14.08	13.25667	217.3	289.79
217.6	308.55	14.11	12.96167	220.2	297.32	14.07	13.25694	216.9	291.05
217.6	309.26	14.12	12.96194	220.9	297.99	14.07	13.25722	217.3	291.68
217.3	309.96	14.13	12.96222	219.8	298.64	14.07	13.2575	218	292.31
217.3	310.66	14.13	12.9625	221.2	299.3	14.06	13.25778	217.6	292.92
216.6	311.34	14.13	12.96278	221.6	299.96	14.06	13.25806	217.6	293.55
216.6	312.03	14.13	12.96333	220.5	300.62	14.06	13.25861	217.3	294.18
216.6	312.72	14.13	12.96361	219.8	301.29	14.07	13.25889	217.6	294.81
216.6	313.42	14.13	12.96389	218.4	301.97	14.07	13.25917	217.6	295.42
215.8	314.1	14.13	12.96417	217.3	302.61	14.08	13.25944	217.3	296.05
215.8	314.79	14.13	12.96444	216.9	303.26	14.08	13.25972	217.3	296.69
215.8	315.47	14.13	12.96472	216.9	303.93	14.08	13.26	217.3	297.32
216.2	316.84	14.13	12.96528	219.1	305.25	14.08	13.26028	216.9	297.94
215.8	317.54	14.13	12.96556	216.2	305.93	14.07	13.26083	216.6	298.56
215.5	318.23	14.13	12.96583	216.9	306.59	14.08	13.26111	216.9	299.8
215.5	318.91	14.13	12.96611	216.2	307.23	14.09	13.26139	217.3	300.43
215.8	319.61	14.13	12.96639	215.5	307.89	14.1	13.26167	218	301.06
217.3	320.31	14.13	12.96667	215.8	308.55	14.11	13.26194	218.7	301.71
216.9	321.01	14.13	12.96694	215.1	309.21	14.11	13.26222	218.7	302.32
216.9	321.71	14.13	12.9675	215.5	309.89	14.11	13.2625	219.8	302.94
217.3	322.39	14.12	12.96778	215.5	310.56	14.12	13.26306	219.8	303.56
217.3	323.09	14.12	12.96806	215.8	311.21	14.12	13.26333	219.4	304.19
216.9	323.77	14.12	12.96833	215.1	311.87	14.12	13.26361	218	304.81
219.1	324.48	14.12	12.96861	214.4	313.18	14.13	13.26389	216.9	305.44
219.1	325.87	14.1	12.96889	213.7	313.84	14.13	13.26417	215.8	306.09
221.2	326.55	14.07	12.96917	214	314.48	14.13	13.26444	215.1	306.7
217.3	327.25	14.07	12.96972	213.7	315.14	14.13	13.26472	214	307.93
216.2	327.94	14.07	12.97	215.5	315.79	14.13	13.26528	213.3	308.56
213.7	328.64	14.08	12.97028	217.3	316.44	14.12	13.26556	212.6	309.19
207.2	329.35	14.14	12.97056	216.9	317.09	14.11	13.26583	211.9	309.82
201.4	330.05	14.24	12.97083	218	317.77	14.11	13.26611	213	310.46
196.4	342.32	14.36	12.99694	218.4	318.42	14.1	13.26639	212.6	311.09
198.5	342.53	14.31	12.99722	218	319.08	14.1	13.26667	213.3	311.7
200.7	342.82	14.28	12.9975	216.6	319.74	14.1	13.26694	213.7	312.32
201.4	343.13	14.26	12.99778	215.8	320.42	14.1	13.2675	214.4	312.95
204.7	343.46	14.26	12.99833	216.9	321.08	14.1	13.26778	215.5	313.58
206.1	343.78	14.28	12.99861	216.6	322.39	14.11	13.26806	215.8	314.19
212.2	344.1	14.25	12.99889	217.3	323.05	14.11	13.26833	215.5	314.8
210.4	344.42	14.24	12.99917	216.2	323.71	14.11	13.26861	214.8	315.42
209	345.06	14.3	12.99944	217.6	324.38	14.11	13.26889	214.4	316.04
204.3	345.38	14.42	12.99972	217.3	325.05	14.11	13.26917	213.3	317.28
176.5	345.7	14.52	13.00028	218	325.7	14.1	13.26944	213.7	317.91
163.9	346.01	14.56	13.00056	221.2	326.36	14.09	13.27	213.7	318.54
144.1	346.34	14.62	13.00083	223.8	327.01	14.07	13.27028	213.7	319.16
120.3	346.66	14.81	13.00111	225.2	327.68	14.03	13.27056	213	319.79
81.7	346.98	15.16	13.00139	227.4	328.33	13.97	13.27083	212.6	320.42
57.2	347.3	15.36	13.00167	218	329	13.98	13.27111	211.1	321.05
53.5	347.63	15.49	13.00194	213	329.68	14.08	13.27139	212.6	321.67

14.01	13.45528	214.8	282.16	14.02	13.74444	212.6	285.04	14.05	13.91167
14.01	13.45583	213.3	282.81	14.04	13.74472	211.1	285.7	14.07	13.91194
14	13.45611	211.5	283.44	14.05	13.745	211.1	286.36	14.08	13.91222
14	13.45639	210.4	284.08	14.07	13.74528	210.4	287.67	14.09	13.9125
14.01	13.45667	210.4	284.72	14.07	13.74556	209.3	288.31	14.1	13.91306
14.01	13.45694	211.5	286.03	14.07	13.74583	209.3	288.96	14.11	13.91333
14.02	13.45722	210.1	286.67	14.06	13.74611	209	289.62	14.11	13.91361
14.04	13.4575	211.5	287.33	14.07	13.74667	209.7	290.27	14.11	13.91389
14.05	13.45806	210.1	287.96	14.08	13.74694	209	290.93	14.11	13.91417
14.07	13.45833	209.3	288.61	14.1	13.74722	209.3	291.58	14.11	13.91444
14.09	13.45861	210.1	289.24	14.11	13.7475	210.1	292.24	14.11	13.91472
14.1	13.45889	209.3	289.91	14.11	13.74778	209.7	292.88	14.11	13.91528
14.11	13.45917	209.3	290.55	14.11	13.74806	210.1	293.53	14.11	13.91556
14.11	13.45944	209	291.2	14.11	13.74833	210.4	294.85	14.1	13.91583
14.11	13.45972	210.1	291.85	14.11	13.74889	209.7	295.49	14.09	13.91611
14.1	13.46	209.7	292.5	14.11	13.74917	209.7	296.15	14.09	13.91639
14.1	13.46056	209	293.13	14.11	13.74944	210.1	296.81	14.1	13.91667
14.09	13.46083	209.3	293.78	14.11	13.74972	209.3	297.46	14.09	13.91722
14.09	13.46111	209	295.08	14.11	13.75	208.6	298.11	14.1	13.9175
14.09	13.46139	208.3	295.72	14.11	13.75028	209	298.76	14.11	13.91778
14.09	13.46167	208.3	296.38	14.11	13.75056	209	299.4	14.11	13.91806
14.09	13.46194	208.6	297.03	14.1	13.75111	209.3	300.06	14.11	13.91833
14.09	13.46222	210.1	297.68	14.1	13.75139	208.3	300.71	14.11	13.91861
14.09	13.46278	209	298.32	14.09	13.75167	208.6	301.38	14.11	13.91889
14.09	13.46306	210.4	298.96	14.09	13.75194	209	302.04	14.11	13.91917
14.08	13.46333	210.8	299.6	14.09	13.75222	209.7	302.68	14.11	13.91972
14.09	13.46361	210.8	300.25	14.09	13.7525	210.1	303.97	14.11	13.92
14.09	13.46389	210.4	300.9	14.09	13.75278	209.7	304.63	14.11	13.92028
14.09	13.46417	210.8	301.57	14.09	13.75333	209.7	305.28	14.09	13.92056
14.09	13.46444	210.4	302.21	14.09	13.75361	210.4	305.96	14.08	13.92083
14.09	13.46472	211.5	303.48	14.09	13.75389	210.8	306.6	14.08	13.92111
14.08	13.46528	212.2	304.12	14.08	13.75417	209	307.25	14.09	13.92139
14.08	13.46556	211.9	304.78	14.08	13.75444	206.8	307.89	14.11	13.92194
14.07	13.46583	210.8	305.43	14.07	13.75472	206.5	308.55	14.13	13.92222
14.07	13.46611	212.6	306.1	14.06	13.755	205.4	309.2	14.14	13.9225
14.07	13.46639	210.4	306.73	14.07	13.75556	205.4	309.85	14.15	13.92278
14.07	13.46667	209.3	307.37	14.07	13.75583	204.7	310.52	14.16	13.92306
14.06	13.46694	208.3	308.01	14.08	13.75611	205.4	311.17	14.16	13.92333
14.07	13.4675	207.9	308.66	14.11	13.75639	205.4	311.81	14.16	13.92361
14.09	13.46778	207.5	309.31	14.12	13.75667	206.1	312.46	14.16	13.92389
14.11	13.46806	207.9	309.97	14.13	13.75694	206.1	313.77	14.16	13.92444
14.12	13.46833	207.2	311.26	14.13	13.75722	207.2	314.41	14.15	13.92472
14.13	13.46861	207.2	311.89	14.13	13.75778	207.9	315.04	14.14	13.925
14.14	13.46889	207.2	312.54	14.13	13.75806	208.3	315.69	14.14	13.92528
14.14	13.46917	207.2	313.19	14.13	13.75833	208.6	316.33	14.14	13.92556
14.14	13.46972	206.5	313.84	14.13	13.75861	208.6	316.98	14.14	13.92583
14.14	13.47	206.5	314.46	14.14	13.75889	208.3	317.64	14.13	13.92611
14.14	13.47028	206.5	315.11	14.14	13.75917	208.6	318.29	14.14	13.92667
14.13	13.47056	206.1	315.74	14.14	13.75944	207.5	318.94	14.14	13.92694
14.13	13.47083	205.7	316.38	14.14	13.76	206.5	319.59	14.14	13.92722
14.12	13.47111	205.7	317.02	14.14	13.76028	206.8	320.26	14.14	13.9275
14.12	13.47139	204.7	317.68	14.14	13.76056	206.5	320.91	14.14	13.92778
14.11	13.47167	205.4	318.32	14.14	13.76083	206.8	322.21	14.14	13.92806
14.11	13.47222	205.4	318.97	14.14	13.76111	206.8	322.85	14.14	13.92833
14.12	13.4725	205.4	320.26	14.14	13.76139	206.8	323.51	14.14	13.92889
14.12	13.47278	205.7	320.91	14.14	13.76167	207.9	324.16	14.14	13.92917
14.13	13.47306	206.1	321.56	14.14	13.76222	206.5	324.82	14.13	13.92944
14.13	13.47333	206.5	322.2	14.13	13.7625	209	325.49	14.13	13.92972
14.13	13.47361	205.4	322.84	14.13	13.76278	208.6	326.12	14.11	13.93
14.13	13.47389	207.9	323.49	14.13	13.76306	210.8	326.77	14.09	13.93028
14.14	13.47444	207.5	324.13	14.13	13.76333	208.3	327.41	14.06	13.93056
14.13	13.47472	208.3	324.8	14.13	13.76361	207.5	328.08	14.06	13.93083

219.1	279.66	13.99	14.06	9.2	354.75	15.9	14.23333	253	321.33
219.8	280.28	13.99	14.06028	8.8	355.76	15.94	14.23361	252.6	322.15
218.7	280.9	13.99	14.06056	8.8	356.75	15.96	14.23389	253	322.98
218.4	281.53	13.99	14.06111	9.2	357.77	15.98	14.23444	253.3	323.81
217.3	282.17	13.99	14.06139	9.2	358.74	15.98	14.23472	253.3	324.67
219.8	282.8	13.98	14.06167	9.5	359.74	15.99	14.235	253	325.5
218.7	283.4	13.98	14.06194	9.5	361.74	16.01	14.23528	253.3	326.32
218.7	284.02	14.01	14.06222	9.9	362.74	16.01	14.23556	253.3	327.14
217.3	284.63	14.01	14.0625	9.9	363.73	16.03	14.23583	253	327.97
216.6	285.89	14.01	14.06278	9.9	364.73	16.03	14.23611	252.6	328.81
214.8	286.52	14.03	14.06333	9.9	365.73	16.04	14.23667	251.9	330.48
214.8	287.15	14.05	14.06361	9.5	366.73	16.05	14.23694	251.9	331.3
213.7	287.77	14.06	14.06389	9.2	367.73	16.06	14.23722	252.3	332.13
213.3	288.38	14.08	14.06417	9.2	368.73	16.07	14.2375	253	332.98
212.2	289	14.09	14.06444	9.2	369.71	16.08	14.23778	252.6	333.8
212.2	289.62	14.09	14.06472	8.8	370.71	16.08	14.23806	252.6	334.64
213	290.25	14.09	14.065	8.8	371.72	16.1	14.23833	253	335.46
211.1	290.87	14.1	14.06556	8.8	372.73	16.1	14.23889	254.1	336.29
211.9	291.49	14.09	14.06583	8.8	374.7	16.11	14.23917	253.7	337.13
211.9	292.12	14.1	14.06611	8.8	375.7	16.13	14.23944	253.3	337.96
211.5	293.35	14.1	14.06639	8.5	376.73	16.15	14.23972	253.7	338.8
211.9	293.98	14.09	14.06667	8.5	377.7	16.16	14.24	252.6	339.63
211.9	294.61	14.09	14.06694	8.5	378.69	16.17	14.24028	253	341.29
211.1	295.22	14.09	14.0675	8.5	379.69	16.2	14.24056	253.7	342.09
211.9	295.84	14.09	14.06778	8.5	380.16	16.2	14.24111	254.4	342.91
211.9	296.47	14.09	14.06806					256.6	343.73
211.1	297.1	14.09	14.06833					257.7	344.56
210.8	297.72	14.09	14.06861					249	345.39
211.5	298.35	14.09	14.06889					224.5	346.22
211.1	298.96	14.09	14.06917					213	347.05
211.9	299.57	14.09	14.06944					204.3	347.89
211.1	300.2	14.09	14.07					203.9	348.74
210.1	300.82	14.1	14.07028					170	349.56
209.7	302.09	14.1	14.07056					158.1	350.37
209.3	302.7	14.11	14.07083					118.8	351.2
209.7	303.3	14.1	14.07111					86.7	352.9
209.3	303.93	14.11	14.07139					52.1	353.73
207.9	304.55	14.11	14.07167					42.7	354.52
207.5	305.18	14.11	14.07194					25.1	355.37
209	305.82	14.11	14.0725					21.1	356.2
209.7	306.45	14.11	14.07278					16	357.05
207.2	307.05	14.11	14.07306					13.2	357.88
206.8	307.66	14.13	14.07333					12.1	358.7
206.8	308.29	14.14	14.07361					11.3	359.53
205.7	308.9	14.14	14.07389					11	360.36
205	309.54	14.15	14.07417					10.6	361.2
205.7	310.8	14.15	14.07472					11	362.87
205.7	311.41	14.15	14.075					11	363.69
205.4	312.03	14.15	14.07528					11	364.52
206.5	312.64	14.15	14.07556					10.6	365.36
206.8	313.27	14.14	14.07583					11	366.18
207.2	313.89	14.14	14.07611					10.6	367.03
207.2	314.49	14.14	14.07667					10.3	367.86
207.2	315.1	14.14	14.07694					10.3	368.7
206.8	315.71	14.14	14.07722					10.3	369.51
206.5	316.33	14.14	14.0775					9.5	370.35
206.8	316.95	14.14	14.07778					9.5	371.18
206.8	318.19	14.14	14.07806					9.5	372.04
206.5	318.82	14.14	14.07833					9.2	373.69
206.8	319.43	14.14	14.07889					9.2	374.51
207.5	320.07	14.14	14.07917					9.5	375.35
206.8	320.7	14.14	14.07944					9.2	376.19

13.59	14.34111	256.6	319.83	13.54	14.47833	256.6	328.05	13.51	14.61111
13.59	14.34139	255.9	321.49	13.54	14.47861	256.6	328.94	13.52	14.61167
13.59	14.34167	256.6	322.3	13.54	14.47889	256.2	329.83	13.53	14.61194
13.58	14.34194	256.6	323.12	13.53	14.47944	255.9	330.69	13.53	14.61222
13.58	14.34222	256.6	323.95	13.53	14.47972	255.5	331.55	13.53	14.6125
13.58	14.34278	256.6	324.8	13.53	14.48	256.6	332.44	13.53	14.61278
13.58	14.34306	256.6	325.61	13.53	14.48028	256.6	334.21	13.53	14.61306
13.56	14.34333	256.2	326.44	13.53	14.48056	256.6	335.07	13.53	14.61333
13.56	14.34361	256.6	327.25	13.53	14.48083	256.2	335.93	13.52	14.61389
13.58	14.34389	255.9	328.09	13.52	14.48111	257	336.81	13.52	14.61417
13.59	14.34417	255.5	328.92	13.53	14.48167	257	337.69	13.52	14.61444
13.59	14.34444	255.5	329.77	13.54	14.48194	256.2	338.57	13.52	14.61472
13.59	14.345	255.1	330.57	13.54	14.48222	257	339.43	13.52	14.615
13.59	14.34528	255.5	332.22	13.54	14.4825	256.6	340.32	13.52	14.61528
13.59	14.34556	255.9	333.05	13.54	14.48278	256.6	341.19	13.52	14.61556
13.58	14.34583	256.2	333.88	13.54	14.48306	258	342.05	13.51	14.61611
13.58	14.34611	256.2	334.71	13.54	14.48333	258	342.9	13.51	14.61639
13.58	14.34639	256.2	335.52	13.53	14.48389	258.4	343.76	13.5	14.61667
13.57	14.34667	255.9	336.35	13.53	14.48417	258.4	345.5	13.5	14.61694
13.57	14.34722	255.5	337.18	13.54	14.48444	254.4	346.38	13.53	14.61722
13.57	14.3475	255.1	338.01	13.54	14.48472	249	347.25	13.59	14.6175
13.57	14.34778	254.8	338.84	13.54	14.485	237.8	348.14	13.68	14.61778
13.57	14.34806	255.9	339.67	13.54	14.48528	236	349.02	13.77	14.61833
13.56	14.34833	256.2	340.48	13.54	14.48556	235.7	349.89	13.81	14.61861
13.56	14.34861	255.9	341.32	13.53	14.48583	196.7	350.75	13.95	14.61889
13.54	14.34889	256.6	342.11	13.53	14.48639	174	351.62	14.17	14.61917
13.54	14.34944	258	343.74	13.53	14.48667	134.7	352.51	14.42	14.61944
13.57	14.34972	258.4	344.56	13.51	14.48694	126	353.4	14.65	14.61972
13.73	14.35	258.4	345.39	13.5	14.48722	93.6	354.26	14.85	14.62
13.89	14.35028	248.7	346.2	13.54	14.4875	85.6	355.12	15.02	14.62028
14.07	14.35056	247.2	347.04	13.61	14.48778	69.8	356	15.16	14.62083
14.19	14.35083	227.7	347.85	13.77	14.48806	61.5	357.77	15.25	14.62111
14.35	14.35111	230.3	348.71	13.9	14.48861	41.6	358.63	15.34	14.62139
14.52	14.35167	225.6	349.53	13.97	14.48889	31.5	359.51	15.43	14.62167
14.73	14.35194	187.7	350.35	14.02	14.48917	25.4	360.39	15.51	14.62194
15	14.35222	159.2	351.16	14.31	14.48944	21.1	361.26	15.55	14.62222
15.27	14.3525	117.7	352	14.61	14.48972	18.6	362.14	15.58	14.6225
15.49	14.35278	102.6	352.84	14.87	14.49	16.8	363.01	15.62	14.62306
15.61	14.35306	90.7	354.48	15.07	14.49028	15.3	363.89	15.65	14.62333
15.71	14.35333	73	355.31	15.22	14.49083	15.3	364.76	15.66	14.62361
15.79	14.35389	43.4	356.13	15.36	14.49111	14.6	365.64	15.65	14.62389
15.82	14.35417	41.3	356.97	15.48	14.49139	13.5	366.5	15.65	14.62417
15.85	14.35444	25.4	357.8	15.55	14.49167	13.2	367.4	15.67	14.62444
15.86	14.35472	19.6	358.61	15.63	14.49194	13.2	369.14	15.68	14.62472
15.88	14.355	17.5	359.44	15.68	14.49222	12.4	370	15.69	14.62528
15.9	14.35528	15.3	360.27	15.71	14.4925	12.4	370.87	15.7	14.62556
15.91	14.35556	14.6	361.1	15.74	14.49306	12.1	371.76	15.7	14.62583
15.93	14.35611	13.2	361.91	15.76	14.49333	12.1	372.64	15.72	14.62611
15.93	14.35639	12.8	362.76	15.77	14.49361	12.1	373.5	15.74	14.62639
15.93	14.35667	12.4	363.58	15.78	14.49389	12.1	374.36	15.74	14.62667
15.92	14.35694	12.1	365.23	15.79	14.49417	12.4	375.25	15.75	14.62694
15.92	14.35722	12.1	366.06	15.79	14.49444	12.4	376.12	15.75	14.6275
15.94	14.3575	12.1	366.89	15.79	14.49472	13.2	377.02	15.75	14.62778
15.94	14.35778	11.3	367.72	15.79	14.49528	14.6	377.87	15.74	14.62806
15.94	14.35833	11	368.55	15.81	14.49556	15.7	378.75	15.74	14.62833
15.96	14.35861	11	369.37	15.82	14.49583	15.7	379.62	15.73	14.62861
15.97	14.35889	10.6	370.19	15.83	14.49611	16	380.1	15.72	14.62889
15.98	14.35917	10.3	371.02	15.84	14.49639				
15.99	14.35944	10.3	371.87	15.85	14.49667				
16	14.35972	10.3	372.7	15.84	14.49694				
16.01	14.36	10.3	373.52	15.86	14.4975				
16.03	14.36056	10.3	374.33	15.87	14.49778				

283.6	307.44	13.59	9.466111	284.4	325.45	13.56	9.795556	282.9	304.64
284	308.02	13.6	9.466389	284.4	326.07	13.56	9.795833	282.9	305.2
283.6	308.6	13.6	9.466667	284.4	326.69	13.56	9.796111	282.9	305.78
284	309.19	13.6	9.466944	284.7	327.33	13.56	9.796389	283.3	306.35
283.6	309.78	13.6	9.467222	284.4	327.96	13.56	9.796667	283.3	306.89
284.4	310.36	13.6	9.4675	284.7	328.61	13.55	9.796944	283.3	307.45
284	310.96	13.6	9.468056	283.3	329.25	13.55	9.797222	283.6	308
284.4	311.53	13.6	9.468333	283.3	329.9	13.56	9.797778	283.3	309.12
284.4	312.1	13.6	9.468611	284.4	330.52	13.55	9.798056	282.9	309.68
284.4	312.68	13.6	9.468889	284.7	331.15	13.55	9.798333	283.3	310.25
284	313.27	13.6	9.469167	285.1	332.43	13.55	9.798611	283.6	310.81
284	314.41	13.6	9.469444	285.1	333.07	13.54	9.798889	283.6	311.37
284	314.99	13.6	9.469722	285.4	333.71	13.54	9.799167	283.6	311.92
284.4	315.56	13.6	9.47	285.1	334.35	13.54	9.799722	283.3	312.48
284.4	316.14	13.59	9.470556	285.8	334.99	13.54	9.8	283.6	313.03
284.4	316.71	13.59	9.470833	286.2	335.61	13.54	9.800278	283.3	313.59
284.4	317.29	13.59	9.471111	286.2	336.25	13.54	9.800556	283.3	314.15
284	317.88	13.59	9.471389	286.5	336.89	13.54	9.800833	283.6	314.69
284.7	318.45	13.59	9.471667	286.2	337.53	13.54	9.801111	283.6	315.79
284.4	319.04	13.59	9.471944	286.9	338.16	13.54	9.801389	283.3	316.34
284.4	319.61	13.59	9.472222	287.2	338.81	13.54	9.801667	283.6	316.89
284.7	320.22	13.59	9.4725	287.6	339.44	13.54	9.802222	283.6	317.47
284	320.8	13.59	9.473056	288.3	340.71	13.54	9.8025	283.6	318.02
284.4	321.38	13.59	9.473333	287.6	341.35	13.54	9.802778	283.6	318.57
284.4	321.95	13.59	9.473611	287.6	341.96	13.54	9.803056	283.6	319.14
284	322.54	13.59	9.473889	288.3	342.59	13.54	9.803333	283.6	319.69
283.6	323.7	13.59	9.474167	288.3	343.21	13.54	9.803611	283.6	320.27
284	324.28	13.59	9.474444	288.3	343.84	13.54	9.803889	282.9	320.83
284	324.88	13.59	9.474722	288.3	344.49	13.54	9.804444	283.3	321.39
284.4	325.47	13.59	9.475	288.3	345.12	13.54	9.804722	283.3	321.94
284	326.04	13.59	9.475556	288.3	345.75	13.56	9.805	283.3	322.49
284	326.61	13.59	9.475833	288	346.38	13.56	9.805278	283.6	323.61
284	327.19	13.59	9.476111	286.9	347.02	13.58	9.805556	283.3	324.17
284.4	327.76	13.59	9.476389	285.4	347.66	13.61	9.805833	283.3	324.74
284.7	328.35	13.59	9.476667	286.2	348.96	13.63	9.806389	283.6	325.32
284	328.94	13.58	9.476944	286.2	349.59	13.64	9.806667	283.6	325.87
284	329.54	13.58	9.477222	284.4	350.21	13.65	9.806944	283.6	326.42
284	330.12	13.58	9.477778	280.4	350.85	13.65	9.807222	284	326.97
285.1	330.69	13.58	9.478056	275.7	351.48	13.66	9.8075	284	327.52
285.8	331.85	13.58	9.478333	270.7	352.13	13.68	9.807778	283.6	328.09
285.8	332.42	13.58	9.478611	258	352.78	13.71	9.808056	283.6	328.64
286.2	333.02	13.58	9.478889	256.2	353.42	13.73	9.808333	283.3	329.22
286.5	333.6	13.58	9.479167	251.9	354.05	13.75	9.808889	283.3	330.35
286.5	334.19	13.57	9.479444	249.7	354.68	13.76	9.809167	284	330.89
286.5	334.77	13.57	9.48	240.4	355.31	13.78	9.809444	284	331.44
286.9	335.33	13.57	9.480278	240.4	355.95	13.78	9.809722	284	332
286.9	335.92	13.58	9.480556	241.4	357.24	13.78	9.81	284	332.56
287.2	336.5	13.57	9.480833	236	357.88	13.79	9.810278	284.4	333.13
287.2	337.09	13.57	9.481111	225.9	358.52	13.81	9.810556	284.4	333.7
287.6	337.68	13.57	9.481389	219.1	359.14	13.82	9.811111	284.4	334.26
288	338.25	13.56	9.481667	215.8	359.78	13.83	9.811389	284.4	334.82
288.3	339.43	13.56	9.481944	214	360.42	13.84	9.811667	284.7	335.37
288.3	340	13.56	9.4825	206.1	361.07	13.85	9.811944	284.7	335.92
289.1	340.58	13.56	9.482778	201.4	361.7	13.86	9.812222	284.7	336.48
288.7	341.16	13.56	9.483056	196.7	362.34	13.87	9.8125	285.1	337.61
288.3	341.74	13.56	9.483333	197.1	362.98	13.88	9.812778	285.1	338.16
288.7	342.3	13.56	9.483611	194.2	363.62	13.88	9.813056	285.4	338.73
289.1	342.87	13.57	9.483889	193.5	364.26	13.89	9.813611	285.4	339.29
289.4	343.45	13.56	9.484167	188.8	364.9	13.89	9.813889	285.8	339.84
289.4	344.02	13.57	9.484722	182.7	366.16	13.9	9.814167	285.8	340.4
289.4	344.61	13.58	9.485	180.5	366.8	13.9	9.814444	285.1	340.96
289.4	345.19	13.59	9.485278	177.6	367.45	13.91	9.814722	285.1	341.51

13.53	10.10111	282.9	318.05	13.53	10.41917	280.4	337.14	13.53	10.58278
13.53	10.10139	282.9	318.69	13.53	10.41944	280	337.81	13.53	10.58306
13.53	10.10194	283.3	319.32	13.53	10.42	280	338.5	13.52	10.58333
13.54	10.10222	283.3	320.6	13.53	10.42028	280.8	339.87	13.53	10.58361
13.54	10.1025	282.6	321.24	13.53	10.42056	280.8	340.54	13.53	10.58389
13.54	10.10278	282.9	321.86	13.53	10.42083	280.8	341.23	13.53	10.58444
13.54	10.10306	282.6	322.49	13.53	10.42111	280.8	341.89	13.52	10.58472
13.54	10.10333	282.9	323.11	13.53	10.42139	281.1	342.56	13.51	10.585
13.54	10.10361	282.9	323.75	13.53	10.42167	281.5	343.22	13.52	10.58528
13.54	10.10417	282.6	324.38	13.53	10.42222	281.1	343.91	13.53	10.58556
13.54	10.10444	282.9	325.02	13.53	10.4225	281.5	344.59	13.52	10.58583
13.54	10.10472	282.9	325.66	13.53	10.42278	281.1	345.26	13.53	10.58611
13.54	10.105	282.9	326.28	13.53	10.42306	281.8	345.94	13.54	10.58639
13.54	10.10528	282.9	326.9	13.53	10.42333	280	346.62	13.55	10.58694
13.54	10.10556	282.9	327.54	13.53	10.42361	278.6	347.3	13.58	10.58722
13.54	10.10583	282.6	328.17	13.53	10.42389	279.3	347.99	13.6	10.5875
13.54	10.10639	282.6	329.46	13.53	10.42444	281.5	348.69	13.61	10.58778
13.54	10.10667	282.9	330.09	13.53	10.42472	282.2	349.37	13.61	10.58806
13.54	10.10694	283.3	330.7	13.53	10.425	279	350.71	13.62	10.58833
13.54	10.10722	283.3	331.33	13.53	10.42528	271.4	351.4	13.64	10.58861
13.54	10.1075	283.3	331.95	13.53	10.42556	263.8	352.08	13.66	10.58889
13.54	10.10778	283.3	332.59	13.53	10.42583	260.2	352.78	13.68	10.58944
13.54	10.10806	283.6	333.23	13.52	10.42611	257.7	353.47	13.69	10.58972
13.54	10.10861	283.6	333.86	13.53	10.42667	253	354.14	13.71	10.59
13.54	10.10889	283.6	334.5	13.53	10.42694	247.9	354.81	13.73	10.59028
13.54	10.10917	283.6	335.13	13.52	10.42722	246.1	355.5	13.74	10.59056
13.54	10.10944	284	335.75	13.53	10.4275	244.3	356.18	13.75	10.59083
13.54	10.10972	283.6	337.02	13.52	10.42778	242.2	356.87	13.75	10.59111
13.54	10.11	284	337.65	13.53	10.42806	235.7	357.56	13.77	10.59139
13.54	10.11028	284	338.27	13.53	10.42833	228.8	358.25	13.79	10.59194
13.54	10.11083	284.4	338.91	13.52	10.42889	227.4	358.92	13.79	10.59222
13.54	10.11111	284.4	339.55	13.52	10.42917	224.1	359.6	13.8	10.5925
13.54	10.11139	284.4	340.17	13.52	10.42944	214.4	360.28	13.82	10.59278
13.54	10.11167	284	340.81	13.52	10.42972	206.5	361.65	13.83	10.59306
13.54	10.11194	284.4	341.43	13.52	10.43	202.5	362.34	13.84	10.59333
13.54	10.11222	284.4	342.05	13.52	10.43028	196.7	363.03	13.85	10.59361
13.54	10.1125	284.4	342.66	13.51	10.43056	194.2	363.69	13.86	10.59389
13.54	10.11306	284.7	343.28	13.51	10.43111	189.5	364.39	13.87	10.59444
13.54	10.11333	284.7	343.91	13.51	10.43139	189.5	365.08	13.87	10.59472
13.54	10.11361	284.4	345.18	13.52	10.43167	185.2	365.75	13.88	10.595
13.53	10.11389	285.1	345.8	13.54	10.43194	180.5	366.43	13.89	10.59528
13.54	10.11417	285.1	346.43	13.54	10.43222	175.1	367.12	13.89	10.59556
13.54	10.11444	284.4	347.06	13.54	10.4325	172.2	367.82	13.9	10.59583
13.54	10.11472	284	347.69	13.56	10.43278	171.1	368.5	13.9	10.59611
13.54	10.11528	284.4	348.34	13.58	10.43333	167.9	369.18	13.9	10.59667
13.53	10.11556	283.6	348.98	13.61	10.43361	165.3	370.54	13.91	10.59694
13.53	10.11583	284.4	349.6	13.61	10.43389	163.5	371.22	13.91	10.59722
13.53	10.11611	281.5	350.22	13.63	10.43417	162.1	371.93	13.92	10.5975
13.53	10.11639	277.1	350.85	13.64	10.43444	161.4	372.62	13.92	10.59778
13.53	10.11667	273.5	351.48	13.65	10.43472	159.6	373.28	13.92	10.59806
13.53	10.11694	271	352.12	13.66	10.435	156.7	373.96	13.92	10.59833
13.53	10.1175	261.3	353.41	13.69	10.43556	154.9	374.63	13.93	10.59861
13.53	10.11778	254.4	354.02	13.71	10.43583	154.2	375.32	13.94	10.59917
13.53	10.11806	252.6	354.64	13.73	10.43611	152.7	376.01	13.94	10.59944
13.53	10.11833	250.5	355.27	13.74	10.43639	152	376.72	13.94	10.59972
13.53	10.11861	249.4	355.9	13.75	10.43667	150.6	377.39	13.95	10.6
13.53	10.11889	245.4	356.55	13.75	10.43694	147.7	378.07	13.95	10.60028
13.53	10.11917	234.6	357.18	13.77	10.43722	147.7	378.74	13.95	10.60056
13.53	10.11972	232.4	357.82	13.79	10.43778	145.9	379.43	13.96	10.60083
13.53	10.12	225.9	358.45	13.8	10.43806	146.2	380.21	13.96	10.60139
13.53	10.12028	222.7	359.07	13.81	10.43833				
13.52	10.12056	219.8	359.7	13.82	10.43861				

277.9	296.16	13.51	10.93528	277.1	316.84	13.52	11.29694	277.5	328.81
277.9	296.7	13.51	10.93556	277.1	317.45	13.52	11.29722	277.5	329.47
277.9	297.22	13.51	10.93583	277.1	318.07	13.51	11.2975	277.5	330.12
277.9	297.74	13.51	10.93611	277.1	318.67	13.52	11.29778	276.8	330.76
277.9	298.27	13.51	10.93639	277.1	319.29	13.52	11.29833	277.5	331.4
277.9	299.31	13.51	10.93694	276.8	319.9	13.52	11.29861	277.1	332.05
277.9	299.83	13.51	10.93722	277.1	320.53	13.51	11.29889	277.1	332.71
278.2	300.35	13.51	10.9375	276.8	321.13	13.51	11.29917	277.1	334.03
277.1	300.88	13.51	10.93778	276.8	321.75	13.51	11.29944	277.1	334.68
277.1	301.42	13.51	10.93806	276.8	322.35	13.51	11.29972	277.1	335.32
277.5	301.95	13.51	10.93833	277.1	322.96	13.51	11.3	277.5	335.96
277.5	302.47	13.51	10.93861	276.8	323.57	13.51	11.30028	277.1	336.62
277.5	302.98	13.51	10.93917	277.1	324.18	13.51	11.30083	276.8	337.27
277.9	303.51	13.51	10.93944	276.8	325.43	13.51	11.30111	276.8	337.93
278.2	304.02	13.51	10.93972	276.8	326.03	13.51	11.30139	276.4	338.57
277.9	305.08	13.51	10.94	276.8	326.64	13.51	11.30167	276.8	339.24
277.9	305.6	13.51	10.94028	276.8	327.24	13.51	11.30194	276.8	339.88
277.5	306.14	13.51	10.94056	276.8	327.84	13.51	11.30222	276.8	340.53
277.5	306.67	13.51	10.94083	276.8	328.46	13.51	11.3025	276.4	341.18
277.9	307.18	13.52	10.94139	276.4	329.08	13.51	11.30278	277.1	342.45
277.9	307.7	13.52	10.94167	276.8	329.71	13.51	11.30333	277.1	343.07
277.9	308.21	13.52	10.94194	276.4	330.31	13.52	11.30361	277.1	343.73
277.9	308.74	13.53	10.94222	276.4	330.91	13.52	11.30389	277.1	344.38
277.9	309.27	13.53	10.9425	276.8	331.51	13.51	11.30417	277.5	345.04
277.5	309.8	13.53	10.94278	277.1	332.13	13.51	11.30444	277.9	345.68
278.2	310.33	13.53	10.94333	276.8	332.74	13.51	11.30472	277.9	346.33
277.9	310.85	13.53	10.94361	276.8	333.37	13.51	11.305	276.4	346.97
277.9	311.89	13.53	10.94389	276.8	333.98	13.51	11.30556	276.4	347.63
277.9	312.41	13.53	10.94417	277.1	335.19	13.51	11.30583	275.3	348.3
277.9	312.93	13.53	10.94444	276.8	335.8	13.51	11.30611	275.7	348.96
277.9	313.46	13.53	10.94472	276.8	336.41	13.51	11.30639	276.1	350.24
277.9	313.98	13.53	10.945	277.5	337.02	13.51	11.30667	273.5	350.89
277.9	314.49	13.53	10.94528	277.5	337.64	13.51	11.30694	272.5	351.54
277.9	315.01	13.52	10.94583	277.1	338.24	13.51	11.30722	271.7	352.19
277.9	315.53	13.52	10.94611	277.5	338.87	13.51	11.30778	266	352.87
277.9	316.05	13.52	10.94639	277.5	339.48	13.51	11.30806	257.7	353.52
277.9	316.56	13.52	10.94667	277.5	340.09	13.51	11.30833	256.6	354.16
277.9	317.08	13.52	10.94694	277.1	340.69	13.51	11.30861	253	354.79
277.9	317.61	13.52	10.94722	277.1	341.31	13.51	11.30889	246.1	355.45
277.9	318.66	13.52	10.9475	277.1	342.5	13.51	11.30917	244.7	356.1
277.9	319.18	13.52	10.94806	277.9	343.09	13.51	11.30944	241.8	356.77
277.9	319.7	13.52	10.94833	277.9	343.71	13.51	11.31	235.3	357.42
277.9	320.24	13.52	10.94861	277.5	344.32	13.5	11.31028	230.3	358.72
277.9	320.76	13.52	10.94889	278.2	344.93	13.51	11.31056	226.3	359.37
277.5	321.29	13.52	10.94917	278.2	345.53	13.52	11.31083	223.4	360.02
277.9	321.81	13.52	10.94944	278.2	346.15	13.53	11.31111	218.7	360.68
277.5	322.33	13.52	10.94972	277.9	346.75	13.54	11.31139	212.2	361.33
277.9	322.85	13.52	10.95028	277.5	347.36	13.56	11.31167	209	361.98
277.9	323.37	13.52	10.95056	275	347.98	13.59	11.31222	205	362.64
277.5	323.89	13.52	10.95083	275.3	348.61	13.6	11.3125	200.7	363.29
277.5	324.43	13.52	10.95111	276.4	349.22	13.6	11.31278	196.7	363.93
277.9	325.5	13.52	10.95139	277.9	350.42	13.6	11.31306	191	364.6
277.9	326.01	13.52	10.95167	271	351.03	13.61	11.31333	189.2	365.24
277.9	326.53	13.52	10.95194	264.9	351.64	13.64	11.31361	189.2	366.54
277.5	327.04	13.52	10.9525	266	352.26	13.65	11.31389	187.7	367.2
277.5	327.57	13.52	10.95278	264.5	352.9	13.66	11.31444	183	367.85
277.5	328.09	13.52	10.95306	259.5	353.5	13.67	11.31472	180.1	368.51
277.5	328.62	13.52	10.95333	256.2	354.1	13.68	11.315	176.5	369.16
277.5	329.15	13.52	10.95361	250.8	354.7	13.7	11.31528	169.7	369.8
277.5	329.69	13.52	10.95389	245.4	355.32	13.72	11.31556	174.4	370.46
277.5	330.21	13.52	10.95417	236.4	355.93	13.74	11.31583	174.7	371.1
277.1	330.72	13.52	10.95472	236	356.55	13.75	11.31611	170.8	371.78



13.51	11.5325	225.2	310.65	14.17	12.40778	220.5	323.47	14.09	12.66472
13.51	11.53278	224.1	311.28	14.16	12.40806	218.7	324.09	14.08	12.665
13.51	11.53306	228.5	311.89	14.15	12.40833	219.4	324.74	14.07	12.66528
13.51	11.53333	229.2	312.52	14.14	12.40861	221.6	325.37	14.08	12.66556
13.51	11.53389	231.3	313.14	14.13	12.40889	220.5	325.98	14.07	12.66611
13.51	11.53417	231.3	313.78	14.11	12.40917	223.1	326.6	14.07	12.66639
13.51	11.53444	232.4	314.38	14.09	12.40944	219.1	327.22	14.06	12.66667
13.51	11.53472	232.8	314.99	14.08	12.41	222.7	327.85	14.06	12.66694
13.51	11.535	233.9	315.61	14.07	12.41028	225.2	328.48	14.05	12.66722
13.51	11.53528	235	316.85	14.06	12.41056	214.4	329.11	14.06	12.6675
13.51	11.53583	234.2	317.49	14.04	12.41083	211.5	329.75	14.11	12.66778
13.51	11.53611	234.6	318.11	14.03	12.41111	207.9	330.98	14.15	12.66833
13.51	11.53639	235	318.72	14.02	12.41139	207.2	331.61	14.18	12.66861
13.51	11.53667	236.4	319.35	14.02	12.41167	205.4	332.23	14.19	12.66889
13.51	11.53694	237.1	319.98	14.01	12.41222	203.2	332.87	14.21	12.66917
13.51	11.53722	235.7	320.62	14	12.4125	203.6	333.49	14.23	12.66944
13.51	11.5375	236.8	321.24	13.99	12.41278	205.4	334.13	14.23	12.66972
13.51	11.53806	236.4	321.87	13.99	12.41306	208.6	334.75	14.21	12.67028
13.51	11.53833	235.7	322.48	13.99	12.41333	213	335.37	14.19	12.67056
13.51	11.53861	235.3	323.11	13.99	12.41361	214	335.99	14.16	12.67083
13.51	11.53889	234.2	323.73	13.99	12.41389	212.2	336.62	14.15	12.67111
13.51	11.53917	235.3	325	13.99	12.41444	209.3	337.25	14.16	12.67139
13.51	11.53944	235.7	325.64	13.98	12.41472	206.1	338.5	14.18	12.67167
13.51	11.53972	237.1	326.24	13.97	12.415	205	339.14	14.19	12.67194
13.52	11.54028	238.6	326.86	13.95	12.41528	205.4	339.75	14.21	12.6725
13.53	11.54056	239.3	327.48	13.93	12.41556	210.8	340.38	14.2	12.67278
13.56	11.54083	237.5	328.12	13.9	12.41583	212.6	341.01	14.18	12.67306
13.58	11.54111	231	328.75	13.91	12.41611	210.8	341.62	14.15	12.67333
13.59	11.54139	226.3	329.4	13.97	12.41667	209	342.23	14.16	12.67361
13.6	11.54167	224.1	330.02	14.01	12.41694	215.8	342.84	14.14	12.67389
13.6	11.54194	223.1	330.64	14.02	12.41722	210.8	343.46	14.14	12.67444
13.61	11.5425	224.9	331.25	14.01	12.4175	233.1	344.09	14.08	12.67472
13.61	11.54278	224.9	331.88	14	12.41778	210.4	344.71	14.09	12.675
13.62	11.54306	226.7	333.14	13.99	12.41806	173.6	345.96	14.34	12.67528
13.63	11.54333	228.1	333.76	13.97	12.41833	144.1	346.58	14.57	12.67556
13.66	11.54361	227.4	334.4	13.96	12.41889	86	347.21	14.97	12.67583
13.68	11.54389	227	335.01	13.95	12.41917	58.2	347.83	15.27	12.67611
13.7	11.54417	228.5	335.63	13.95	12.41944	62.9	348.48	15.39	12.67667
13.71	11.54472	229.9	336.25	13.94	12.41972	57.2	349.11	15.48	12.67694
13.73	11.545	228.1	336.89	13.93	12.42	46.7	349.73	15.52	12.67722
13.73	11.54528	229.5	337.52	13.93	12.42028	33.7	350.34	15.54	12.6775
13.75	11.54556	230.3	338.14	13.92	12.42056	10.6	350.97	15.62	12.67778
13.77	11.54583	229.9	338.77	13.91	12.42083	8.5	351.59	15.72	12.67806
13.78	11.54611	229.9	339.4	13.9	12.42139	7.7	352.87	15.78	12.67833
13.78	11.54667	229.2	340.02	13.9	12.42167	7.4	353.49	15.81	12.67889
13.8	11.54694	225.9	340.65	13.9	12.42194	7.4	354.11	15.83	12.67917
13.8	11.54722	232.1	341.27	13.91	12.42222	7	354.72	15.85	12.67944
13.82	11.5475	227.4	342.49	13.9	12.4225	7	355.35	15.86	12.67972
13.83	11.54778	227.7	343.1	13.89	12.42278	7	355.98	15.87	12.68
13.83	11.54806	239.6	343.72	13.88	12.42306	7	356.62	15.89	12.68028
13.85	11.54833	250.8	344.36	13.83	12.42361	7	357.24	15.9	12.68083
13.85	11.54889	241.8	344.97	13.83	12.42389	7	357.88	15.91	12.68111
13.86	11.54917	219.1	345.6	13.85	12.42417	7	358.5	15.92	12.68139
13.86	11.54944	156.7	346.22	14.08	12.42444	7	359.12	15.93	12.68167
13.87	11.54972	127.1	346.85	14.37	12.42472	7	359.74	15.94	12.68194
13.87	11.55	112.7	347.47	14.55	12.425	7	361.01	15.95	12.68222
13.87	11.55028	118.5	348.11	14.65	12.42528	7	361.63	15.96	12.6825
13.88	11.55056	97.2	348.75	14.72	12.42556	7.4	362.26	15.96	12.68306
13.89	11.55111	122.4	349.37	14.77	12.42611	7	362.89	15.97	12.68333
13.89	11.55139	84.9	349.98	14.81	12.42639	7	363.51	15.98	12.68361
13.89	11.55167	62.9	351.22	14.9	12.42667	7	364.14	15.99	12.68389
13.89	11.55194	61.1	351.86	14.97	12.42694	7	364.77	15.99	12.68417

51	347.95	15.58	13.0025	211.1	330.33	14.14	13.27167	211.5	322.3
46.7	348.28	15.63	13.00278	210.1	331.64	14.16	13.27222	211.1	322.91
36.2	348.93	15.69	13.00306	210.1	332.3	14.18	13.2725	212.6	323.53
28.7	349.25	15.73	13.00333	208.6	332.97	14.18	13.27278	213	324.16
33	349.56	15.74	13.00361	205.7	333.63	14.19	13.27306	214.4	324.8
39.8	349.88	15.69	13.00389	205	334.29	14.2	13.27333	211.9	326.05
53.9	350.2	15.64	13.00417	205.4	334.95	14.21	13.27361	209.7	326.67
51.4	350.52	15.63	13.00472	206.1	335.61	14.22	13.27389	217.3	327.29
28.3	350.83	15.65	13.005	205	336.26	14.21	13.27417	215.1	327.92
15.7	351.16	15.77	13.00528	207.9	336.93	14.21	13.27472	209.3	328.54
11	351.48	15.85	13.00556	205.4	337.59	14.21	13.275	203.6	329.19
9.5	351.8	15.87	13.00583	204.7	338.25	14.21	13.27528	202.9	329.81
8.8	352.12	15.9	13.00611	210.8	338.92	14.19	13.27556	204.7	330.44
8.8	352.45	15.91	13.00639	210.4	339.59	14.16	13.27583	203.9	331.04
7.7	353.11	15.93	13.00694	210.8	340.9	14.17	13.27611	204.3	331.67
7.7	353.43	15.94	13.00722	213	341.55	14.15	13.27639	204.7	332.3
7.7	353.75	15.93	13.0075	213.7	342.2	14.14	13.27694	206.1	332.93
7.4	354.07	15.93	13.00778	205	342.84	14.14	13.27722	206.1	333.55
7.4	354.38	15.94	13.00806	222	343.49	14.12	13.2775	206.5	334.81
7.4	354.7	15.95	13.00833	241.8	344.16	14.03	13.27778	205	335.43
7.4	355.01	15.96	13.00889	210.1	344.82	13.9	13.27806	205	336.05
7.4	355.33	15.96	13.00917	143.7	345.47	14.21	13.27833	204.7	336.68
7.4	355.65	15.95	13.00944	153.1	346.13	14.45	13.27861	201.8	337.31
7.4	355.98	15.95	13.00972	89.6	346.79	14.79	13.27917	196.7	337.94
7.4	356.63	15.96	13.01	48.5	347.45	15.21	13.27944	194.6	338.56
7.4	356.96	15.97	13.01028	46.7	348.12	15.48	13.27972	195.6	339.19
7.4	357.27	15.98	13.01056	57.5	349.44	15.58	13.28	197.8	339.81
7.4	357.6	15.99	13.01111	32.6	350.09	15.64	13.28028	199.6	340.43
7.4	357.92	15.99	13.01139	25.4	350.75	15.75	13.28056	203.2	341.06
7.4	358.25	15.99	13.01167	9.5	351.41	15.8	13.28083	193.5	341.68
7.4	358.56	15.99	13.01194	8.1	352.08	15.87	13.28139	198.5	342.28
7.4	358.88	15.99	13.01222	7.7	352.75	15.91	13.28167	203.9	343.52
7.4	359.19	15.99	13.0125	7.4	353.42	15.93	13.28194	215.8	344.15
7.4	359.52	15.99	13.01306	7.4	354.07	15.94	13.28222	211.1	344.77
7.4	359.84	16	13.01333	7.4	354.72	15.95	13.2825	184.1	345.39
7.4	360.49	16	13.01361	7.4	355.38	15.96	13.28278	132.5	346.01
7.4	360.81	16.01	13.01389	7.4	356.04	15.97	13.28306	135.1	346.64
7.4	361.14	16.01	13.01417	7.4	356.72	15.98	13.28361	76.6	347.26
7	361.45	16.02	13.01444	7.4	358.04	15.98	13.28389	66.9	347.89
7.4	361.77	16.03	13.01472	7.4	358.69	15.98	13.28417	73.4	348.53
7.4	362.09	16.03	13.015	7.4	359.35	15.98	13.28444	35.5	349.17
7.4	362.43	16.02	13.01556	7.4	360.01	15.99	13.28472	51.7	349.78
7.4	362.75	16.03	13.01583	7.4	360.69	15.99	13.285	30.5	350.4
7.4	363.15	16.03	13.01611	7.4	361.34	15.99	13.28528	10.3	351.65
7.4	363.65	16.03	13.01639	7.4	362.01	16	13.28583	8.8	352.27
7.4	364.69	16.03	13.01667	7.4	362.67	16	13.28611	8.1	352.93
7	365.2	16.03	13.01694	7.4	363.34	16.01	13.28639	7.7	353.55
7.4	365.73	16.04	13.0175	7.4	363.99	16.01	13.28667	7.7	354.16
7	366.24	16.04	13.01778	7.4	364.65	16.02	13.28694	7.7	354.78
7.4	366.76	16.05	13.01806	7.4	365.31	16.03	13.28722	7.4	355.4
7.4	367.29	16.05	13.01833	7.4	366.63	16.03	13.2875	7.7	356.03
7.4	367.82	16.05	13.01861	7.4	367.3	16.04	13.28806	7.7	356.67
7.4	368.33	16.06	13.01889	7.4	367.97	16.05	13.28833	7.7	357.29
7	368.85	16.06	13.01944	7.4	368.63	16.05	13.28861	7.7	357.93
7.4	369.36	16.06	13.01972	7.4	369.29	16.05	13.28889	7.4	358.55
7.4	370.39	16.06	13.02	7.4	369.94	16.06	13.28917	7.4	359.79
7.4	370.91	16.07	13.02028	7.4	370.61	16.07	13.28944	7.4	360.43
7	371.44	16.07	13.02056	7.4	371.27	16.08	13.28972	7.4	361.05
7.4	371.97	16.07	13.02083	7.4	371.95	16.08	13.29028	7.4	361.68
7	372.51	16.08	13.02139	7.4	372.62	16.09	13.29056	7.7	362.31
7	373.01	16.09	13.02167	7.4	373.27	16.09	13.29083	7.7	362.94
7	373.53	16.1	13.02194	7.4	373.92	16.1	13.29111	7.7	363.56

14.13	13.475	209	325.45	14.12	13.76389	200.7	328.73	14.11	13.93139
14.14	13.47528	208.6	326.09	14.12	13.76444	196.7	329.41	14.17	13.93167
14.14	13.47556	209.3	326.72	14.11	13.76472	197.4	330.05	14.22	13.93194
14.13	13.47583	213.3	327.37	14.09	13.765	196	331.33	14.24	13.93222
14.12	13.47611	209.7	328.01	14.06	13.76528	195.6	331.99	14.25	13.9325
14.12	13.47639	198.2	329.33	14.09	13.76556	196.7	332.64	14.25	13.93278
14.13	13.47694	196.4	329.98	14.18	13.76583	195.3	333.31	14.25	13.93306
14.13	13.47722	197.1	330.61	14.22	13.76611	193.8	333.96	14.26	13.93361
14.09	13.4775	194.9	331.25	14.25	13.76639	192.8	334.61	14.27	13.93389
14.07	13.47778	193.5	331.89	14.26	13.76694	191.7	335.25	14.28	13.93417
14.13	13.47806	194.9	332.55	14.26	13.76722	192.4	335.9	14.3	13.93444
14.19	13.47833	197.4	333.2	14.26	13.7675	196.4	336.55	14.28	13.93472
14.21	13.47861	198.9	333.85	14.24	13.76778	200.3	337.21	14.26	13.935
14.22	13.47917	200.7	334.5	14.23	13.76806	201.1	337.87	14.23	13.93528
14.22	13.47944	199.2	335.14	14.21	13.76833	196	338.51	14.22	13.93583
14.22	13.47972	198.5	335.78	14.21	13.76861	196.7	339.18	14.24	13.93611
14.22	13.48	197.8	336.42	14.22	13.76889	195.3	340.47	14.25	13.93639
14.21	13.48028	193.1	337.08	14.24	13.76944	191.3	341.12	14.26	13.93667
14.21	13.48056	192.4	338.37	14.26	13.76972	189.2	341.76	14.28	13.93694
14.2	13.48083	191.7	339.02	14.28	13.77	200.7	342.39	14.26	13.93722
14.21	13.48139	197.4	339.67	14.26	13.77028	184.5	343.03	14.23	13.9375
14.21	13.48167	196.7	340.3	14.24	13.77056	195.3	343.68	14.3	13.93778
14.22	13.48194	190.6	340.96	14.23	13.77083	214.4	344.34	14.21	13.93833
14.25	13.48222	196	341.58	14.26	13.77111	152	344.99	14.21	13.93861
14.28	13.4825	197.8	342.22	14.23	13.77167	161.7	345.63	14.5	13.93889
14.29	13.48278	198.9	342.85	14.22	13.77194	104.8	346.29	14.83	13.93917
14.28	13.48306	214.8	343.49	14.19	13.77222	61.1	346.93	15.19	13.93944
14.26	13.48333	233.9	344.14	14.09	13.7725	41.3	347.59	15.46	13.93972
14.23	13.48389	191.7	344.78	14.1	13.77278	24.3	348.92	15.66	13.94
14.22	13.48417	135.8	345.43	14.3	13.77306	20	349.56	15.77	13.94056
14.26	13.48444	163.5	346.06	14.45	13.77333	31.2	350.2	15.77	13.94083
14.25	13.48472	79.9	347.35	14.89	13.77389	16	350.85	15.82	13.94111
14.14	13.485	62.9	348.02	15.28	13.77417	9.2	351.5	15.91	13.94139
14.04	13.48528	43.8	348.68	15.52	13.77444	8.5	352.16	15.96	13.94167
14.13	13.48556	43.1	349.32	15.62	13.77472	8.1	352.83	15.99	13.94194
14.47	13.48611	42	349.95	15.68	13.775	8.1	353.49	15.99	13.94222
14.69	13.48639	18.6	350.59	15.76	13.77528	8.1	354.11	16	13.94278
15.03	13.48667	9.5	351.23	15.87	13.77556	8.1	354.77	16.01	13.94306
15.31	13.48694	8.5	351.88	15.93	13.77611	8.1	355.42	16.02	13.94333
15.45	13.48722	8.1	352.54	15.97	13.77639	8.1	356.08	16.02	13.94361
15.55	13.4875	8.1	353.2	15.98	13.77667	8.1	357.4	16.02	13.94389
15.62	13.48778	7.7	353.84	15.99	13.77694	8.1	358.05	16.03	13.94417
15.63	13.48833	7.7	354.47	16	13.77722	8.1	358.7	16.05	13.94444
15.75	13.48861	7.7	355.76	16.01	13.7775	8.1	359.34	16.05	13.945
15.84	13.48889	7.7	356.43	16.01	13.77778	8.1	360	16.05	13.94528
15.89	13.48917	7.7	357.07	16.03	13.77806	8.1	360.66	16.05	13.94556
15.91	13.48944	7.7	357.73	16.04	13.77861	8.1	361.32	16.06	13.94583
15.93	13.48972	8.1	358.37	16.04	13.77889	8.1	361.96	16.06	13.94611
15.93	13.49	7.7	359.01	16.05	13.77917	8.1	362.63	16.08	13.94639
15.94	13.49056	7.7	359.64	16.06	13.77944	8.1	363.28	16.09	13.94667
15.95	13.49083	7.7	360.31	16.06	13.77972	8.1	363.93	16.09	13.94722
15.96	13.49111	7.7	360.96	16.07	13.78	8.1	364.58	16.1	13.9475
15.96	13.49139	7.7	361.6	16.08	13.78028	8.1	365.88	16.1	13.94778
15.98	13.49167	7.7	362.26	16.08	13.78083	8.1	366.53	16.1	13.94806
15.98	13.49194	7.7	362.91	16.08	13.78111	8.1	367.2	16.11	13.94833
15.99	13.49222	7.7	363.55	16.09	13.78139	8.1	367.85	16.12	13.94861
15.99	13.49278	7.7	364.85	16.1	13.78167	8.1	368.51	16.12	13.94889
16.01	13.49306	7.7	365.49	16.1	13.78194	8.1	369.15	16.13	13.94944
16.01	13.49333	7.7	366.13	16.11	13.78222	8.1	369.81	16.13	13.94972
16.01	13.49361	7.7	366.79	16.12	13.7825	8.1	370.46	16.13	13.95
16.02	13.49389	7.7	367.43	16.13	13.78306	8.1	371.11	16.15	13.95028
16.03	13.49417	7.7	368.1	16.14	13.78333	8.1	371.78	16.15	13.95056

207.2	321.32	14.14	14.07972	9.5	377.04
207.5	321.93	14.14	14.08	9.5	377.85
206.5	322.55	14.14	14.08028	9.5	378.68
207.2	323.17	14.14	14.08056	10.3	379.38
204.7	323.79	14.14	14.08111	10.3	379.63
205	324.41	14.16	14.08139	10.3	379.83
205.7	325.06	14.16	14.08167	9.9	379.99
208.3	326.29	14.15	14.08194		
205.7	326.9	14.13	14.08222		
207.9	327.53	14.13	14.0825		
206.8	328.15	14.11	14.08278		
208.3	328.78	14.08	14.08333		
198.9	329.42	14.14	14.08361		
197.8	330.04	14.19	14.08389		
197.1	330.64	14.23	14.08417		
197.1	331.26	14.24	14.08444		
197.8	331.88	14.25	14.08472		
196.4	332.51	14.25	14.085		
197.4	333.76	14.25	14.08556		
197.1	334.39	14.25	14.08583		
195.6	335.01	14.25	14.08611		
196.4	335.62	14.26	14.08639		
196.4	336.24	14.26	14.08667		
191.3	336.86	14.26	14.08694		
190.6	337.5	14.28	14.08722		
193.8	338.11	14.29	14.08778		
196.4	338.74	14.27	14.08806		
200.7	339.36	14.24	14.08833		
200	339.97	14.21	14.08861		
196.4	340.59	14.22	14.08889		
191.3	341.82	14.22	14.08917		
198.9	342.43	14.24	14.08944		
190.2	343.04	14.23	14.09		
201.4	343.65	14.26	14.09028		
192.8	344.28	14.17	14.09056		
181.9	344.9	14.19	14.09083		
108.4	345.52	14.34	14.09111		
100.4	346.13	14.8	14.09139		
83.5	346.76	15.21	14.09167		
56.4	347.38	15.45	14.09222		
49.6	348.01	15.58	14.0925		
39.1	348.64	15.65	14.09278		
31.2	349.87	15.7	14.09306		
47.1	350.49	15.74	14.09333		
15.3	351.11	15.79	14.09361		
9.2	351.74	15.9	14.09389		
8.8	352.36	15.96	14.09444		
8.5	353.01	15.99	14.09472		
8.1	353.62	15.99	14.095		
8.1	354.24	16.01	14.09528		
8.1	354.85	16.01	14.09556		
8.1	355.46	16.03	14.09583		
8.1	356.1	16.04	14.09611		
8.1	356.72	16.05	14.09639		
8.1	357.35	16.04	14.09694		
8.1	358.6	16.04	14.09722		
8.1	359.21	16.03	14.0975		
8.1	359.84	16.05	14.09778		
8.1	360.46	16.05	14.09806		
8.1	361.09	16.05	14.09833		
8.1	361.7	16.05	14.09861		
8.1	362.34	16.06	14.09917		

16.04	14.36083	10.3	375.99	15.89	14.49806
16.06	14.36111	10.3	376.85	15.89	14.49833
16.06	14.36139	10.6	377.66	15.9	14.49861
16.04	14.36167	10.6	378.46	15.9	14.49889
16.03	14.36194	11	379.3	15.88	14.49944
16.02	14.36222	11.3	380.13	15.85	14.49972
16.01	14.36278	11.3	380.87	15.82	14.5

289.4	345.76	13.59	9.485556	177.6	368.1	13.91	9.815	285.4	342.05
289.1	346.34	13.58	9.485833	174.4	368.73	13.92	9.815278	285.8	342.6
287.2	347.51	13.61	9.486111	170.8	369.36	13.92	9.815833	285.8	343.15
288	348.1	13.63	9.486389	166.4	369.99	13.93	9.816111	286.2	343.71
283.3	348.69	13.65	9.486944	157.8	370.64	13.94	9.816389	286.2	344.27
281.8	349.28	13.67	9.487222	155.6	371.27	13.94	9.816667	286.2	345.38
283.3	349.84	13.68	9.4875	155.2	371.93	13.94	9.816944	286.2	345.94
286.2	350.41	13.67	9.487778	154.9	372.57	13.94	9.817222	286.2	346.49
280.4	351	13.68	9.488056	156.7	373.2	13.94	9.8175	284.7	347.05
276.4	351.58	13.69	9.488333	154.5	373.83	13.95	9.818056	283.3	347.61
270.7	352.17	13.71	9.488611	149.1	375.1	13.95	9.818333	284.7	348.18
260.2	352.76	13.73	9.489167	148.4	375.74	13.96	9.818611	284.7	348.76
253.7	353.36	13.75	9.489444	149.5	376.4	13.96	9.818889	283.6	349.31
246.5	353.93	13.77	9.489722	148.8	377.04	13.96	9.819167	282.2	349.86
241.4	355.08	13.78	9.49	149.5	377.67	13.96	9.819444	279	350.41
239.3	355.65	13.79	9.490278	146.6	378.29	13.97	9.819722	271.4	350.97
234.6	356.25	13.8	9.490556	144.4	378.94	13.97	9.820278	269.2	351.53
232.4	356.84	13.81	9.490833	141.2	379.57	13.97	9.820556	269.6	352.66
229.9	357.42	13.82	9.491389	142.3	380.17	13.98	9.820833	268.1	353.23
224.1	358.01	13.83	9.491667	143	380.31	13.98	9.821111	262	353.79
220.9	358.59	13.83	9.491944					257.3	354.33
217.6	359.16	13.84	9.492222					255.9	354.89
215.5	359.74	13.85	9.4925					253.7	355.45
215.1	360.33	13.85	9.492778					240.7	356.01
212.2	360.92	13.85	9.493056					233.5	356.58
204.7	361.5	13.87	9.493333					231.3	357.14
198.9	362.67	13.88	9.493889					226.7	357.71
193.5	363.26	13.89	9.494167					225.2	358.27
191	363.83	13.9	9.494444					217.6	358.82
189.2	364.42	13.9	9.494722					215.1	359.93
185.5	365	13.9	9.495					215.8	360.51
185.2	365.58	13.9	9.495278					214	361.07
182.7	366.16	13.91	9.495833					209.3	361.62
180.5	366.74	13.91	9.496111					206.5	362.18
176.9	367.34	13.92	9.496389					206.1	362.75
170.8	367.92	13.93	9.496667					203.9	363.31
165.3	368.51	13.93	9.496944					193.5	363.86
163.5	369.08	13.94	9.497222					191.7	364.43
158.1	370.24	13.94	9.4975					188.8	364.99
157.8	370.83	13.95	9.498056					184.5	365.55
159.2	371.41	13.95	9.498333					181.9	366.1
157.4	372.01	13.95	9.498611					172.9	366.66
155.6	372.61	13.95	9.498889					169	367.79
156	373.17	13.95	9.499167					166.1	368.36
149.8	373.75	13.95	9.499444					164.6	368.92
150.6	374.33	13.95	9.499722					163.5	369.47
148.4	374.91	13.95	9.500278					162.1	370.02
148	375.5	13.96	9.500556					160.7	370.59
145.9	376.1	13.97	9.500833					159.9	371.15
145.5	376.69	13.97	9.501111					157.8	371.72
144.4	377.84	13.97	9.501389					156.3	372.29
140.8	378.41	13.97	9.501667					157.4	372.86
137.9	379	13.99	9.501944					158.1	373.4
137.2	379.58	13.99	9.502222					156.7	374.51
137.9	380.18	13.99	9.502778					157.4	375.07
137.9	380.21	13.99	9.503056					156	375.64
								158.5	376.2
								150.9	376.79
								148	377.34
								150.2	377.88
								151.6	378.44
								146.6	379

13.52	10.12083	210.4	360.34	13.83	10.43889
13.51	10.12111	211.9	360.97	13.83	10.43917
13.51	10.12139	209.7	362.24	13.84	10.43944
13.51	10.12167	203.2	362.87	13.85	10.43972
13.52	10.12222	196.4	363.5	13.86	10.44028
13.53	10.12225	188.8	364.13	13.87	10.44056
13.54	10.12278	187	364.77	13.88	10.44083
13.54	10.12306	183.7	365.39	13.89	10.44111
13.57	10.12333	177.6	366.03	13.9	10.44139
13.6	10.12361	178.7	366.66	13.9	10.44167
13.61	10.12389	176.2	367.31	13.9	10.44194
13.61	10.12444	174	367.94	13.9	10.4425
13.63	10.12472	171.1	368.58	13.9	10.44278
13.64	10.125	172.9	369.2	13.9	10.44306
13.65	10.12528	173.3	369.83	13.9	10.44333
13.66	10.12556	166.4	371.09	13.91	10.44361
13.68	10.12583	165.3	371.74	13.92	10.44389
13.68	10.12611	163.9	372.39	13.92	10.44417
13.69	10.12667	160.7	373	13.92	10.44472
13.71	10.12694	161.7	373.63	13.92	10.445
13.72	10.12722	158.1	374.26	13.92	10.44528
13.73	10.1275	157.1	374.89	13.93	10.44556
13.74	10.12778	156	375.52	13.93	10.44583
13.77	10.12806	154.9	376.17	13.94	10.44611
13.78	10.12861	152	376.81	13.94	10.44639
13.8	10.12889	150.9	377.45	13.95	10.44694
13.81	10.12917	148.4	378.06	13.95	10.44722
13.82	10.12944	147	379.32	13.96	10.4475
13.83	10.12972	146.2	379.86	13.97	10.44778
13.83	10.13	146.2	379.88	13.97	10.44806
13.83	10.13028				
13.83	10.13083				
13.85	10.13111				
13.85	10.13139				
13.85	10.13167				
13.85	10.13194				
13.87	10.13222				
13.89	10.1325				
13.89	10.13278				
13.89	10.13333				
13.9	10.13361				
13.9	10.13389				
13.92	10.13417				
13.92	10.13444				
13.92	10.13472				
13.93	10.135				
13.93	10.13556				
13.93	10.13583				
13.93	10.13611				
13.94	10.13639				
13.94	10.13667				
13.94	10.13694				
13.94	10.13722				
13.94	10.13778				
13.94	10.13806				
13.94	10.13833				
13.94	10.13861				
13.95	10.13889				
13.95	10.13917				
13.96	10.13944				
13.95	10.14				
13.96	10.14028				



277.5	331.24	13.52	10.955	235	357.16	13.76	11.31667	167.9	372.44
277.9	332.29	13.52	10.95528	232.8	358.39	13.77	11.31694	165	373.09
277.5	332.82	13.51	10.95556	231.7	359	13.77	11.31722	159.2	374.36
277.9	333.35	13.51	10.95583	228.1	359.6	13.78	11.3175	157.4	375.02
277.5	333.88	13.51	10.95611	219.8	360.22	13.79	11.31778	156.7	375.68
277.9	334.4	13.51	10.95667	215.5	360.84	13.8	11.31806	155.6	376.35
277.9	334.92	13.51	10.95694	213	361.44	13.82	11.31833	155.6	377
277.9	335.44	13.51	10.95722	208.3	362.06	13.83	11.31889	154.2	377.65
278.2	335.95	13.51	10.9575	201.1	362.68	13.83	11.31917	151.6	378.28
277.9	336.48	13.51	10.95778	193.1	363.29	13.85	11.31944	153.8	378.94
277.9	337.01	13.51	10.95806	193.5	363.89	13.86	11.31972	151.6	379.57
277.9	337.54	13.51	10.95833	195.3	364.51	13.85	11.32	151.6	379.99
278.2	338.58	13.51	10.95889	190.6	365.12	13.86	11.32028	151.6	380.1
278.2	339.12	13.51	10.95917	188.4	366.34	13.87	11.32056		
278.2	339.65	13.51	10.95944	185.2	366.97	13.87	11.32111		
278.6	340.16	13.51	10.95972	183.7	367.58	13.87	11.32139		
278.6	340.69	13.51	10.96	181.6	368.2	13.88	11.32167		
278.2	341.21	13.5	10.96028	180.5	368.8	13.88	11.32194		
278.2	341.71	13.51	10.96056	178.7	369.41	13.89	11.32222		
278.6	342.23	13.51	10.96111	173.3	370.02	13.89	11.3225		
278.6	342.74	13.5	10.96139	171.5	370.62	13.89	11.32278		
279	343.25	13.5	10.96167	169.3	371.25	13.89	11.32333		
279	343.78	13.51	10.96194	162.1	371.87	13.9	11.32361		
278.6	344.83	13.51	10.96222	161.7	372.5	13.9	11.32389		
279	345.36	13.51	10.9625	159.2	373.09	13.92	11.32417		
279	345.87	13.53	10.96278	158.5	374.3	13.92	11.32444		
279	346.4	13.53	10.96333	158.5	374.92	13.92	11.32472		
278.6	346.91	13.54	10.96361	156.3	375.53	13.92	11.325		
278.6	347.44	13.57	10.96389	155.2	376.16	13.92	11.32556		
277.9	347.97	13.59	10.96417	156.3	376.79	13.93	11.32583		
278.6	348.51	13.6	10.96444	153.8	377.4	13.93	11.32611		
279.3	349.04	13.6	10.96472	152	377.99	13.94	11.32639		
279	349.55	13.6	10.965	150.6	378.59	13.94	11.32667		
277.9	350.06	13.61	10.96556	150.9	379.11	13.95	11.32694		
273.2	351.11	13.63	10.96583	150.2	379.63	13.95	11.32722		
270.7	351.63	13.63	10.96611	150.2	380.07	13.95	11.32778		
270.3	352.17	13.64	10.96639	150.2	380.21	13.95	11.32806		
262.7	352.7	13.66	10.96667						
258.4	353.24	13.68	10.96694						
255.9	353.76	13.7	10.9675						
253.7	354.26	13.71	10.96778						
252.6	354.78	13.72	10.96806						
249	355.3	13.73	10.96833						
242.5	355.83	13.74	10.96861						
240.7	356.37	13.75	10.96889						
236.4	357.42	13.77	10.96917						
231.3	357.95	13.77	10.96972						
230.6	358.47	13.78	10.97						
229.2	358.99	13.78	10.97028						
224.5	359.51	13.79	10.97056						
220.5	360.04	13.8	10.97083						
216.9	360.56	13.81	10.97111						
213	361.1	13.82	10.97139						
209.7	361.62	13.83	10.97194						
207.2	362.13	13.83	10.97222						
194.2	362.67	13.85	10.9725						
193.1	363.19	13.86	10.97278						
194.2	364.24	13.86	10.97306						
194.2	364.77	13.86	10.97333						
194.2	365.29	13.87	10.97389						
190.2	365.82	13.87	10.97417						
187	366.34	13.87	10.97444						

13.89	11.55222	54.3	352.49	15.01	12.42722	7	365.39	16	12.68444
13.9	11.5525	49.2	353.13	15.05	12.4275	7	366.01	16.02	12.68472
13.9	11.55278	46.7	353.76	15.08	12.42778	7	366.65	16.03	12.68528
13.92	11.55333	44.9	354.37	15.12	12.42833	7	367.28	16.03	12.68556
13.92	11.55361	39.1	354.99	15.15	12.42861	7	368.54	16.04	12.68583
13.92	11.55389	35.2	355.62	15.2	12.42889	7	369.17	16.04	12.68611
13.92	11.55417	32.6	356.24	15.25	12.42917	7	369.78	16.05	12.68639
13.93	11.55444	26.9	356.89	15.29	12.42944	7	370.41	16.05	12.68667
13.94	11.55472	24.3	357.51	15.35	12.42972	7	371.03	16.06	12.68722
13.94	11.555	20.7	358.14	15.4	12.43	7	371.68	16.06	12.6875
13.94	11.55556	20	359.38	15.43	12.43056	7	372.32	16.07	12.68778
13.94	11.55583	16.4	360	15.46	12.43083	7	372.94	16.08	12.68806
13.94	11.55611	16	360.64	15.5	12.43111	7	373.55	16.08	12.68833
		13.5	361.26	15.53	12.43139	7	374.18	16.08	12.68861
		11	361.88	15.58	12.43167	7	374.8	16.08	12.68889
		9.5	362.52	15.64	12.43194	7	376.07	16.09	12.68944
		9.9	363.15	15.67	12.43222	7	376.72	16.09	12.68972
		9.2	363.77	15.69	12.4325	7	377.33	16.09	12.69
		7.7	364.39	15.73	12.43306	7	377.95	16.1	12.69028
		7.7	365.02	15.75	12.43333	7	378.57	16.1	12.69056
		7.7	365.64	15.76	12.43361	7	379.2	16.1	12.69083
		7.4	366.27	15.79	12.43389	7	379.83	16.1	12.69111
		7	366.9	15.81	12.43417	7	380.09	16.1	12.69167
		7	367.54	15.82	12.43444				
		7	368.78	15.85	12.43472				
		7	369.4	15.86	12.43528				
		7	370.03	15.87	12.43556				
		7	370.65	15.89	12.43583				
		6.7	371.28	15.89	12.43611				
		6.7	371.92	15.9	12.43639				
		6.7	372.56	15.9	12.43667				
		6.7	373.17	15.9	12.43694				
		6.7	373.79	15.89	12.4375				
		6.7	374.41	15.91	12.43778				
		7	375.04	15.91	12.43806				
		6.7	375.67	15.92	12.43833				
		6.7	376.94	15.93	12.43861				
		6.7	377.55	15.94	12.43889				
		7	378.17	15.94	12.43917				
		7	378.79	15.94	12.43972				
		6.7	379.42	15.94	12.44				
		6.7	380.03	15.95	12.44028				
		6.7	380.18	15.95	12.44056				

7.4	374.03	16.1	13.02222	7.4	375.24	16.11	13.29139	7.7	364.19
7.4	374.55	16.11	13.0225	7.4	375.9	16.12	13.29167	7.4	364.82
7.4	375.07	16.11	13.02278	7.4	376.59	16.13	13.29194	7.4	365.43
7.4	375.6	16.12	13.02306	7.4	377.25	16.13	13.2925	7.4	366.06
7.4	376.67	16.13	13.02361	7.4	377.9	16.14	13.29278	7.4	366.68
7.4	377.18	16.13	13.02389	7.4	378.56	16.14	13.29306	7.4	367.33
7.4	377.68	16.14	13.02417	7.4	379.21	16.14	13.29333	7.4	368.58
7.4	378.2	16.15	13.02444	7.4	379.85	16.15	13.29361	7.7	369.2
7.4	378.71	16.15	13.02472	7.4	380.06	16.15	13.29389	7.7	369.82
7.4	379.24	16.15	13.025					7.7	370.44
7.4	379.76	16.15	13.02528					7.7	371.08
7.4	380.19	16.15	13.02583					7.7	371.71
								7.7	372.36
								7.7	372.97
								7.7	373.59
								7.7	374.21
								7.7	374.84
								7.7	376.11
								7.4	376.74
								7.7	377.37
								7.7	377.98
								7.7	378.6
								7.7	379.23
								7.7	379.84
								7.7	379.99

16.03	13.49444	7.7	368.74	16.15	13.78361	8.1	372.45	16.15	13.95083
16.03	13.495	7.7	369.38	16.15	13.78389	8.1	373.09	16.15	13.95111
16.05	13.49528	7.7	370.03	16.16	13.78417	8.1	374.38	16.16	13.95167
16.06	13.49556	7.7	370.67	16.16	13.78444	8.1	375.03	16.17	13.95194
16.06	13.49583	7.7	371.32	16.17	13.78472	8.1	375.69	16.17	13.95222
16.06	13.49611	7.7	371.99	16.17	13.78528	8.1	376.36	16.17	13.9525
16.07	13.49639	8.1	373.28	16.18	13.78556	8.1	377.02	16.18	13.95278
16.08	13.49667	8.1	373.91	16.19	13.78583	8.1	377.66	16.18	13.95306
16.09	13.49722	8.1	374.55	16.2	13.78611	8.1	378.31	16.19	13.95333
16.08	13.4975	8.1	375.21	16.19	13.78639	8.1	378.96	16.19	13.95389
16.08	13.49778	8.1	375.86	16.19	13.78667	8.1	379.62	16.2	13.95417
16.08	13.49806	8.1	376.53	16.2	13.78694	8.1	380.22	16.2	13.95444
16.1	13.49833	8.1	377.17	16.22	13.7875	8.1	380.26	16.2	13.95472
16.11	13.49861	8.1	377.81	16.22	13.78778				
16.12	13.49889	8.1	378.45	16.23	13.78806				
16.13	13.49944	8.1	379.1	16.23	13.78833				
16.13	13.49972	8.1	379.75	16.23	13.78861				
16.13	13.5	8.1	380.16	16.23	13.78889				
16.14	13.50028								
16.15	13.50056								
16.15	13.50083								
16.15	13.50111								
16.16	13.50167								
16.16	13.50194								
16.16	13.50222								

8.1	362.96	16.08	14.09944
8.1	363.58	16.08	14.09972
8.1	364.2	16.08	14.1
8.1	364.82	16.09	14.10028
8.1	365.44	16.1	14.10056
8.1	366.06	16.1	14.10083
8.1	367.32	16.1	14.10111
8.1	367.95	16.11	14.10167
8.1	368.57	16.11	14.10194
8.1	369.19	16.12	14.10222
8.1	369.8	16.12	14.1025
8.1	370.43	16.13	14.10278
8.1	371.04	16.13	14.10306
8.1	371.68	16.14	14.10333
8.5	372.32	16.15	14.10389
8.5	372.94	16.15	14.10417
8.5	373.55	16.16	14.10444
8.5	374.17	16.17	14.10472
8.5	374.78	16.17	14.105
8.5	376.05	16.18	14.10528
8.5	376.69	16.19	14.10556
8.5	377.3	16.2	14.10611
8.8	377.92	16.2	14.10639
8.5	378.53	16.2	14.10667
8.5	379.16	16.21	14.10694
8.5	379.79	16.21	14.10722
8.8	380.42	16.21	14.1075
8.5	381.02	16.21	14.10778



144.8	379.51
144.8	379.82
144.8	379.85



13.97	10.14056
13.97	10.14083
13.97	10.14111

182.7	366.87	13.88	10.97472
176.2	367.4	13.89	10.975
174.4	367.94	13.89	10.97528
172.9	368.45	13.89	10.97556
172.9	368.98	13.9	10.97583
172.2	369.49	13.9	10.97639
169.3	370.54	13.9	10.97667
167.9	371.06	13.9	10.97694
165.7	371.6	13.9	10.97722
165	372.14	13.91	10.9775
164.6	372.67	13.91	10.97778
163.9	373.18	13.91	10.97833
161	373.7	13.91	10.97861
158.9	374.22	13.92	10.97889
158.1	374.75	13.92	10.97917
154.9	375.27	13.93	10.97944
153.8	375.81	13.94	10.97972
154.2	376.34	13.94	10.98
154.2	377.4	13.94	10.98056
154.5	377.9	13.94	10.98083
153.1	378.43	13.94	10.98111
150.9	378.95	13.95	10.98139
149.1	379.48	13.95	10.98167
150.2	380	13.95	10.98194
150.2	380.17	13.95	10.98222



# WELL DEVELOPMENT LOG

Project Name: Atlas Site 4 - DG1  
 Site Name: Atlas D Missile Site 4 - Cheyenne, WY  
 Development Date: 7-14-21/7-15-21

Project No.: 60613342  
 Field Crew: J. KINKADE  
 Weather: 72°F Partly Cloudy, Breezy  
1 hr. after heavy rain (7-14-21)

Analytical Instruments: pH: Hanna 98494  
 Temp: " "  
 D.O.: " "

Specific Conductivity: Hanna 98494  
 ORP: " "  
 Turbidity: LaMotte 2020 wle

Well ID: MW54B-Temp  
 Casing Stickup: 2.5 ft.  
 Static Water Level: 157.78' bTOC  
 Well Depth/Diameter: 209' / 4" bTOC

Type of Well: Temporary Well

## CASING VOLUME CALCULATION

(TD(ft) - DTW(ft)) x gal/ft = 1 casing volume (gals)  
(209 - 157.78) x 0.65 = 33.3 gal

Time	Casing Volumes	Gallons Removed	Diss. Oxygen (mg/l)	ORP (mV)	Temp (°C)	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	PWL (ft TOC)
1747	Pump set @ 175'	bTOC		11 gal./min					
1752		55	4.17	-133.5	10.55	7.44	285	39.7	
1757		110	4.62	-120.7	10.52	7.43	285	8.60	
1802		165	4.76	-119.0	10.47	7.58	285	4.10	
1807		220	4.86	-115.6	10.44	7.68	285	2.24	
1809	Pump off	242							
7-15-21 0817	Pump on @ 185'	bTOC		11 gal./min					
0827		352	4.95	-79.9	10.47	7.27	282	0.80	
0837		462	5.11	-73.1	10.48	7.37	282	0.58	
0847		572	5.20	-63.9	10.47	7.40	282	0.60	
0849	Pump off	594							
0851	Pump on @ 195'	bTOC		11 gal./min					
0901		704	5.42	-13.7	10.42	7.39	282	1.49	
0911		814	5.46	-5.2	10.42	7.36	282	1.02	
0921		924	5.48	0.1	10.42	7.40	282	0.63	
0924	COLLECTED SAMPLE FEW4-MW54B-Temp								
0925	Pump off	968							
0929	Pump on @ 200'	bTOC		11 gal./min					
0939		1078	5.50	6.8	10.41	7.42	280	0.81	
0949		1188	5.53	10.6	10.37	7.43	282	0.50	
0951	Pump off	1210							

DEVELOPMENT COMPLETE

JWK

Development Equipment: Drill Rig with 10' stainless steel bailer (~5 gal.), 3/4" Grundfos Pump

Comments: Drill Rig bailed ~250 gal. over 2 hrs. on 7-13-21, using 10' stainless steel bailer

Signature(s): J. Kinkade

## WELL DEVELOPMENT LOG

Pg. 1 of 2

Project Name: Atlas Site 4 - DGI  
 Site Name: Atlas D Missile Site 4 - Cheyenne, WY  
 Development Date: 7-12-21 / 7-13-21

Project No.: 60613342  
 Field Crew: JWK, BS, HG  
 Weather: 80°F Sunny Breezy

Analytical Instruments: pH: Hanna 98494  
 Temp: " "  
 D.O.: " "

Specific Conductivity: Hanna 98494  
 ORP: " "  
 Turbidity: LaMotte 2020 we

Well ID: MW 105 - Temp

Type of Well: Temporary well

Casing Stickup: \_\_\_\_\_

## CASING VOLUME CALCULATION

Static Water Level: 75.97 (measured 7-13-21) bTOC

(TD(ft) - DTW(ft)) x \_\_\_\_\_ gal/ft = 1 casing volume (gals)

Well Depth/Diameter: 185' / 4" bgs

$(185 - 75.97) \times 0.65 = 70.87 \text{ gal}$

	Time	Casing Volumes	Gallons Removed	Diss. Oxygen (mg/l)	ORP (mV)	Temp (°C)	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	PWL (ft TOC)
12-21	1555	Pump on	Pump set @ 120' bgs			purge rate 11 gal/min				
	1603		88	3.7628.1	-255.0	10.53	7.76	304	opaque brown	
	1608		143	8.61	-136.3	10.66	7.54	311	cloudy	
	1613		198	9.25	-127.6	10.56	7.59	312	206	
	1623		308	9.94	-115.7	10.43	7.61	315	168	
	1633		418	10.16	-113.0	10.43	7.61	316	743	
	1643		528	10.32	-106.7	10.33	7.59	317	107.8	
	1645	Pump off	550							
13-21	1024	Pump on @ 135' bgs								
	1034		660	4.44	-188.7	10.05	7.50	320	1559	JWK 133
	1044		770	8.50	-113.1	10.24	7.39	322	83.3	WL Meter malfunction
	1054		880	9.38	-94.8	10.23	7.34	322	44.2	
	1056	pump off	902							
	1058	Pump on @ 150' bgs								
	1108		1012	6.45	-96.5	9.86	7.37	322	1009	
	1118		1122	6.69	-72.4	9.84	7.38	323	70	
	1128		1232	7.67	-71.7	9.72	7.38	323	19.4	
	1130	Pump off	1254							
	1133	Pump on @ 165' bgs								
	1143		1364	6.83	-61.7	9.82	7.30	324	44.1	

CONT.

CONT.

Development Equipment: Drill Rig with 10' stainless steel bailer (5 gal.), 3ft. GRUNDFOS PUMP

Comments: \_\_\_\_\_

Signature(s): JWK

# WELL DEVELOPMENT LOG

Pg. 2 of 2

Project Name: Atlas Site 4 - DGI  
 Site Name: Atlas D Missile Site 4 - Cheyenne, WY  
 Development Date: 7-12-21 / 7-13-21

Project No.: 60613392  
 Field Crew: JWK, HG, BS  
 Weather: 70-80°F Partly Cloudy, Breezy

Analytical Instruments: pH: Hanna 98494  
 Temp: " "  
 D.O.: " "

Specific Conductivity: Hanna 98494  
 ORP: " "  
 Turbidity: LaMotte 2020 we

Well ID: MW 105-Temp

Type of Well: Temporary Well

Casing Stickup: \_\_\_\_\_

## CASING VOLUME CALCULATION

Static Water Level: 75.97 (measured 7-13-21) bTOC

(TD(ft) - DTW(ft)) x \_\_\_\_\_ gal/ft = 1 casing volume (gals)

Well Depth/Diameter: 185' / 4" bgs

70.87

Time	Casing Volumes	Gallons Removed	Diss. Oxygen (mg/l)	ORP (mV)	Temp (°C)	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	PWL (ft TOC)
CONT.									
1150		1441	6.87	-52.3	9.82	7.33	324	29.9	
1151	Pump off	1452							
1528	Pump on @	175' bgs	11 gal./min						
1538		1562	7.25	-119.4	9.69	7.60	325	80.6	
1545	COLLECTED SAMPLE FEW4-MW105-Temp								
	3x40mL VOA/8260 C/HK142								
1548		1672	6.91	-71.3	9.62	7.56	326	18.9	
1550	Pump off	1694							
DEVELOPMENT COMPLETE									

Development Equipment: Drill Rig with 10' Stainless Steel bailer (~5 gal.);  
3ft. GRONPOS PUMP

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Signature(s): JWK



# WELL DEVELOPMENT LOG

Pg. 1 of 2

Project Name: Atlas Site 4 ~~ST Addendum~~ DGI  
 Site Name: Atlas D Missile Site 4 - Cheyenne, WY  
 Development Date: 7/9/21 - 7/10/21

Project No.: ~~E15-019-201~~ 60613342  
 Field Crew: JKINKADE, JM, DG, JH, HG  
 Weather: 60-90°F Sunny, Breezy

Analytical Instruments: pH: Hanna 98494  
 Temp: " "  
 D.O.: " "

Specific Conductivity: Hanna 98494  
 ORP: " "  
 Turbidity: LaMotte 2020 we

Well ID: MW107-TEMP.  
 Casing Stickup: 2' 4"  
 Static Water Level:   
 Well Depth/Diameter: 380' / 4"

Type of Well: Temporary Well  
 CASING VOLUME CALCULATION  
 (TD(ft) - DTW(ft)) x gal/ft = 1 casing volume (gals)

Time	Casing Volumes	Gallons Removed	Diss. Oxygen (mg/l)	ORP (mV)	Temp (°C)	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	PWL (ft TOC)
1557	Begin pumping								
1602		55	6.74	53.2	13.47	7.23	294	mostly clear	
1607		110	6.68	61.4	12.45	7.62	289		
1612		165	6.60	74.3	12.22	7.55	289		
1614									
7-10-21 1111	Begin pumping @ 190' bTOC				11 gal./min				
1121		275	6.47	63.6	12.77	7.60	290	1.18	
1131		385	6.49	63.3	12.61	7.66	289	0.40	
1134	Pump off	418							
1145	Pump on @ 215' bTOC				11 gal./min				
1155		528	6.47	86.7	12.80	7.13	289	1.16	
1205		638	6.46	69.5	12.51	7.52	288	0.45	
1207	Pump off	660							
1220	Pump on @ 240' bTOC				11 gal./min				
1230		770	6.41	76.7	12.96	7.42	288	1.13	
1240		880	6.41	79.4	12.93	7.44	288	0.79	
1242	Pump off	902							
1308	Pump on @ 265' bTOC				11 gal./min				
1318		1012	6.45	77.2	12.90	7.49	288	0.58	
1328		1122	6.47	75.7	12.86	7.46	289	0.89	

1330 Pump off 1144  
 CONT. →

CONT. →

Development Equipment: Drill Rig with 10' Stainless Steel bailer (~5 gal.), 3ft. GROUNDFOSS PUMP

Comments: Bailed with drill rig for 3 hrs (~300 gal.) on 7-1-21 & 7-7-21

Signature(s): JKINKADE

## WELL DEVELOPMENT LOG

Pg. 2 of 2

Project Name: Atlas Site 4 DG1  
 Site Name: Atlas D Missile Site 4 - Cheyenne, WY  
 Development Date: 7-10-21 / 7-11-21

Project No.: 60613342  
 Field Crew: J. KINKADE, JM, DG, JH  
 Weather: \_\_\_\_\_

Analytical Instruments: pH: Hanna 98494  
 Temp: " "  
 D.O: " "

Specific Conductivity: Hanna 98494  
 ORP: " "  
 Turbidity: LaMotte 2020 we

Well ID: MW107-Temp  
 Casing Stickup: 2'4"  
 Static Water Level: \_\_\_\_\_  
 Well Depth/Diameter: 380' / 4"

Type of Well: TEMPORARY WELL

## CASING VOLUME CALCULATION

(TD(ft) - DTW(ft)) x \_\_\_\_\_ gal/ft = 1 casing volume (gals)

CONT.  
7-10-21

Time	Casing Volumes	Gallons Removed	Diss. Oxygen (mg/l)	ORP (mV)	Temp (°C)	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	PWL (ft TOC)
1422	Pump on	@ 290'	bTOC	- 11 gal./min					
1432		1254	6.49	71.9	12.94	7.39	289	0.87	
1434	Pump off	1276							
1440	Pump on	@ 315'	bTOC	- 11 gal./min					
1450		1386	6.46	67.1	12.64	7.44	288	1.00	
1452	Pump off	1408							
1651	Pump on	@ 340'	bTOC	- 11 gal./min					
1701		1518	6.46	76.8	12.72	7.45	288	1.75	
1711		1628	6.51	72.2	12.49	7.55	289	0.68	
1714	Collected sample	FEW4-MW107-Temp							
1716	Pump off	1683							
7/11/21	1042	Pump on @ 360'	TOC	pumping at 11 gpm					
1052		1793	6.44	72.57	12.92	7.33	281	0.37	
1102	Pump off	1903	6.49	59.0	12.71	7.45	282	0.81	
1225	Pump on @ 370'	TOC		11 gpm					
1235		2013	6.47	68.3	13.13	7.54	285	2.28	
1245		2123	6.57	68.3	12.80	7.44	286	1.77	
1246	Pump off	- Development of temp well complete							

Development Equipment: Drill Rig with 10' Stainless Steel Bailer (5gal.)

Comments: Bailed with Drill Rig for 3 hrs (~300 gal.) on 7-1-21 & 7-7-21

Signature(s):

J. Kinkade









Facility: B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study  
 Event: FE Warren Site 4 FS DGI  
 SDG: 93276  
 Guidance Document: F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2  
 Prime Contractor: URS Group, Inc.  
 Project Manager: Robert Mallisee  
 Contract Laboratory(ies): Agriculture & Priority Pollutants Laboratories, Inc., Clovis, CA  
 Data Review Contractor: URS Group, Inc.  
 Data Review Level: S2BVEM  
 Primary Data Reviewer: Gary Torf, Project Chemist  
 Date Submitted: March 22, 2021

Field Sample ID	Lab Sample ID	Matrix Type/Type Code	SW8260C
FEW4-MW104-TEMP	BA17794	Water Field Sample/N	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at S2BVEM data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the F.E. Warren Atlas Site 4 - Draft Final LT & PM UFP-QAPP Addendum 1 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by URS Group, Inc.; analyses were performed by Agriculture & Priority Pollutants Laboratories, Inc., Clovis, CA and were reported under sample delivery group (SDG) 93276. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

Blank - Negative

Extracted Internal Standard

## Data Validation Report for 93276

Lab Blank  
LCS Recovery  
LCS RPD  
Prep Hold Time  
Surrogate  
Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 51 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

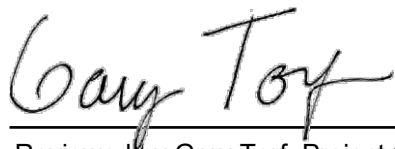
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Analytical Method	Data Reviewer Comment
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SW8260C	No additional comments; see Checklist for detail.
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March 22, 2021

Reviewed by Gary Torf, Project Chemist, URS Group, Inc.

As the Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

## Data Validation Report for 93276

No Outliers were associated with this sample delivery group.

### Qualified Results

No results associated with this sample delivery group required qualification.

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### Trace Results

No results associated with this sample delivery group are considered trace.

---

### Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

---

### Reason Code Definitions

Code	Definition
TR	Trace Level Detect

---

### Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

## Data Validation Report for 93276

J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

## Data Validation Report for 93276

### Review Questions

Method: SW8260C (Volatile Organic Compounds by GC/MS)

Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			Cooler at receipt was 5.0° C
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the GC/MS system properly tuned based on method criteria?	•			
Was instrument tuning completed every 12 hours during sample analysis?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?		•		Zeus 0908Z13.D: Bromomethane 35% difference was greater than the 20% limit. The analyte was not detected in any associated samples.
Were CCVs run at the required frequency and within acceptance criteria?	•			
Were internal standard retention times and area criteria within method requirements?	•			
Were internal standards spiked for every sample, standard, and QC sample?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than DL?	•			
Were target analytes in the field blank less than DL?			•	A field blank was not collected with this SDG.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		Matrix spike duplicate samples were not collected with this SDG.
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
Was the laboratory duplicate RPD within project acceptance limits?			•	A laboratory duplicate sample was not analyzed with this SDG.

## Data Validation Report for 93276

Were surrogate recoveries within project acceptance limits?	•	
Were all reported analytes within established retention time windows?	•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•	Field duplicate samples were not collected with this SDG.
Were QAPP specified laboratory PQLs achieved?	•	
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•	
Were DoD QSM corrective actions followed if deviations were noted?	•	
Were any data recommended for rejection (exclusion) in the data validation process?	•	



**Automated Data Review Detail Report for 93276**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2

**US Army Corps  
of Engineers®****Sample Summary**

Location	Field Sample ID	Date	Time	Sample Type	Matrix	SBD	SED	SW8260C
FEW4-MW104	FEW4-MW104-TEMP	09-02-2020	1037	N	WG	0.00	0.00	X
Total								1

**Batch Report**

Test Method: SW8260C      Analysis Batch: 257203

Location	Matrix	Field Sample ID	Lab Sample ID	Calibration Run#/ Ref	Dil'n	Collection Date/Time	Extraction Date/Time	Analysis Date/Time	Prep/Leach Batch	Sample Type
LABQC	WQ	BS-Z200909AW-257203	BS-Z200909AW257203		1/1	9/9/2020 09:07	9/9/2020 09:07	9/9/2020 09:07	257203/	BS
LABQC	WQ	BD-Z200909AW-257203	BD-Z200909AW257203		1/1	9/9/2020 09:31	9/9/2020 09:31	9/9/2020 09:31	257203/	BD
LABQC	WQ	LB-Z200909AW-257203	LB-Z200909AW257203		1/1	9/9/2020 09:54	9/9/2020 09:54	9/9/2020 09:54	257203/	LB
FEW4-MW104	WG	FEW4-MW104-TEMP	BA17794		1/1	9/2/2020 10:37	9/9/2020 17:40	9/9/2020 17:40	257203/	N

**Field Batch Report**

--No Records Found--

MS Mismatch Report  
--No Records Found--

Section to identify Matrix Spike mismatches where parent sample differs from MS by dilution.

QC Outliers Report  
--No Records Found--

Qualified Results  
--No Records Found--

Detected Results

Test Method: SW8260C      Extraction Method: SW5030      Leach Method: NONE

FieldSample ID	LabSample ID	Matrix	Type	Dilution	Analyte	LOQ	Lab Result	Qualified Result	Units	Reason
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FEW4-MW104-TEMP	BA17794	W	N	1	Trichloroethene (TCE)	1.00	4.20	4.20	ug/l
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## Automated Data Review Detail Report for 93276

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2



**US Army Corps  
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### Rejected Results

--No Records Found--

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Facility: B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study  
 Event: FE Warren Site 4 FS Pilot Studies  
 SDG: 93432  
 Guidance Document: F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2  
 Prime Contractor: URS Group, Inc.  
 Project Manager: Robert Mallisee  
 Contract Laboratory(ies): Agriculture & Priority Pollutants Laboratories, Inc., Clovis, CA  
 Data Review Contractor: URS Group, Inc.  
 Data Review Level: S2BVEM  
 Primary Data Reviewer: January 14or, Project  
 Date Submitted: remist  
 , 2021

Field Sample ID	Lab Sample ID	Matrix Type/Type Code	SW8260C
FEW4-IDW-EFF-PT-3	BA18747	Water Field Sample/N	X
FEW4-IDW-INT-PT-3	BA18748	Water Field Sample/N	X
FEW4-MW106-TEMP-1	BA18749	Water Field Sample/N	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at S2BVEM data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the F.E. Warren Atlas Site 4 - Draft Final LT & PM UFP-QAPP Addendum 2 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by URS Group, Inc.; analyses were performed by Agriculture & Priority Pollutants Laboratories, Inc., Clovis, CA and were reported under sample delivery group (SDG) 93432. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

## Data Validation Report for 93432

Blank - Negative

Lab Blank

LCS Recovery

LCS RPD

Prep Hold Time

Surrogate

Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 153 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

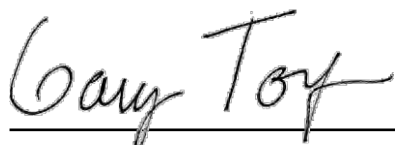
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Analytical Method	Data Reviewer Comment
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SW8260C	No additional comments; see Checklist for detail.
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January 14, 2021

Reviewed by Gary Torf, Project Chemist, URS Group, Inc.

As the Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

## Data Validation Report for 93432

No Outliers were associated with this sample delivery group.

### Qualified Results

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

## Data Validation Report for 93432

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J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
---	--

---

No results associated with this sample delivery group required qualification.

---

### Trace Results

No results associated with this sample delivery group are considered trace.

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### Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

---

### Reason Code Definitions

Code	Definition
------	------------

TR	Trace Level Detect
----	--------------------

---

### Flag Code and Definitions

R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
---	---

B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
---	--

UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
----	--

X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.
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## Data Validation Report for 93432

### Review Questions

Method: SW8260C (Volatile Organic Compounds by GC/MS)

Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			Cooler at receipt was 5.0° C
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the GC/MS system properly tuned based on method criteria?	•			
Was instrument tuning completed every 12 hours during sample analysis?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?		•		Thor Ending 0929T49.D: Bromomethane 69% difference was greater than the 50% limit. The analyte was not detected in any associated samples.
Were internal standard retention times and area criteria within method requirements?	•			
Were internal standards spiked for every sample, standard, and QC sample?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than DL?	•			
Were target analytes in the field blank less than DL?			•	A field blank was not collected with this SDG.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		Matrix spike duplicate samples were not collected with this SDG.
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
Was the laboratory duplicate RPD within project acceptance limits?			•	A laboratory duplicate was not analyzed with this SDG.

## Data Validation Report for 93432

Were surrogate recoveries within project acceptance limits?	.	
Were all reported analytes within established retention time windows?	.	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	.	Field duplicate samples were not collected with this SDG.
Were QAPP specified laboratory PQLs achieved?	.	
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	.	
Were DoD QSM corrective actions followed if deviations were noted?	.	
Were any data rejected during the verification process?	.	

**Automated Data Review Detail Report for 93432**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2

**US Army Corps  
of Engineers®****Sample Summary**

								SW8260C
Location	Field Sample ID	Date	Time	Sample Type	Matrix	SBD	SED	
FEW4-IDW-EFF	FEW4-IDW-EFF-PT-3	09-18-2020	1002	N	WW	0.00	0.00	
FEW4-IDW-INT	FEW4-IDW-INT-PT-3	09-18-2020	0958	N	WW	0.00	0.00	
FEW4-MW106	FEW4-MW106-TEMP-1	09-18-2020	0918	N	WG	0.00	0.00	
Total 3								

**Batch Report**

Test Method: SW8260C      Analysis Batch: 257240

Location	Matrix	Field Sample ID	Lab Sample ID	Calibration Ref	Run#/ Dil'n	Collection Date/Time	Extraction Date/Time	Analysis Date/Time	Prep/Leach Batch	Sample Type
LABQC	WQ	BS-T200929BW-257240	BS-T200929BW257240		1/1	9/29/2020 19:36	9/29/2020 19:36	9/29/2020 19:36	257240/	BS
LABQC	WQ	BD-T200929BW-257240	BD-T200929BW257240		1/1	9/29/2020 20:05	9/29/2020 20:05	9/29/2020 20:05	257240/	BD
LABQC	WQ	LB-T200929BW-257240	LB-T200929BW257240		1/1	9/29/2020 20:33	9/29/2020 20:33	9/29/2020 20:33	257240/	LB
FEW4-IDW-EFF	WW	FEW4-IDW-EFF-PT-3	BA18747		1/1	9/18/2020 10:02	9/30/2020 00:17	9/30/2020 00:17	257240/	N
FEW4-IDW-INT	WW	FEW4-IDW-INT-PT-3	BA18748		1/1	9/18/2020 09:58	9/30/2020 00:46	9/30/2020 00:46	257240/	N
FEW4-MW106	WG	FEW4-MW106-TEMP-1	BA18749		1/1	9/18/2020 09:18	9/30/2020 01:14	9/30/2020 01:14	257240/	N

Test Method: SW8260C      Analysis Batch: 257795

**Automated Data Review Detail Report for 93432**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2

**US Army Corps  
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Location	Matrix	Field Sample ID	Lab Sample ID	Calibration Ref	Run#/ Dil'n	Collection Date/Time	Extraction Date/Time	Analysis Date/Time	Prep/Leach Batch	Sample Type
LABQC	WQ	BS-Z201001AW-257795	BS-Z201001AW257795		2/1	10/1/2020 12:59	10/1/2020 12:59	10/1/2020 12:59	257795/	BS
LABQC	WQ	BD-Z201001AW-257795	BD-Z201001AW257795		2/1	10/1/2020 13:22	10/1/2020 13:22	10/1/2020 13:22	257795/	BD
LABQC	WQ	LB-Z201001AW-257795	LB-Z201001AW- 257795		2/1	10/1/2020 16:04	10/1/2020 16:04	10/1/2020 16:04	257795/	LB

**Batch Report**

Test Method: SW8260C      Analysis Batch: 257795

Location	Matrix	Field Sample ID	Lab Sample ID	Calibration Ref	Run#/ Dil'n	Collection Date/Time	Extraction Date/Time	Analysis Date/Time	Prep/Leach Batch	Sample Type
FEW4-MW106	WG	FEW4-MW106-TEMP-1	BA18749		2/5	9/18/2020 09:18	10/1/2020 20:19	10/1/2020 20:19	257795/	N

## Automated Data Review Detail Report for 93432

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2



**US Army Corps  
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### Field Batch Report

--No Records Found--

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### MS Mismatch Report

--No Records Found--

Section to identify Matrix Spike mismatches where parent sample differs from MS by dilution.

---

### QC Outliers Report

--No Records Found--

---

### Qualified Results

--No Records Found--

Detected Results

Test Method: SW8260C		Extraction Method: SW5030		Leach Method: NONE						
FieldSample ID	LabSample ID	Matrix	Type	Dilution	Analyte	LOQ	Lab Result	Qualified Result	Units	Reason
FEW4-MW106-TEMP-1	BA18749	W	N	1	cis-1,2-Dichloroethene	1.00	1.90	1.90	ug/l	
FEW4-MW106-TEMP-1	BA18749	W	N	5	Trichloroethene (TCE)	5.00	160	160	ug/l	

**Automated Data Review Detail Report for 93432**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2



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Rejected Results

--No Records Found--

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Facility: B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study  
 Event: FE Warren Site 4 FS DGI  
 SDG: 93886  
 Guidance Document: F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2  
 Prime Contractor: URS Group, Inc.  
 Project Manager: Robert Mallisee  
 Contract Laboratory(ies): Agriculture & Priority Pollutants Laboratories, Inc., Clovis, CA  
 Data Review Contractor: URS Group, Inc.  
 Data Review Level: S2BVEM  
 Primary Data Reviewer: Gary Torf, Project Chemist  
 Date Submitted: March 22, 2021

Field Sample ID	Lab Sample ID	Matrix Type/Type Code	SW8260C
FEW4-MW92B-TEMP	BA20821	Water Field Sample/N	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at S2BVEM data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the F.E. Warren Atlas Site 4 - Draft Final LT & PM UFP-QAPP Addendum 1 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by URS Group, Inc.; analyses were performed by Agriculture & Priority Pollutants Laboratories, Inc., Clovis, CA and were reported under sample delivery group (SDG) 93886. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

Blank - Negative

Extracted Internal Standard



## Data Validation Report for 93886

Lab Blank  
LCS Recovery  
LCS RPD  
Prep Hold Time  
Surrogate  
Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 51 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

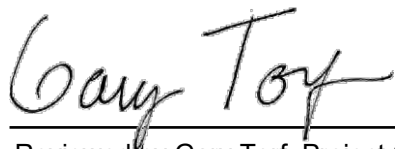
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Analytical Method	Data Reviewer Comment
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SW8260C	No additional comments; see Checklist for detail.
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March 22, 2021

Reviewed by Gary Torf, Project Chemist, URS Group, Inc.

As the Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

## Data Validation Report for 93886

No Outliers were associated with this sample delivery group.

### Qualified Results

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

## Data Validation Report for 93886

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J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
---	--

---

No results associated with this sample delivery group required qualification.

---

### Trace Results

No results associated with this sample delivery group are considered trace.

---

### Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

---

### Reason Code Definitions

Code	Definition
------	------------

TR	Trace Level Detect
----	--------------------

---

### Flag Code and Definitions

R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
---	---

B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
---	--

UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
----	--

X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.
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## Data Validation Report for 93886

### Review Questions

Method: SW8260C (Volatile Organic Compounds by GC/MS)

Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			Cooler at receipt was 5.0° C
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the GC/MS system properly tuned based on method criteria?	•			
Was instrument tuning completed every 12 hours during sample analysis?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Were internal standard retention times and area criteria within method requirements?	•			
Were internal standards spiked for every sample, standard, and QC sample?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than DL?	•			
Were target analytes in the field blank less than DL?			•	A field blank was not collected with this SDG.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		Matrix spike duplicate samples were not collected with this SDG.
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
Was the laboratory duplicate RPD within project acceptance limits?			•	A laboratory duplicate sample was not analyzed with this SDG.
Were surrogate recoveries within project acceptance limits?	•			

## Data Validation Report for 93886

Were all reported analytes within established retention time windows?	•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•	Field duplicate samples were not collected with this SDG.
Were QAPP specified laboratory PQLs achieved?	•	
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•	
Were DoD QSM corrective actions followed if deviations were noted?	•	
Were any data recommended for rejection (exclusion) in the data validation process?	•	

**Automated Data Review Detail Report for 93886**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2

Sample Summary								SW8260C
Location	Field Sample ID	Date	Time	Sample Type	Matrix	SBD	SED	
FEW4-MW92B	FEW4-MW92B-TEMP	10-21-2020	0817	N	WG	0.00	0.00	X
Total								1

**Batch Report**

Test Method: SW8260C		Analysis Batch: 258756								
Location	Matrix	Field Sample ID	Lab Sample ID	Calibration Run#/ Ref	Dil'n	Collection Date/Time	Extraction Date/Time	Analysis Date/Time	Prep/Leach Batch	Sample Type
LABQC	WQ	BS-M2010291AW-258756	BS-M2010291AW258756		1/1	10/29/2020 17:53	10/29/2020 17:53	10/29/2020 17:53	258756/	BS
LABQC	WQ	BD-M2010291AW-258756	BD-M2010291AW258756		1/1	10/29/2020 18:23	10/29/2020 18:23	10/29/2020 18:23	258756/	BD
LABQC	WQ	LB-M2010291AW-258756	LB-M2010291AW258756		1/1	10/29/2020 19:50	10/29/2020 19:50	10/29/2020 19:50	258756/	LB
FEW4-MW92B	WG	FEW4-MW92B-TEMP	BA20821		1/1	10/21/2020 08:17	10/30/2020 03:06	10/30/2020 03:06	258756/	N

**Field Batch Report**

--No Records Found--

**Automated Data Review Detail Report for 93886**  
B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study  
F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2

MS Mismatch Report  
--No Records Found--

Section to identify Matrix Spike mismatches where parent sample differs from MS by dilution.

QC Outliers Report  
--No Records Found--

Qualified Results  
--No Records Found--

**Detected Results**

Test Method: SW8260C		Extraction Method: SW5030		Leach Method: NONE						
FieldSample ID	LabSample ID	Matrix	Type	Dilution	Analyte	LOQ	Lab Result	Qualified Result	Units	Reason

**Automated Data Review Detail Report for 93886**  
B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study  
F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2

FEW4-MW92B-TEMP	BA20821	W	N	1	Trichloroethene (TCE)	1.00	63.0	63.0	ug/l
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# **Automated Data Review Detail Report for 93886**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2

## Rejected Results

--No Records Found--

---



Facility: B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study  
 Event: FE Warren Site 4 FS DGI  
 SDG: 93953  
 Guidance Document: F.E. Warren Atlas Site 4 Data Gaps UFP-QAPP Addendum 2  
 Prime Contractor: URS Group, Inc.  
 Project Manager: Robert Mallisee  
 Contract Laboratory(ies): Agriculture & Priority Pollutants Laboratories, Inc., Clovis, CA  
 Data Review Contractor: URS Group, Inc.  
 Data Review Level: S2BVEM  
 Primary Data Reviewer: Gary Torf, Project Chemist  
 Date Submitted: March 22, 2021

Field Sample ID	Lab Sample ID	Matrix Type/Type Code	SW8260C
FEW4-MW106-272-DEV	BA21118	Water Field Sample/N	X
FEW4-MW106-316-16-DEV	BA21251	Water Field Sample/N	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at S2BVEM data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the F.E. Warren Atlas Site 4 - Draft Final LT & PM UFP-QAPP Addendum 1 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by URS Group, Inc.; analyses were performed by Agriculture & Priority Pollutants Laboratories, Inc., Clovis, CA and were reported under sample delivery group (SDG) 93953. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

## Data Validation Report for 93953

Blank - Negative  
Extracted Internal Standard  
Lab Blank  
LCS Recovery  
LCS RPD  
Prep Hold Time  
Surrogate  
Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 102 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

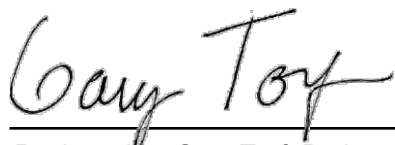
---

Analytical Method	Data Reviewer Comment
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SW8260C	No additional comments; see Checklist for detail.
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March 22, 2021

Reviewed by Gary Torf, Project Chemist, URS Group, Inc.

As the Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

## Data Validation Report for 93953

No Outliers were associated with this sample delivery group.

### Qualified Results

No results associated with this sample delivery group required qualification.

---

### Table of All Trace Results

**Test Method: SW8260C    Extraction Method: SW5030**

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW106-316-16-DEV N		cis-1,2-Dichloroethene	1.00	0.860 J	0.860 J		ug/L	TR

---

### Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

---

### Reason Code Definitions

Code	Definition
TR	Trace Level Detect

---

### Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.

## Data Validation Report for 93953

UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

### Review Questions

Method: SW8260C (Volatile Organic Compounds by GC/MS)

Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			Cooler at receipt was 2.0° C
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the GC/MS system properly tuned based on method criteria?	•			
Was instrument tuning completed every 12 hours during sample analysis?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Were internal standard retention times and area criteria within method requirements?	•			
Were internal standards spiked for every sample, standard, and QC sample?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than DL?	•			
Were target analytes in the field blank less than DL?			•	A field blank was not collected with this SDG.

## Data Validation Report for 93953

Was an LCS/LCSD pair prepared and analyzed with each batch?	•	
Were LCS/LCSD recoveries within project acceptance limits?	•	
Was the LCS/LCSD RPD within project acceptance limits?	•	
Was a MS/MSD pair prepared with each batch?	•	Matrix spike duplicate samples were not collected with this SDG.
Were MS/MSD recoveries within project acceptance limits?	•	
Was the MS/MSD RPD within project acceptance limits?	•	
Was the laboratory duplicate RPD within project acceptance limits?	•	A laboratory duplicate sample was not analyzed with this SDG.
Were surrogate recoveries within project acceptance limits?	•	
Were all reported analytes within established retention time windows?	•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•	Field duplicate samples were not collected with this SDG.
Were QAPP specified laboratory PQLs achieved?	•	
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•	
Were DoD QSM corrective actions followed if deviations were noted?	•	
Were any data recommended for rejection (exclusion) in the data validation process?	•	

**Automated Data Review Detail Report for 93953**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2

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## Sample Summary

								SW8260C
Location	Field Sample ID	Date	Time	Sample Type	Matrix	SBD	SED	
FEW4-MW106	FEW4-MW106-272-DEV	10-30-2020	1404	N	WG	0.00	0.00	X
FEW4-MW106	FEW4-MW106-316-16-DEV	10-29-2020	1331	N	WG	0.00	0.00	X
Total								2

## Batch Report

Test Method: SW8260C		Analysis Batch: 258564								
Location	Matrix	Field Sample ID	Lab Sample ID	Calibration Run#/ Ref	Dil'n	Collection Date/Time	Extraction Date/Time	Analysis Date/Time	Prep/Leach Batch	Sample Type
LABQC	WQ	BS-Z2011101AW-258564	BS-Z2011101AW258564		2/1	11/10/2020 12:47	11/10/2020 12:47	11/10/2020 12:47	258564/	BS
LABQC	WQ	BD-Z2011101AW-258564	BD-Z2011101AW258564		2/1	11/10/2020 13:10	11/10/2020 13:10	11/10/2020 13:10	258564/	BD
LABQC	WQ	LB-Z2011101AW-258564	LB-Z2011101AW258564		2/1	11/10/2020 13:33	11/10/2020 13:33	11/10/2020 13:33	258564/	LB
FEW4-MW106	WG	FEW4-MW106-272-DEV	BA21118		2/2	10/30/2020 14:04	11/10/2020 14:19	11/10/2020 14:19	258564/	N
FEW4-MW106	WG	FEW4-MW106-316-16-DEV	BA21251		2/2	10/29/2020 13:31	11/10/2020 14:42	11/10/2020 14:42	258564/	N

Test Method: SW8260C Analysis Batch: 258600

Location	Matrix	Field Sample ID	Lab Sample ID	Calibration Run#/ Ref	Dil'n	Collection Date/Time	Extraction Date/Time	Analysis Date/Time	Prep/Leach Batch	Sample Type
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**Automated Data Review Detail Report for 93953**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2

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LABQC	WQ	BS-T201106AW-258600	BS-T201106AW258600	1/1	11/6/2020 09:50	11/6/2020 09:50	11/6/2020 09:50	258600/	BS
LABQC	WQ	BD-T201106AW-258600	BD-T201106AW258600	1/1	11/6/2020 10:18	11/6/2020 10:18	11/6/2020 10:18	258600/	BD
LABQC	WQ	LB-T201106AW-258600	LB-T201106AW258600	1/1	11/6/2020 10:46	11/6/2020 10:46	11/6/2020 10:46	258600/	LB
FEW4-MW106	WG	FEW4-MW106-272-DEV	BA21118	1/1	10/30/2020 14:04	11/6/2020 13:35	11/6/2020 13:35	258600/	N

**Batch Report**

Test Method: SW8260C      Analysis Batch: 258600

Location	Matrix	Field Sample ID	Lab Sample ID	Calibration Run#/ Ref	Collection Date/Time	Extraction Date/Time	Analysis Date/Time	Prep/Leach Batch	Sample Type
FEW4-MW106	WG	FEW4-MW106-316-16-DEV	BA21251	1/1	10/29/2020 13:31	11/6/2020 14:03	11/6/2020 14:03	258600/	N



Field Batch Report

--No Records Found--

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MS Mismatch Report

--No Records Found--

Section to identify Matrix Spike mismatches where parent sample differs from MS by dilution.

---

QC Outliers Report

--No Records Found--

Qualified Results

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Test Method: SW8260C	Extraction Method: SW5030	Leach Method: NONE
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Automated Data Review Detail Report for 93953  
B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study  
F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2



FieldSample ID	LabSample ID	Matrix	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW106-316-16-DEV	BA21251	W	N	cis-1,2-Dichloroethene	1.00	0.860 J	0.860 J		ug/l	TR

Qualified analytes in samples are reported as estimated, not  
detected (UU) at the Limit of Detection (LOD).

## Automated Data Review Detail Report for 93953

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2



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### Detected Results

Test Method: SW8260C		Extraction Method: SW5030		Leach Method: NONE						
FieldSample ID	LabSample ID	Matrix	Type	Dilution	Analyte	LOQ	Lab Result	Qualified Result	Units	Reason
FEW4-MW106-272-DEV	BA21118	W	N	1	cis-1,2-Dichloroethene	1.00	1.30	1.30	ug/l	
FEW4-MW106-272-DEV	BA21118	W	N	2	Trichloroethene (TCE)	2.00	200	200	ug/l	
FEW4-MW106-316-16-DEV	BA21251	W	N	1	cis-1,2-Dichloroethene	1.00	0.860 J	0.860 J	ug/l	TR
FEW4-MW106-316-16-DEV	BA21251	W	N	2	Trichloroethene (TCE)	2.00	150	150	ug/l	

**Automated Data Review Detail Report for 93953**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2



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Rejected Results

--No Records Found--

---



Facility: B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study  
 Event: FE Warren Site 4 FS DGI  
 SDG: 93972  
 Guidance Document: F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2  
 Prime Contractor: URS Group, Inc.  
 Project Manager: Robert Mallisee  
 Contract Laboratory(ies): Agriculture & Priority Pollutants Laboratories, Inc., Clovis, CA  
 Data Review Contractor: URS Group, Inc.  
 Data Review Level: S2BVEM  
 Primary Data Reviewer: Gary Torf, Project Chemist  
 Date Submitted: March 22, 2021

Field Sample ID	Lab Sample ID	Matrix Type/Type Code	SW8260C
FEW4-MW106-230-16-DEV	BA21151	Water Field Sample/N	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at S2BVEM data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the F.E. Warren Atlas Site 4 - Draft Final LT & PM UFP-QAPP Addendum 1 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by URS Group, Inc.; analyses were performed by Agriculture & Priority Pollutants Laboratories, Inc., Clovis, CA and were reported under sample delivery group (SDG) 93972. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

Blank - Negative

Extracted Internal Standard

## Data Validation Report for 93972

Lab Blank  
LCS Recovery  
LCS RPD  
Prep Hold Time  
Surrogate  
Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 51 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

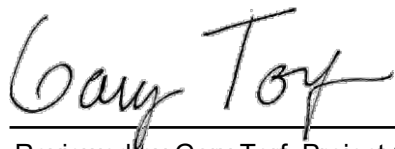
---

Analytical Method	Data Reviewer Comment
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SW8260C	No additional comments; see Checklist for detail.
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March 22, 2021

Reviewed by Gary Torf, Project Chemist, URS Group, Inc.

As the Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

## Data Validation Report for 93972

No Outliers were associated with this sample delivery group.

### Qualified Results

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

## Data Validation Report for 93972

---

J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
---	--

---

No results associated with this sample delivery group required qualification.

---

### Trace Results

No results associated with this sample delivery group are considered trace.

---

### Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

---

### Reason Code Definitions

Code	Definition
------	------------

TR	Trace Level Detect
----	--------------------

---

### Flag Code and Definitions

R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
---	---

B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
---	--

UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
----	--

X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.
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## Data Validation Report for 93972

### Review Questions

Method: SW8260C (Volatile Organic Compounds by GC/MS)

Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			Cooler at receipt was 4.0° C
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the GC/MS system properly tuned based on method criteria?	•			
Was instrument tuning completed every 12 hours during sample analysis?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Were internal standard retention times and area criteria within method requirements?	•			
Were internal standards spiked for every sample, standard, and QC sample?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than DL?	•			
Were target analytes in the field blank less than DL?			•	A field blank was not collected with this SDG.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?			•	Matrix spike duplicate samples were not collected with this SDG.
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
Was the laboratory duplicate RPD within project acceptance limits?			•	A laboratory duplicate sample was not analyzed with this SDG.
Were surrogate recoveries within project acceptance limits?	•			

## Data Validation Report for 93972

Were all reported analytes within established retention time windows?	•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•	Field duplicate samples were not collected with this SDG.
Were QAPP specified laboratory PQLs achieved?	•	
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•	
Were DoD QSM corrective actions followed if deviations were noted?	•	
Were any data recommended for rejection (exclusion) in the data validation process?	•	

**Automated Data Review Detail Report for 93972**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2

**US Army Corps  
of Engineers®****Sample Summary**

Location	Field Sample ID	Date	Time	Sample Type	Matrix	SBD	SED	SW8260C
FEW4-MW106	FEW4-MW106-230-16-DEV	10-31-2020	1338	N	WG	0.00	0.00	X
Total								1

**Batch Report**

Test Method: SW8260C Analysis Batch: 258791

Location	Matrix	Field Sample ID	Lab Sample ID	Calibration Ref	Run#/ Dil'n	Collection Date/Time	Extraction Date/Time	Analysis Date/Time	Prep/Leach Batch	Sample Type
LABQC	WQ	BS-Z201111AW-258791	BS-Z201111AW258791		1/1	11/11/2020 09:33	11/11/2020 09:33	11/11/2020 09:33	258791/	BS
LABQC	WQ	BD-Z201111AW-258791	BD-Z201111AW258791		1/1	11/11/2020 09:56	11/11/2020 09:56	11/11/2020 09:56	258791/	BD
LABQC	WQ	LB-Z201111AW-258791	LB-Z201111AW258791		1/1	11/11/2020 10:19	11/11/2020 10:19	11/11/2020 10:19	258791/	LB
FEW4-MW106	WG	FEW4-MW106-230-16-DEV	BA21151		1/1	10/31/2020 13:38	11/11/2020 13:47	11/11/2020 13:47	258791/	N

Test Method: SW826 C Analysis Batch: 258792

Location	Matrix	Field Sample ID	Lab Sample ID	Calibration Ref	Run#/ Dil'n	Collection Date/Time	Extraction Date/Time	Analysis Date/Time	Prep/Leach Batch	Sample Type
LABQC	WQ	BS-Z201113BW-258792	BS-Z201113BW258792		2/1	11/13/2020 19:40	11/13/2020 19:40	11/13/2020 19:40	258792/	BS

## Automated Data Review Detail Report for 93972

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2



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LABQC	WQ	BD-Z201113BW-258792	BD-Z201113BW258792	2/1	11/13/2020 20:04	11/13/2020 20:04	11/13/2020 20:04	258792/	BD
LABQC	WQ	LB-Z201113BW-258792	LB-Z201113BW258792	2/1	11/13/2020 21:59	11/13/2020 21:59	11/13/2020 21:59	258792/	LB
FEW4-MW106	WG	FEW4-MW106-230-16-DEV	BA21151	2/2	10/31/2020 13:38	11/13/2020 23:31	11/13/2020 23:31	258792/	N

### Field Batch Report

--No Records Found--

### MS Mismatch Report

--No Records Found--

Section to identify Matrix Spike mismatches where parent sample differs from MS by dilution.

### QC Outliers Report

--No Records Found--

Qualified Results

--No Records Found--

Detected Results

Test Method: SW8260C		Extraction Method: SW5030		Leach Method: NONE						
FieldSample ID	LabSample ID	Matrix	Type	Dilution	Analyte	LOQ	Lab Result	Qualified Result	Units	Reason
FEW4-MW106-230-16-DEV	BA21151	W	N	1	cis-1,2-Dichloroethene	1.00	1.30	1.30	ug/l	
FEW4-MW106-230-16-DEV	BA21151	W	N	2	Trichloroethene (TCE)	2.00	150	150	ug/l	

## Automated Data Review Detail Report for 93972

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2



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### Rejected Results

--No Records Found--

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Facility: B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study  
 Event: FE Warren Site 4 FS DGI  
 SDG: 96723  
 Guidance Document: F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2  
 Prime Contractor: URS Group, Inc.  
 Project Manager: Robert Mallisee  
 Contract Laboratory(ies): Agriculture & Priority Pollutants Laboratories, Inc., Clovis, CA  
 Data Review Contractor: URS Group, Inc.  
 Data Review Level: S2AVEM  
 Primary Data Reviewer: Gary Torf, Project Chemist  
 Date Submitted: November 30, 2021

Field Sample ID	Lab Sample ID	Matrix Type/Type Code	SW8260C
FEW4-IDW-RECIRC1	BA35539	Water Field Sample/N	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at S2AVEM data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the F.E. Warren Atlas Site 4 - Draft Final LT & PM UFP-QAPP Addendum 1 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by URS Group, Inc.; analyses were performed by Agriculture & Priority Pollutants Laboratories, Inc., Clovis, CA and were reported under sample delivery group (SDG) 96723. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

Lab Blank

LCS Recovery

## Data Validation Report for 96723

LCS RPD

Prep Hold Time

Surrogate

Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 51 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency (X qualifier). Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

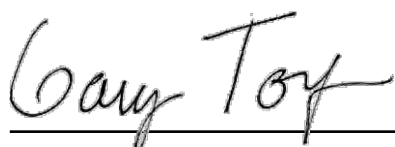
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Analytical Method	Data Reviewer Comment
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SW8260C	No additional comments; see Checklist for detail.
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November 30, 2021

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Reviewed by Gary Torf, Project Chemist, URS Group, Inc.

As the Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of the reported sample results and method quality control data between the two deliverables.



## Data Validation Report for 96723

No Outliers were associated with this sample delivery group.

### Qualified Results

No results associated with this sample delivery group required qualification.

---

### Trace Results

and trace.

No results associated with this sample delivery group are considered.

---

### Table of Results with Modified Qualifiers

#### Modified Qualifiers for test method SW8260C

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
FEW4-IDW-RECIRC1 BA35539	N	Acetone	10.0	12.0	12.0	2.00 U	

Analytes not found in project samples are reported as not detected at the limit of detection (LOD) unless blank contamination occurs and then the sample may be reported as not detected at the (LOQ) based on the sample concentration.  
In instances where no LOD is provided, results are reported down to the LOQ.  
Trace values are not included in the qualified results table unless additional reason codes are associated.

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### Reason Code Definitions

Code	Definition
TR	Trace Level Detect

## Data Validation Report for 96723

There are no Flag Code definitions to display.

---

### Bias

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-	The result may be biased low
---	------------------------------

---

+	The result may be biased high
---	-------------------------------

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Note - The bias field is a separate field; however, it is an integral part of the final flag (qualifier) on the sample result

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## Data Validation Report for 96723

### Review Questions

Method: SW8260C (Volatile Organic Compounds by GC/MS)

Review Questions	Yes	No	NA	Comment
Were all samples documented correctly on the chain-of-custody (COC)?	•			
Did samples listed on COCs match the sample labels?	•			
Were samples relinquished properly on the COC?	•			
Were all samples properly preserved?	•			
Were sampling dates/times, date and time of laboratory receipt of samples, and sample conditions upon receipt at the laboratory (including preservation, pH, and temperature) are documented?	•			
Were sample results reported with percent moisture correction if required?			•	
Were analytical methods performed and analysis dates present?	•			
Were all requested target analytes reported?	•			
Were QAPP specified laboratory PQLs achieved?	•			
Were holding times met?	•			
Were trip blanks analyzed at the proper frequency and in control?			•	
Were field blanks analyzed at the proper frequency and in control?			•	
Were equipment blanks analyzed at the proper frequency and in control?			•	
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than DL?	•			
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If ISM was used for sample collection, were laboratory triplicates analyzed and within project acceptance limits?			•	

## Data Validation Report for 96723

Were surrogate recoveries within project acceptance limits?	.	
Were field replicates (duplicates, triplicates, etc.) analyzed at the proper frequency and in control?		.
Were reported sample concentrations within calibration range?	.	
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	.	
Were DoD QSM corrective actions followed if deviations were noted?	.	

### Review Questions

Method: SW8260C (Volatile Organic Compounds by GC/MS)

Review Questions	Yes	No	NA	Comment
Were any data recommended for exclusion in the data validation process?	.			Detections of common lab contaminants that have not historically been seen at the site, including 2-butanone, acetone, and methylene chloride have been revised to non-detect at the direction of the USACE-Omaha Project Chemist citing professional judgment.  This includes the acetone result for sample FEW4-IDW-RECIRC1.

Sample Summary								SW8260C
Location	Field Sample ID	Date	Time	Sample Type	Matrix	SBD	SED	
FEW4-IDW	FEW4-IDW-RECIRC1	06-30-2021	0730	N	WW	0.00	0.00	X
Total								1

**Automated Data Review Detail Report for 96723**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2

**US Army Corps  
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Test Method: SW8260C

Analysis Batch: 268137

Location	Matrix	Field Sample ID	Lab Sample ID	Calibration Ref	Run#/ Dil'n	Collection Date/Time	Extraction Date/Time	Analysis Date/Time	Prep/Leach Batch	Sample Type
LABQC	WQ	BS-T2107082AW-268137	BS-T2107082AW268137		1/1	7/8/2021 16:33	7/8/2021 16:33	7/8/2021 16:33	268137/	BS
LABQC	WQ	BD-T2107082AW-268137	BD- T2107082AW268137		1/1	7/8/2021 16:58	7/8/2021 16:58	7/8/2021 16:58	268137/	BD
LABQC	WQ	LB-T2107082AW-268137	LB-T2107082AW268137		1/1	7/8/2021 17:23	7/8/2021 17:23	7/8/2021 17:23	268137/	LB
FEW4-IDW	WW	FEW4-IDW-RECIRC1	BA35539		1/1	6/30/2021 07:30	7/8/2021 22:45	7/8/2021 22:45	268137/	N

## Automated Data Review Detail Report for 96723

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2



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### Field Batch Report

--No Records Found--

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### MS Mismatch Report

--No Records Found--

Section to identify Matrix Spike mismatches where parent sample differs from MS by dilution.

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### QC Outliers Report

--No Records Found--

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Qualified Results

--No Records Found--

Detected Results

Test Method: SW8260C		Extraction Method: SW5030		Leach Method: NONE						
FieldSample ID	LabSample ID	Matrix	Type	Dilution	Analyte	LOQ	Lab Result	Qualified Result	Units	Reason
FEW4-IDW-RECIRC1	BA35539	W	N	1	Acetone	10.0	12.0	12.0	ug/l	



**Automated Data Review Detail Report for 96723**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2



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Rejected Results

--No Records Found--

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Facility: B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study  
 Event: FE Warren Site 4 FS DGI  
 SDG: 96780  
 Guidance Document: F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2  
 Prime Contractor: URS Group, Inc.  
 Project Manager: Robert Mallisee  
 Contract Laboratory(ies): Agriculture & Priority Pollutants Laboratories, Inc., Clovis, CA  
 Data Review Contractor: URS Group, Inc.  
 Data Review Level: S2BVEM  
 Primary Data Reviewer: Gary Torf, Project Chemist  
 Date Submitted: November 30, 2021

Field Sample ID	Lab Sample ID	Matrix Type/Type Code		SW8260C
FEW4-MW105-(109.0)	BA35719	Solid	Field Sample/N	X
FEW4-MW105-(119.0)	BA35720	Solid	Field Sample/N	X
FEW4-MW105-(129.0)	BA35721	Solid	Field Sample/N	X
FEW4-MW105-(139.0)	BA35722	Solid	Field Sample/N	X
FEW4-MW105-(149.0)	BA35723	Solid	Field Sample/N	X
FEW4-MW105-(159.0)	BA35724	Solid	Field Sample/N	X
FEW4-MW105-(169.0)	BA35725	Solid	Field Sample/N	X
FEW4-MW105-(169.0)-FD	BA35726	Solid	Field Duplicate/FD	X
FEW4-MW105-(179.0)	BA35727	Solid	Field Sample/N	X
FEW4-MW105-(189.0)	BA35728	Solid	Field Sample/N	X
FEW4-MW105-(69.0)	BA35729	Solid	Field Sample/N	X
FEW4-MW105-(79.0)	BA35730	Solid	Field Sample/N	X
FEW4-MW105-(89.0)	BA35731	Solid	Field Sample/N	X

## Data Validation Report for 96780

FEW4-MW105-(89.0)-FD	BA35732	Solid	Field Duplicate/FD	X
FEW4-MW105-(99.0)	BA35733	Solid	Field Sample/N	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at S2BVEM data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the F.E. Warren Atlas Site 4 - Draft Final LT & PM UFP-QAPP Addendum 1 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by URS Group, Inc.; analyses were performed by Agriculture & Priority Pollutants Laboratories, Inc., Clovis, CA and were reported under sample delivery group (SDG) 96780. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

Field Duplicate RPD  
Lab Blank  
LCS Recovery  
LCS RPD  
MS Recovery  
MS RPD  
Prep Hold Time  
Surrogate  
Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 319 results (41.70%) out of the 765 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency (X qualifier). Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

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Analytical Method	Data Reviewer Comment
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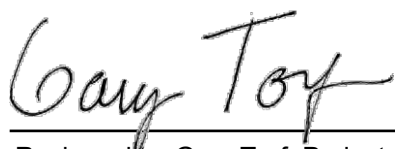
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## Data Validation Report for 96780

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SW8260C	Several samples had low IS area responses. The samples were analyzed a second time with similar results. Because of the low IS area responses, several surrogate recoveries were outside control limits. Due to the IS failures, the TCE responses in these samples are biased very high.
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November 30, 2021

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Reviewed by Gary Torf, Project Chemist, URS Group, Inc.

As the Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of the reported sample results and method quality control data between the two deliverables.

## Data Validation Report for 96780

### Quality Control Outliers for test method SW8260C, Field Duplicate RPD

Field duplicate analyses are performed in order to assess sample collection/laboratory precision for each sample matrix. Summary forms were evaluated and compared to electronic data deliverables. Field duplicate results that were outside of the acceptance criteria are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
FEW4-MW105-(89.0)-FD (N)/ BA35732	Acetone	111.1	< 50	< 50	rpd	J/None	D3	
FEW4-MW105-(89.0)-FD (N)/ BA35732	Benzene	101.0	< 50	< 50	rpd	J/None	D3	
FEW4-MW105-(89.0)-FD (N)/ BA35732	cis-1,2-Dichloroethene	310.0	< 6.3	< 6.3	ug/kg	J/None	D3	
FEW4-MW105-(89.0)-FD (N)/ BA35732	m,p-Xylene	91.00	< 13	< 13	ug/kg	J/None	D3	
FEW4-MW105-(89.0)-FD (N)/ BA35732	o-Xylene	39.00	< 6.3	< 6.3	ug/kg	J/None	D3	
FEW4-MW105-(89.0)-FD (N)/ BA35732	Toluene	104.3	< 50	< 50	rpd	J/None	D3	
FEW4-MW105-(89.0)-FD (N)/ BA35732	Trichloroethene (TCE)	103.0	< 50	< 50	rpd	J/None	D3	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results. Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

### Qualified Results associated with the Field Duplicate RPD for SW8260C

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(89.0) BA35731	N	Acetone	13.0	6000	6.30 UJ	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	Benzene	6.30	250	250 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	cis-1,2-Dichloroethene	6.30	310	310 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	m,p-Xylene	13.0	39.0	39.0 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	o-Xylene	6.30	19.0	19.0 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	Toluene	6.30	220	220 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	Trichloroethene (TCE)	6.30	16000	16000 J	+	ug/kg	D3/I/S

## Data Validation Report for 96780

FEW4-MW105-(89.0)-FD BA35732	FD	Acetone	13.0	21000	6.60 UJ	+	ug/kg	D3/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Benzene	6.60	760	760 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	m,p-Xylene	13.0	130	130 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	o-Xylene	6.60	58.0	58.0 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Toluene	6.60	700	700 J	+	ug/kg	D3/I/S

### Qualified Results associated with the Field Duplicate RPD for SW8260C

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(89.0)-FD BA35732	FD	Trichloroethene (TCE)	6.60	50000	50000 J	+	ug/kg	D3/I/S

Analytes not found in project samples are reported as not detected at the limit of detection (LOD) unless blank contamination occurs and then the sample may be reported as not detected at the (LOQ) based on the sample concentration. In instances where no LOD is provided, results are reported down to the LOQ.

## Data Validation Report for 96780

### Quality Control Outliers for test method SW8260C, LCS Recovery

The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
BD-T210716AS-268140 (BD)/ BD-T210716AS-268140	Chloromethane	45.00	50 - 136	50 - 136	percent	J/UJ	C	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results. Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

### Qualified Results associated with the LCS Recovery for SW8260C

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(109.0) BA35719	N	Chloromethane	14.0	7.20 U	7.20 UJ		ug/kg	C
FEW4-MW105-(129.0) BA35721	N	Chloromethane	14.0	6.90 U	6.90 UJ	+	ug/kg	C/I/S
FEW4-MW105-(139.0) BA35722	N	Chloromethane	14.0	6.90 U	6.90 UJ	+	ug/kg	C/I/S
FEW4-MW105-(149.0) BA35723	N	Chloromethane	15.0	7.50 U	7.50 UJ	+	ug/kg	C/S
FEW4-MW105-(159.0) BA35724	N	Chloromethane	12.0	6.20 U	6.20 UJ	+	ug/kg	C/I/S
FEW4-MW105-(169.0) BA35725	N	Chloromethane	15.0	7.40 U	7.40 UJ		ug/kg	C
FEW4-MW105-(169.0)-FD BA35726	FD	Chloromethane	15.0	7.30 U	7.30 UJ		ug/kg	C
FEW4-MW105-(179.0) BA35727	N	Chloromethane	15.0	7.40 U	7.40 UJ		ug/kg	C
FEW4-MW105-(189.0) BA35728	N	Chloromethane	14.0	7.20 U	7.20 UJ		ug/kg	C
FEW4-MW105-(69.0) BA35729	N	Chloromethane	13.0	6.60 U	6.60 UJ		ug/kg	C
FEW4-MW105-(79.0) BA35730	N	Chloromethane	14.0	7.10 U	7.10 UJ		ug/kg	C
FEW4-MW105-(89.0) BA35731	N	Chloromethane	13.0	6.30 U	6.30 UJ	+	ug/kg	C/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Chloromethane	13.0	6.60 U	6.60 UJ	+	ug/kg	C/I/S
FEW4-MW105-(99.0) BA35733	N	Chloromethane	15.0	7.40 U	7.40 UJ		ug/kg	C

Analytes not found in project samples are reported as not detected at the limit of detection (LOD) unless blank contamination occurs and then the sample may be reported as not detected at the (LOQ) based on the sample concentration. In instances where no LOD is provided, results are reported down to the LOQ.

## Data Validation Report for 96780

### Quality Control Outliers for test method SW8260C, LCS RPD

The objective of laboratory control sample/laboratory control sample duplicate (LCS/LCSD) RPD analysis is to demonstrate acceptable method precision by the laboratory at the time of analysis. LCS/LCSD analyses are also performed to generate data that determines the long-term precision of the analytical method on various matrices. Non-homogenous samples can impact the apparent method precision. Summary forms were evaluated and compared to electronic data deliverables. Laboratory control sample/laboratory control sample duplicate RPD results that were outside of the acceptance criteria are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
BD-T210716AS-268140 (BD)/ BD-T210716AS-268140	Chloromethane	64.02	< 20	< 20	rpd	J/None	Z	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results. Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.



## Data Validation Report for 96780

### Quality Control Outliers for test method SW8260C, MS Recovery

Data for matrix spikes/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. These data alone cannot be used to evaluate the precision and accuracy of individual samples. However, when exercising professional judgment, MS/MSD data can be used in conjunction with other available QC information. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
FEW4-MW105-(109.0)-MS (MS)/ BA35719MS	1,1,2-Trichloro- 1,2,2- trifluoroethane	138.0	66 - 136	66 - 136	percent	J/None	M	
FEW4-MW105-(109.0)-MS (MS)/ BA35719MS	Bromochloromethane	76.00	78 - 125	78 - 125	percent	J/X	M	
FEW4-MW105-(109.0)-MS (MS)/ BA35719MS	Cyclohexane	136.0	67 - 131	67 - 131	percent	J/None	M	
FEW4-MW105-(109.0)-MS (MS)/ BA35719MS	Methyl acetate	41.00	53 - 144	53 - 144	percent	J/X	M	
FEW4-MW105-(109.0)-MS (MS)/ BA35719MS	Methylcyclohexane	135.0	66 - 133	66 - 133	percent	J/None	M	
FEW4-MW105-(109.0)-MSD (SD)/ BA35719MSD	1,1,2-Trichloro- 1,2,2trifluoroethane	143.0	66 - 136	66 - 136	percent	J/None	M	
FEW4-MW105-(109.0)-MSD (SD)/ BA35719MSD	Cyclohexane	140.0	67 - 131	67 - 131	percent	J/None	M	
FEW4-MW105-(109.0)-MSD (SD)/ BA35719MSD	Methyl acetate	40.00	53 - 144	53 - 144	percent	J/X	M	
FEW4-MW105-(109.0)-MSD (SD)/ BA35719MSD	Methylcyclohexane	141.0	66 - 133	66 - 133	percent	J/None	M	
FEW4-MW105-(109.0)-MSD (SD)/ BA35719MSD	Trichloroethene (TCE)	124.0	77 - 123	77 - 123	percent	J/None	M	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results. Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

### Qualified Results associated with the MS Recovery for SW8260C

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias Units	Reason
FEW4-MW105-(109.0)	N	Bromochloromethane	14.0	2.90 U	2.90 U	ug/kg	M

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BA35719

FEW4-MW105-(109.0)	N	Methyl acetate	14.0	2.90 U	2.90 U	ug/kg	M
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BA35719

FEW4-MW105-(109.0)	N	Trichloroethene (TCE)	7.20	57.0	57.0 J	+	ug/kg	M
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BA35719

Analytes not found in project samples are reported as not detected at the limit of detection (LOD) unless blank contamination occurs and then the sample may be reported as not detected at the (LOQ) based on the sample concentration. In instances where no LOD is provided, results are reported down to the LOQ.

### Quality Control Outliers for test method SW8260C, Surrogate

Method performance for individual samples is demonstrated through spiking activities. All samples are spiked with surrogate compounds prior to sample preparation. The sample itself may produce effects due to such factors as interferences and high concentrations of analytes. Summary forms were evaluated and compared to electronic data deliverables. Surrogate results that were outside of the acceptance criteria are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
FEW4-MW105-(119.0) (N)/ BA35720	Dibromofluoromethane	124.0	78 - 119	10 - 119	percent	J/None	I	
FEW4-MW105-(129.0) (N)/ BA35721	1,2-Dichloroethane-d4	157.0	71 - 136	10 - 136	percent	J/None	I	
FEW4-MW105-(129.0) (N)/ BA35721	1-Bromo-4fluorobenzene (4Bromofluorobenzene)	149.0	79 - 119	10 - 119	percent	J/None	I	
FEW4-MW105-(129.0) (N)/ BA35721	Dibromofluoromethane	131.0	78 - 119	10 - 119	percent	J/None	I	
FEW4-MW105-(129.0) (N)/ BA35721	Toluene-d8	55.00	85 - 116	10 - 116	percent	J/UJ	I	
FEW4-MW105-(139.0) (N)/ BA35722	1-Bromo-4fluorobenzene (4Bromofluorobenzene)	193.0	79 - 119	10 - 119	percent	J/None	I	
FEW4-MW105-(139.0) (N)/ BA35722	Dibromofluoromethane	27.00	78 - 119	10 - 119	percent	J/UJ	I	
FEW4-MW105-(139.0) (N)/ BA35722	Toluene-d8	56.00	85 - 116	10 - 116	percent	J/UJ	I	
FEW4-MW105-(159.0) (N)/ BA35724	1,2-Dichloroethane-d4	154.0	71 - 136	10 - 136	percent	J/None	I	
FEW4-MW105-(159.0) (N)/ BA35724	1-Bromo-4fluorobenzene (4Bromofluorobenzene)	137.0	79 - 119	10 - 119	percent	J/None	I	
FEW4-MW105-(159.0) (N)/ BA35724	Toluene-d8	57.00	85 - 116	10 - 116	percent	J/UJ	I	

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FEW4-MW105-(89.0) (N)/ BA35731	1,2-Dichloroethane-d4	157.0	71 - 136	10 - 136	percent	J/None	I
FEW4-MW105-(89.0) (N)/ BA35731	1-Bromo-4fluorobenzene (4Bromofluorobenzene)	138.0	79 - 119	10 - 119	percent	J/None	I
FEW4-MW105-(89.0) (N)/ BA35731	Dibromofluoromethane	57.00	78 - 119	10 - 119	percent	J/UJ	I
FEW4-MW105-(89.0) (N)/ BA35731	Toluene-d8	52.00	85 - 116	10 - 116	percent	J/UJ	I
FEW4-MW105-(89.0)-FD (FD)/ BA35732	1,2-Dichloroethane-d4	42.00	71 - 136	10 - 136	percent	J/UJ	I
MW105-(89.0)-FD (FD)/ BA35732	1-Bromo-4FEW4-fluorobenzene (4-Bromofluorobenzene)	128.0	79 - 119	10 - 119	percent	J/None	I
FEW4-MW105-(89.0)-FD (FD)/ BA35732	Dibromofluoromethane	0.000	78 - 119	10 - 119	percent	J/X	I
FEW4-MW105-(89.0)-FD (FD)/ BA35732	Toluene-d8	52.00	85 - 116	10 - 116	percent	J/UJ	I

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results. Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

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### Qualified Results associated with the Surrogate for SW8260C

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(119.0) BA35720	N	Acetone	14.0	13.0 J	6.80 UJ	+	ug/kg	I
FEW4-MW105-(119.0) BA35720	N	Trichloroethene (TCE)	6.80	67.0	67.0 J	+	ug/kg	I
FEW4-MW105-(129.0) BA35721	N	1,1,1-Trichloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,1,2,2-Tetrachloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,1,2-Trichloro- 1,2,2trifluoroethane	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,1,2-Trichloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,1-Dichloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,1-Dichloroethene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,2,3-Trichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,2,4-Trichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,2-Dibromo- 3chloropropane	14.0	6.90 U	6.90 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,2-Dibromoethane (EDB)	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,2-Dichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,2-Dichloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,2-Dichloropropane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,3-Dichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,4-Dichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	2-Butanone (MEK)	14.0	4.10 U	4.10 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	2-Hexanone	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	4-Methyl-2-pentanone (MIBK)	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Acetone	14.0	14000	6.90 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Benzene	6.90	140	140 J	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Bromochloromethane	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S

## Data Validation Report for 96780

### Qualified Results associated with the Surrogate for SW8260C

FEW4-MW105-(129.0) BA35721	N	Bromodichloromethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Bromoform	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Bromomethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Carbon disulfide	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(129.0) BA35721	N	Carbon tetrachloride	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Chlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Chloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Chloroform	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Chloromethane	14.0	6.90 U	6.90 UJ	+	ug/kg	C/I/S
FEW4-MW105-(129.0) BA35721	N	cis-1,2-Dichloroethene	6.90	190	190 J	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	cis-1,3-Dichloropropene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Cyclohexane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Dibromochloromethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Dichlorodifluoromethane	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Ethylbenzene	6.90	26.0	26.0 J	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Isopropylbenzene (Cumene)	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	m,p-Xylene	14.0	38.0	38.0 J	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Methyl acetate	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Methyl tert-butyl ether (MTBE)	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Methylcyclohexane	27.0	6.90 U	6.90 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Methylene chloride	27.0	14.0 U	14.0 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	o-Xylene	6.90	17.0	17.0 J	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Styrene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S

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### Qualified Results associated with the Surrogate for SW8260C

FEW4-MW105-(129.0) BA35721	N	Tetrachloroethene (PCE)	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Toluene	6.90	130	130 J	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	trans-1,2-Dichloroethene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	trans-1,3-Dichloropropene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Trichloroethene (TCE)	6.90	22000	22000 J	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Trichlorofluoromethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Vinyl chloride	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,1,1-Trichloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,1,2,2-Tetrachloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(139.0) BA35722	N	1,1,2-Trichloro- 1,2,2trifluoroethane	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,1,2-Trichloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,1-Dichloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,1-Dichloroethene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,2,3-Trichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,2,4-Trichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,2-Dibromo- 3chloropropane	14.0	6.90 U	6.90 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,2-Dibromoethane (EDB)	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,2-Dichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,2-Dichloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,2-Dichloropropane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,3-Dichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,4-Dichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	2-Butanone (MEK)	14.0	4.10 U	4.10 UJ	+	ug/kg	I/S

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### Qualified Results associated with the Surrogate for SW8260C

FEW4-MW105-(139.0) BA35722	N	2-Hexanone	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	4-Methyl-2-pentanone (MIBK)	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Acetone	14.0	29000	6.90 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Benzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Bromochloromethane	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Bromodichloromethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Bromoform	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Bromomethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Carbon disulfide	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Carbon tetrachloride	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Chlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Chloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Chloroform	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Chloromethane	14.0	6.90 U	6.90 UJ	+	ug/kg	C/I/S
FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(139.0) BA35722	N	cis-1,2-Dichloroethene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	cis-1,3-Dichloropropene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Cyclohexane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Dibromochloromethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Dichlorodifluoromethane	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Ethylbenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Isopropylbenzene (Cumene)	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	m,p-Xylene	14.0	6.90 U	6.90 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Methyl acetate	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S

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### Qualified Results associated with the Surrogate for SW8260C

FEW4-MW105-(139.0) BA35722	N	Methyl tert-butyl ether (MTBE)	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Methylcyclohexane	27.0	6.90 U	6.90 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Methylene chloride	27.0	14.0 U	14.0 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	o-Xylene	6.90	56.0	56.0 J	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Styrene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Tetrachloroethene (PCE)	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Toluene	6.90	410	410 J	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	trans-1,2-Dichloroethene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	trans-1,3-Dichloropropene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Trichloroethene (TCE)	6.90	51000	51000 J	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Trichlorofluoromethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Vinyl chloride	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,1,1-Trichloroethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,1,2,2-Tetrachloroethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,1,2-Trichloro-1,2,2trifluoroethane	12.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,1,2-Trichloroethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,1-Dichloroethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,1-Dichloroethene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,2,3-Trichlorobenzene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(159.0) BA35724	N	1,2,4-Trichlorobenzene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,2-Dibromo-3chloropropane	12.0	6.20 U	6.20 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,2-Dibromoethane (EDB)	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,2-Dichlorobenzene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S



## Data Validation Report for 96780

### Qualified Results associated with the Surrogate for SW8260C

FEW4-MW105-(159.0) BA35724	N	1,2-Dichloroethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,2-Dichloropropane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,3-Dichlorobenzene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,4-Dichlorobenzene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	2-Butanone (MEK)	12.0	3.70 U	3.70 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	2-Hexanone	12.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	4-Methyl-2-pentanone (MIBK)	12.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Acetone	12.0	9100	6.20 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Benzene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Bromochloromethane	12.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Bromodichloromethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Bromoform	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Bromomethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Carbon disulfide	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Carbon tetrachloride	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Chlorobenzene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Chloroethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Chloroform	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Chloromethane	12.0	6.20 U	6.20 UJ	+	ug/kg	C/I/S
FEW4-MW105-(159.0) BA35724	N	cis-1,2-Dichloroethene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	cis-1,3-Dichloropropene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Cyclohexane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Dibromochloromethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Dichlorodifluoromethane	12.0	2.50 U	2.50 UJ	+	ug/kg	I/S

## Data Validation Report for 96780

### Qualified Results associated with the Surrogate for SW8260C

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(159.0) BA35724	N	Ethylbenzene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Isopropylbenzene (Cumene)	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	m,p-Xylene	12.0	6.20 U	6.20 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Methyl acetate	12.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Methyl tert-butyl ether (MTBE)	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Methylcyclohexane	25.0	6.20 U	6.20 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Methylene chloride	25.0	12.0 U	12.0 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	o-Xylene	6.20	3.10 U	3.10 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Styrene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Tetrachloroethene (PCE)	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Toluene	6.20	120	120 J	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	trans-1,2-Dichloroethene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	trans-1,3-Dichloropropene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Trichloroethene (TCE)	6.20	960	960 J	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Trichlorofluoromethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Vinyl chloride	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,1,1-Trichloroethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,1,2,2-Tetrachloroethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,1,2-Trichloro- 1,2,2trifluoroethane	13.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,1,2-Trichloroethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,1-Dichloroethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,1-Dichloroethene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,2,3-Trichlorobenzene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S

## Data Validation Report for 96780

### Qualified Results associated with the Surrogate for SW8260C

FEW4-MW105-(89.0) BA35731	N	1,2,4-Trichlorobenzene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,2-Dibromo-3chloropropane	13.0	6.30 U	6.30 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,2-Dibromoethane (EDB)	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,2-Dichlorobenzene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,2-Dichloroethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(89.0) BA35731	N	1,2-Dichloropropane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,3-Dichlorobenzene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,4-Dichlorobenzene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	2-Butanone (MEK)	13.0	3.80 U	3.80 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	2-Hexanone	13.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	4-Methyl-2-pentanone (MIBK)	13.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Acetone	13.0	6000	6.30 UJ	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	Benzene	6.30	250	250 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	Bromochloromethane	13.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Bromodichloromethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Bromoform	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Bromomethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Carbon disulfide	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Carbon tetrachloride	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Chlorobenzene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Chloroethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Chloroform	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Chloromethane	13.0	6.30 U	6.30 UJ	+	ug/kg	C/I/S

## Data Validation Report for 96780

### Qualified Results associated with the Surrogate for SW8260C

FEW4-MW105-(89.0) BA35731	N	cis-1,2-Dichloroethene	6.30	310	310 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	cis-1,3-Dichloropropene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Cyclohexane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Dibromochloromethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Dichlorodifluoromethane	13.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Ethylbenzene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Isopropylbenzene (Cumene)	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	m,p-Xylene	13.0	39.0	39.0 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	Methyl acetate	13.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Methyl tert-butyl ether (MTBE)	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(89.0) BA35731	N	Methylcyclohexane	25.0	6.30 U	6.30 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Methylene chloride	25.0	13.0 U	13.0 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	o-Xylene	6.30	19.0	19.0 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	Styrene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Tetrachloroethene (PCE)	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Toluene	6.30	220	220 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	trans-1,2-Dichloroethene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	trans-1,3-Dichloropropene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Trichloroethene (TCE)	6.30	16000	16000 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	Trichlorofluoromethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Vinyl chloride	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,1,1-Trichloroethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,1,2,2-Tetrachloroethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S

## Data Validation Report for 96780

### Qualified Results associated with the Surrogate for SW8260C

FEW4-MW105-(89.0)-FD BA35732	FD	1,1,2-Trichloro- 1,2,2trifluoroethane	13.0	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,1,2-Trichloroethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,1-Dichloroethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,1-Dichloroethene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2,3-Trichlorobenzene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2,4-Trichlorobenzene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2-Dibromo- 3chloropropane	13.0	6.60 U	6.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2-Dibromoethane (EDB)	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2-Dichlorobenzene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2-Dichloroethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2-Dichloropropane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,3-Dichlorobenzene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,4-Dichlorobenzene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	2-Butanone (MEK)	13.0	4.00 U	4.00 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	2-Hexanone	13.0	2.60 U	2.60 UJ	+	ug/kg	I/S
FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(89.0)-FD BA35732	FD	4-Methyl-2-pentanone (MIBK)	13.0	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Acetone	13.0	21000	6.60 UJ	+	ug/kg	D3/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Benzene	6.60	760	760 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Bromochloromethane	13.0	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Bromodichloromethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Bromoform	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Bromomethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Carbon disulfide	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S

## Data Validation Report for 96780

### Qualified Results associated with the Surrogate for SW8260C

FEW4-MW105-(89.0)-FD BA35732	FD	Carbon tetrachloride	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Chlorobenzene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Chloroethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Chloroform	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Chloromethane	13.0	6.60 U	6.60 UJ	+	ug/kg	C/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	cis-1,2-Dichloroethene	6.60	2.60 U	2.60 U	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	cis-1,3-Dichloropropene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Cyclohexane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Dibromochloromethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Dichlorodifluoromethane	13.0	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Ethylbenzene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Isopropylbenzene (Cumene)	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	m,p-Xylene	13.0	130	130 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Methyl acetate	13.0	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Methyl tert-butyl ether (MTBE)	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Methylcyclohexane	26.0	6.60 U	6.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Methylene chloride	26.0	13.0 U	13.0 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	o-Xylene	6.60	58.0	58.0 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Styrene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Tetrachloroethene (PCE)	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(89.0)-FD BA35732	FD	Toluene	6.60	700	700 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	trans-1,2-Dichloroethene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	trans-1,3-Dichloropropene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S

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### Qualified Results associated with the Surrogate for SW8260C

FEW4-MW105-(89.0)-FD BA35732	FD	Trichloroethene (TCE)	6.60	50000	50000 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Trichlorofluoromethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Vinyl chloride	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S

Analytes not found in project samples are reported as not detected at the limit of detection (LOD) unless blank contamination occurs and then the sample may be reported as not detected at the (LOQ) based on the sample concentration. In instances where no LOD is provided, results are reported down to the LOQ.

## Data Validation Report for 96780

Table of All Qualified Results

Test Method: SW8260C		Extraction Method: SW5035						
FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(109.0) BA35719	N	Bromochloromethane	14.0	2.90 U	2.90 U		ug/kg	M
FEW4-MW105-(109.0) BA35719	N	Chloromethane	14.0	7.20 U	7.20 UJ		ug/kg	C
FEW4-MW105-(109.0) BA35719	N	Methyl acetate	14.0	2.90 U	2.90 U		ug/kg	M
FEW4-MW105-(109.0) BA35719	N	Trichloroethene (TCE)	7.20	57.0	57.0 J	+	ug/kg	M
FEW4-MW105-(119.0) BA35720	N	Acetone	14.0	13.0 J	6.80 UJ	+	ug/kg	I
FEW4-MW105-(119.0) BA35720	N	Trichloroethene (TCE)	6.80	67.0	67.0 J	+	ug/kg	I
FEW4-MW105-(129.0) BA35721	N	1,1,1-Trichloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,1,2,2-Tetrachloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,1,2-Trichloro- 1,2,2trifluoroethane	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,1,2-Trichloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,1-Dichloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,1-Dichloroethene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,2,3-Trichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,2,4-Trichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,2-Dibromo- 3chloropropane	14.0	6.90 U	6.90 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,2-Dibromoethane (EDB)	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,2-Dichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,2-Dichloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,2-Dichloropropane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,3-Dichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	1,4-Dichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	2-Butanone (MEK)	14.0	4.10 U	4.10 UJ	+	ug/kg	I/S



## Data Validation Report for 96780

**Table of All Qualified Results**

FEW4-MW105-(129.0) BA35721	N	2-Hexanone	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	4-Methyl-2-pentanone (MIBK)	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Acetone	14.0	14000	6.90 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Benzene	6.90	140	140 J	+	ug/kg	I/S

**Test Method: SW8260C**

**Extraction Method: SW5035**

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(129.0) BA35721	N	Bromochloromethane	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Bromodichloromethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Bromoform	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Bromomethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Carbon disulfide	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Carbon tetrachloride	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Chlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Chloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Chloroform	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Chloromethane	14.0	6.90 U	6.90 UJ	+	ug/kg	C/I/S
FEW4-MW105-(129.0) BA35721	N	cis-1,2-Dichloroethene	6.90	190	190 J	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	cis-1,3-Dichloropropene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Cyclohexane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Dibromochloromethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Dichlorodifluoromethane	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Ethylbenzene	6.90	26.0	26.0 J	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Isopropylbenzene (Cumene)	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	m,p-Xylene	14.0	38.0	38.0 J	+	ug/kg	I/S

## Data Validation Report for 96780

**Table of All Qualified Results**

FEW4-MW105-(129.0) BA35721	N	Methyl acetate	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Methyl tert-butyl ether (MTBE)	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Methylcyclohexane	27.0	6.90 U	6.90 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Methylene chloride	27.0	14.0 U	14.0 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	o-Xylene	6.90	17.0	17.0 J	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Styrene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Tetrachloroethene (PCE)	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Toluene	6.90	130	130 J	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	trans-1,2-Dichloroethene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S

**Test Method: SW8260C**

**Extraction Method: SW5035**

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(129.0) BA35721	N	trans-1,3-Dichloropropene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Trichloroethene (TCE)	6.90	22000	22000 J	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Trichlorofluoromethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(129.0) BA35721	N	Vinyl chloride	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,1,1-Trichloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,1,2,2-Tetrachloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,1,2-Trichloro- 1,2,2trifluoroethane	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,1,2-Trichloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,1-Dichloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,1-Dichloroethene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,2,3-Trichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,2,4-Trichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,2-Dibromo- 3chloropropane	14.0	6.90 U	6.90 UJ	+	ug/kg	I/S

## Data Validation Report for 96780

**Table of All Qualified Results**

FEW4-MW105-(139.0) BA35722	N	1,2-Dibromoethane (EDB)	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,2-Dichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,2-Dichloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,2-Dichloropropane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,3-Dichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	1,4-Dichlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	2-Butanone (MEK)	14.0	4.10 U	4.10 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	2-Hexanone	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	4-Methyl-2-pentanone (MIBK)	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Acetone	14.0	29000	6.90 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Benzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Bromochloromethane	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Bromodichloromethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Bromoform	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S

**Test Method: SW8260C**

**Extraction Method: SW5035**

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(139.0) BA35722	N	Bromomethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Carbon disulfide	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Carbon tetrachloride	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Chlorobenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Chloroethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Chloroform	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Chloromethane	14.0	6.90 U	6.90 UJ	+	ug/kg	C/I/S
FEW4-MW105-(139.0) BA35722	N	cis-1,2-Dichloroethene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S

## Data Validation Report for 96780

**Table of All Qualified Results**

FEW4-MW105-(139.0) BA35722	N	cis-1,3-Dichloropropene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Cyclohexane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Dibromochloromethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Dichlorodifluoromethane	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Ethylbenzene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Isopropylbenzene (Cumene)	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	m,p-Xylene	14.0	6.90 U	6.90 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Methyl acetate	14.0	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Methyl tert-butyl ether (MTBE)	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Methylcyclohexane	27.0	6.90 U	6.90 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Methylene chloride	27.0	14.0 U	14.0 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	o-Xylene	6.90	56.0	56.0 J	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Styrene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Tetrachloroethene (PCE)	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Toluene	6.90	410	410 J	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	trans-1,2-Dichloroethene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	trans-1,3-Dichloropropene	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Trichloroethene (TCE)	6.90	51000	51000 J	+	ug/kg	I/S
FEW4-MW105-(139.0) BA35722	N	Trichlorofluoromethane	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S

**Test Method: SW8260C**

**Extraction Method: SW5035**

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(139.0) BA35722	N	Vinyl chloride	6.90	2.70 U	2.70 UJ	+	ug/kg	I/S
FEW4-MW105-(149.0) BA35723	N	1,1,1-Trichloroethane	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	1,1,2,2-Tetrachloroethane	7.50	3.00 U	3.00 UJ	+	ug/kg	S

## Data Validation Report for 96780

**Table of All Qualified Results**

FEW4-MW105-(149.0) BA35723	N	1,1,2-Trichloro- 1,2,2trifluoroethane	15.0	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	1,1,2-Trichloroethane	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	1,1-Dichloroethane	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	1,1-Dichloroethene	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	1,2,3-Trichlorobenzene	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	1,2,4-Trichlorobenzene	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	1,2-Dibromo- 3chloropropane	15.0	7.50 U	7.50 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	1,2-Dibromoethane (EDB)	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	1,2-Dichlorobenzene	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	1,2-Dichloroethane	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	1,2-Dichloropropane	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	1,3-Dichlorobenzene	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	1,4-Dichlorobenzene	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	2-Butanone (MEK)	15.0	4.50 U	4.50 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	2-Hexanone	15.0	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	4-Methyl-2-pentanone (MIBK)	15.0	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	Acetone	15.0	9.70 J	7.50 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	Benzene	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	Bromochloromethane	15.0	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	Bromodichloromethane	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	Bromoform	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	Bromomethane	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	Carbon disulfide	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	Carbon tetrachloride	7.50	3.00 U	3.00 UJ	+	ug/kg	S

## Data Validation Report for 96780

Table of All Qualified Results

Test Method: SW8260C		Extraction Method: SW5035							
FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason	
FEW4-MW105-(149.0) BA35723	N	Chlorobenzene	7.50	3.00 U	3.00 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	Chloroethane	7.50	3.00 U	3.00 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	Chloroform	7.50	3.00 U	3.00 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	Chloromethane	15.0	7.50 U	7.50 UJ	+	ug/kg	C/S	
FEW4-MW105-(149.0) BA35723	N	cis-1,2-Dichloroethene	7.50	3.00 U	3.00 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	cis-1,3-Dichloropropene	7.50	3.00 U	3.00 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	Cyclohexane	7.50	3.00 U	3.00 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	Dibromochloromethane	7.50	3.00 U	3.00 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	Dichlorodifluoromethane	15.0	3.00 U	3.00 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	Ethylbenzene	7.50	3.00 U	3.00 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	Isopropylbenzene (Cumene)	7.50	3.00 U	3.00 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	m,p-Xylene	15.0	7.50 U	7.50 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	Methyl acetate	15.0	3.00 U	3.00 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	Methyl tert-butyl ether (MTBE)	7.50	3.00 U	3.00 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	Methylcyclohexane	30.0	7.50 U	7.50 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	Methylene chloride	30.0	15.0 U	15.0 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	o-Xylene	7.50	3.80 U	3.80 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	Styrene	7.50	3.00 U	3.00 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	Tetrachloroethene (PCE)	7.50	3.00 U	3.00 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	Toluene	7.50	3.00 U	3.00 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	trans-1,2-Dichloroethene	7.50	3.00 U	3.00 UJ	+	ug/kg	S	
FEW4-MW105-(149.0) BA35723	N	trans-1,3-Dichloropropene	7.50	3.00 U	3.00 UJ	+	ug/kg	S	

## Data Validation Report for 96780

**Table of All Qualified Results**

FEW4-MW105-(149.0) BA35723	N	Trichloroethene (TCE)	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	Trichlorofluoromethane	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(149.0) BA35723	N	Vinyl chloride	7.50	3.00 U	3.00 UJ	+	ug/kg	S
FEW4-MW105-(159.0) BA35724	N	1,1,1-Trichloroethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,1,2,2-Tetrachloroethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S

**Test Method: SW8260C**

**Extraction Method: SW5035**

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(159.0) BA35724	N	1,1,2-Trichloro- 1,2,2trifluoroethane	12.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,1,2-Trichloroethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,1-Dichloroethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,1-Dichloroethene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,2,3-Trichlorobenzene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,2,4-Trichlorobenzene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,2-Dibromo- 3chloropropane	12.0	6.20 U	6.20 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,2-Dibromoethane (EDB)	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,2-Dichlorobenzene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,2-Dichloroethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,2-Dichloropropane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,3-Dichlorobenzene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	1,4-Dichlorobenzene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	2-Butanone (MEK)	12.0	3.70 U	3.70 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	2-Hexanone	12.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	4-Methyl-2-pentanone (MIBK)	12.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Acetone	12.0	9100	6.20 UJ	+	ug/kg	I/S

## Data Validation Report for 96780

**Table of All Qualified Results**

FEW4-MW105-(159.0) BA35724	N	Benzene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Bromochloromethane	12.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Bromodichloromethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Bromoform	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Bromomethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Carbon disulfide	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Carbon tetrachloride	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Chlorobenzene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Chloroethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Chloroform	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S

**Test Method: SW8260C**

**Extraction Method: SW5035**

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(159.0) BA35724	N	Chloromethane	12.0	6.20 U	6.20 UJ	+	ug/kg	C/I/S
FEW4-MW105-(159.0) BA35724	N	cis-1,2-Dichloroethene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	cis-1,3-Dichloropropene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Cyclohexane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Dibromochloromethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Dichlorodifluoromethane	12.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Ethylbenzene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Isopropylbenzene (Cumene)	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	m,p-Xylene	12.0	6.20 U	6.20 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Methyl acetate	12.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Methyl tert-butyl ether (MTBE)	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Methylcyclohexane	25.0	6.20 U	6.20 UJ	+	ug/kg	I/S



## Data Validation Report for 96780

**Table of All Qualified Results**

FEW4-MW105-(159.0) BA35724	N	Methylene chloride	25.0	12.0 U	12.0 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	o-Xylene	6.20	3.10 U	3.10 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Styrene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Tetrachloroethene (PCE)	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Toluene	6.20	120	120 J	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	trans-1,2-Dichloroethene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	trans-1,3-Dichloropropene	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Trichloroethene (TCE)	6.20	960	960 J	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Trichlorofluoromethane	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(159.0) BA35724	N	Vinyl chloride	6.20	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(169.0) BA35725	N	Chloromethane	15.0	7.40 U	7.40 UJ		ug/kg	C
FEW4-MW105-(169.0)-FD BA35726	FD	Chloromethane	15.0	7.30 U	7.30 UJ		ug/kg	C
FEW4-MW105-(179.0) BA35727	N	Chloromethane	15.0	7.40 U	7.40 UJ		ug/kg	C
FEW4-MW105-(189.0) BA35728	N	Chloromethane	14.0	7.20 U	7.20 UJ		ug/kg	C
FEW4-MW105-(69.0) BA35729	N	Chloromethane	13.0	6.60 U	6.60 UJ		ug/kg	C

**Test Method: SW8260C**

**Extraction Method: SW5035**

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(79.0) BA35730	N	Chloromethane	14.0	7.10 U	7.10 UJ		ug/kg	C
FEW4-MW105-(89.0) BA35731	N	1,1,1-Trichloroethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,1,2,2-Tetrachloroethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,1,2-Trichloro- 1,2,2trifluoroethane	13.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,1,2-Trichloroethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,1-Dichloroethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,1-Dichloroethene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S

## Data Validation Report for 96780

**Table of All Qualified Results**

FEW4-MW105-(89.0) BA35731	N	1,2,3-Trichlorobenzene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,2,4-Trichlorobenzene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,2-Dibromo-3chloropropane	13.0	6.30 U	6.30 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,2-Dibromoethane (EDB)	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,2-Dichlorobenzene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,2-Dichloroethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,2-Dichloropropane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,3-Dichlorobenzene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	1,4-Dichlorobenzene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	2-Butanone (MEK)	13.0	3.80 U	3.80 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	2-Hexanone	13.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	4-Methyl-2-pentanone (MIBK)	13.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Acetone	13.0	6000	6.30 UJ	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	Benzene	6.30	250	250 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	Bromochloromethane	13.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Bromodichloromethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Bromoform	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Bromomethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Carbon disulfide	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Carbon tetrachloride	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S

**Test Method: SW8260C**

**Extraction Method: SW5035**

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(89.0) BA35731	N	Chlorobenzene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Chloroethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S

## Data Validation Report for 96780

**Table of All Qualified Results**

FEW4-MW105-(89.0) BA35731	N	Chloroform	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Chloromethane	13.0	6.30 U	6.30 UJ	+	ug/kg	C/I/S
FEW4-MW105-(89.0) BA35731	N	cis-1,2-Dichloroethene	6.30	310	310 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	cis-1,3-Dichloropropene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Cyclohexane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Dibromochloromethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Dichlorodifluoromethane	13.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Ethylbenzene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Isopropylbenzene (Cumene)	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	m,p-Xylene	13.0	39.0	39.0 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	Methyl acetate	13.0	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Methyl tert-butyl ether (MTBE)	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Methylcyclohexane	25.0	6.30 U	6.30 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Methylene chloride	25.0	13.0 U	13.0 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	o-Xylene	6.30	19.0	19.0 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	Styrene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Tetrachloroethene (PCE)	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Toluene	6.30	220	220 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	trans-1,2-Dichloroethene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	trans-1,3-Dichloropropene	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Trichloroethene (TCE)	6.30	16000	16000 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0) BA35731	N	Trichlorofluoromethane	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0) BA35731	N	Vinyl chloride	6.30	2.50 U	2.50 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,1,1-Trichloroethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S

## Data Validation Report for 96780

**Table of All Qualified Results**

FEW4-MW105-(89.0)-FD BA35732	FD	1,1,2,2-Tetrachloroethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
<b>Test Method: SW8260C</b>		<b>Extraction Method: SW5035</b>						
FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(89.0)-FD BA35732	FD	1,1,2-Trichloro- 1,2,2trifluoroethane	13.0	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,1,2-Trichloroethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,1-Dichloroethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,1-Dichloroethene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2,3-Trichlorobenzene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2,4-Trichlorobenzene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2-Dibromo- 3chloropropane	13.0	6.60 U	6.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2-Dibromoethane (EDB)	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2-Dichlorobenzene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2-Dichloroethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2-Dichloropropane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,3-Dichlorobenzene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,4-Dichlorobenzene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	2-Butanone (MEK)	13.0	4.00 U	4.00 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	2-Hexanone	13.0	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	4-Methyl-2-pentanone (MIBK)	13.0	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Acetone	13.0	21000	6.60 UJ	+	ug/kg	D3/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Benzene	6.60	760	760 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Bromochloromethane	13.0	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Bromodichloromethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Bromoform	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S

## Data Validation Report for 96780

**Table of All Qualified Results**

FEW4-MW105-(89.0)-FD BA35732	FD	Bromomethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Carbon disulfide	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Carbon tetrachloride	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Chlorobenzene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Chloroethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Chloroform	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
<b>Test Method: SW8260C</b>		<b>Extraction Method: SW5035</b>						
FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(89.0)-FD BA35732	FD	Chloromethane	13.0	6.60 U	6.60 UJ	+	ug/kg	C/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	cis-1,2-Dichloroethene	6.60	2.60 U	2.60 U	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	cis-1,3-Dichloropropene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Cyclohexane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Dibromochloromethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Dichlorodifluoromethane	13.0	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Ethylbenzene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Isopropylbenzene (Cumene)	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	m,p-Xylene	13.0	130	130 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Methyl acetate	13.0	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Methyl tert-butyl ether (MTBE)	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Methylcyclohexane	26.0	6.60 U	6.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Methylene chloride	26.0	13.0 U	13.0 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	o-Xylene	6.60	58.0	58.0 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Styrene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Tetrachloroethene (PCE)	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S

## Data Validation Report for 96780

**Table of All Qualified Results**

FEW4-MW105-(89.0)-FD BA35732	FD	Toluene	6.60	700	700 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	trans-1,2-Dichloroethene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	trans-1,3-Dichloropropene	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Trichloroethene (TCE)	6.60	50000	50000 J	+	ug/kg	D3/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Trichlorofluoromethane	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Vinyl chloride	6.60	2.60 U	2.60 UJ	+	ug/kg	I/S
FEW4-MW105-(99.0) BA35733	N	Chloromethane	15.0	7.40 U	7.40 UJ		ug/kg	C

Analytes not found in project samples are reported as not detected at the limit of detection (LOD) unless blank contamination occurs and then the sample may be reported as not detected at the (LOQ) based on the sample concentration.

In instances where no LOD is provided, results are reported down to the LOQ.

Trace values are not included in the qualified results table unless additional reason codes are associated.

## Data Validation Report for 96780

### Trace Results

No results associated with this sample delivery group are considered trace.

### Table of Results with Modified Qualifiers

#### Modified Qualifiers for test method SW8260C

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
FEW4-MW105-(109.0) BA35719	N	2-Butanone (MEK)	14.0	5.20 J	5.20 J	4.30 U	
FEW4-MW105-(109.0) BA35719	N	Acetone	14.0	7.60 J	7.60 J	7.20 U	
FEW4-MW105-(109.0) BA35719	N	Bromochloromethane	14.0	2.90 U	2.90 X	2.90 U	M
FEW4-MW105-(109.0) BA35719	N	Methyl acetate	14.0	2.90 U	2.90 X	2.90 U	M
FEW4-MW105-(119.0) BA35720	N	Acetone	14.0	13.0 J	13.0 J	6.80 UJ	I
FEW4-MW105-(129.0) BA35721	N	1,1,1-Trichloroethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	1,1,2,2-Tetrachloroethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	1,1,2-Trichloro- 1,2,2trifluoroethane	14.0	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	1,1,2-Trichloroethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	1,1-Dichloroethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	1,1-Dichloroethene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	1,2,3-Trichlorobenzene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	1,2,4-Trichlorobenzene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	1,2-Dibromo- 3chloropropane	14.0	6.90 U	6.90 UJ	6.90 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	1,2-Dibromoethane (EDB)	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	1,2-Dichlorobenzene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	1,2-Dichloroethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	1,2-Dichloropropane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	1,3-Dichlorobenzene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	1,4-Dichlorobenzene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S

## Data Validation Report for 96780

**Table of Results with Modified Qualifiers**

FEW4-MW105-(129.0) BA35721	N	2-Butanone (MEK)	14.0	4.10 U	4.10 UJ	4.10 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	2-Hexanone	14.0	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	4-Methyl-2-pentanone (MIBK)	14.0	2.70 U	2.70 UJ	2.70 UJ	I/S

**Modified Qualifiers for test method SW8260C**

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
FEW4-MW105-(129.0) BA35721	N	Acetone	14.0	14000	14000 J	6.90 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Benzene	6.90	140	140 J	140 J	I/S
FEW4-MW105-(129.0) BA35721	N	Bromochloromethane	14.0	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Bromodichloromethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Bromoform	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Bromomethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Carbon disulfide	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Carbon tetrachloride	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Chlorobenzene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Chloroethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Chloroform	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Chloromethane	14.0	6.90 U	6.90 UJ	6.90 UJ	C/I/S
FEW4-MW105-(129.0) BA35721	N	cis-1,2-Dichloroethene	6.90	190	190 J	190 J	I/S
FEW4-MW105-(129.0) BA35721	N	cis-1,3-Dichloropropene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Cyclohexane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Dibromochloromethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Dichlorodifluoromethane	14.0	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Ethylbenzene	6.90	26.0	26.0 J	26.0 J	I/S
FEW4-MW105-(129.0) BA35721	N	Isopropylbenzene (Cumene)	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S



## Data Validation Report for 96780

**Table of Results with Modified Qualifiers**

FEW4-MW105-(129.0) BA35721	N	m,p-Xylene	14.0	38.0	38.0 J	38.0 J	I/S
FEW4-MW105-(129.0) BA35721	N	Methyl acetate	14.0	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Methyl tert-butyl ether (MTBE)	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Methylcyclohexane	27.0	6.90 U	6.90 UJ	6.90 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Methylene chloride	27.0	14.0 U	14.0 UJ	14.0 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	o-Xylene	6.90	17.0	17.0 J	17.0 J	I/S
FEW4-MW105-(129.0) BA35721	N	Styrene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Tetrachloroethene (PCE)	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S

**Modified Qualifiers for test method SW8260C**

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
FEW4-MW105-(129.0) BA35721	N	Toluene	6.90	130	130 J	130 J	I/S
FEW4-MW105-(129.0) BA35721	N	trans-1,2-Dichloroethene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	trans-1,3-Dichloropropene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Trichloroethene (TCE)	6.90	22000	22000 J	22000 J	I/S
FEW4-MW105-(129.0) BA35721	N	Trichlorofluoromethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(129.0) BA35721	N	Vinyl chloride	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	1,1,1-Trichloroethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	1,1,2,2-Tetrachloroethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	1,1,2-Trichloro- 1,2,2trifluoroethane	14.0	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	1,1,2-Trichloroethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	1,1-Dichloroethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	1,1-Dichloroethene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	1,2,3-Trichlorobenzene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	1,2,4-Trichlorobenzene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S

## Data Validation Report for 96780

**Table of Results with Modified Qualifiers**

FEW4-MW105-(139.0) BA35722	N	1,2-Dibromo-3chloropropane	14.0	6.90 U	6.90 UJ	6.90 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	1,2-Dibromoethane (EDB)	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	1,2-Dichlorobenzene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	1,2-Dichloroethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	1,2-Dichloropropane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	1,3-Dichlorobenzene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	1,4-Dichlorobenzene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	2-Butanone (MEK)	14.0	4.10 U	4.10 UJ	4.10 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	2-Hexanone	14.0	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	4-Methyl-2-pentanone (MIBK)	14.0	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Acetone	14.0	29000	29000 J	6.90 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Benzene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Bromochloromethane	14.0	2.70 U	2.70 UJ	2.70 UJ	I/S

**Modified Qualifiers for test method SW8260C**

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
FEW4-MW105-(139.0) BA35722	N	Bromodichloromethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Bromoform	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Bromomethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Carbon disulfide	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Carbon tetrachloride	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Chlorobenzene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Chloroethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Chloroform	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Chloromethane	14.0	6.90 U	6.90 UJ	6.90 UJ	C/I/S

## Data Validation Report for 96780

**Table of Results with Modified Qualifiers**

FEW4-MW105-(139.0) BA35722	N	cis-1,2-Dichloroethene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	cis-1,3-Dichloropropene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Cyclohexane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Dibromochloromethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Dichlorodifluoromethane	14.0	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Ethylbenzene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Isopropylbenzene (Cumene)	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	m,p-Xylene	14.0	6.90 U	6.90 UJ	6.90 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Methyl acetate	14.0	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Methyl tert-butyl ether (MTBE)	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Methylcyclohexane	27.0	6.90 U	6.90 UJ	6.90 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Methylene chloride	27.0	14.0 U	14.0 UJ	14.0 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	o-Xylene	6.90	56.0	56.0 J	56.0 J	I/S
FEW4-MW105-(139.0) BA35722	N	Styrene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Tetrachloroethene (PCE)	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Toluene	6.90	410	410 J	410 J	I/S
FEW4-MW105-(139.0) BA35722	N	trans-1,2-Dichloroethene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	trans-1,3-Dichloropropene	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S

**Modified Qualifiers for test method SW8260C**

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
FEW4-MW105-(139.0) BA35722	N	Trichloroethene (TCE)	6.90	51000	51000 J	51000 J	I/S
FEW4-MW105-(139.0) BA35722	N	Trichlorofluoromethane	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(139.0) BA35722	N	Vinyl chloride	6.90	2.70 U	2.70 UJ	2.70 UJ	I/S
FEW4-MW105-(149.0) BA35723	N	1,1,1-Trichloroethane	7.50	3.00 U	3.00 U	3.00 UJ	S

## Data Validation Report for 96780

**Table of Results with Modified Qualifiers**

FEW4-MW105-(149.0) BA35723	N	1,1,2,2-Tetrachloroethane	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	1,1,2-Trichloro- 1,2,2trifluoroethane	15.0	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	1,1,2-Trichloroethane	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	1,1-Dichloroethane	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	1,1-Dichloroethene	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	1,2,3-Trichlorobenzene	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	1,2,4-Trichlorobenzene	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	1,2-Dibromo- 3chloropropane	15.0	7.50 U	7.50 U	7.50 UJ	S
FEW4-MW105-(149.0) BA35723	N	1,2-Dibromoethane (EDB)	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	1,2-Dichlorobenzene	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	1,2-Dichloroethane	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	1,2-Dichloropropane	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	1,3-Dichlorobenzene	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	1,4-Dichlorobenzene	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	2-Butanone (MEK)	15.0	4.50 U	4.50 U	4.50 UJ	S
FEW4-MW105-(149.0) BA35723	N	2-Hexanone	15.0	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	4-Methyl-2-pentanone (MIBK)	15.0	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Acetone	15.0	9.70 J	9.70 J	7.50 UJ	S
FEW4-MW105-(149.0) BA35723	N	Benzene	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Bromochloromethane	15.0	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Bromodichloromethane	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Bromoform	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Bromomethane	7.50	3.00 U	3.00 U	3.00 UJ	S

### Modified Qualifiers for test method SW8260C

## Data Validation Report for 96780

**Table of Results with Modified Qualifiers**

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
FEW4-MW105-(149.0) BA35723	N	Carbon disulfide	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Carbon tetrachloride	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Chlorobenzene	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Chloroethane	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Chloroform	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Chloromethane	15.0	7.50 U	7.50 UJ	7.50 UJ	C/S
FEW4-MW105-(149.0) BA35723	N	cis-1,2-Dichloroethene	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	cis-1,3-Dichloropropene	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Cyclohexane	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Dibromochloromethane	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Dichlorodifluoromethane	15.0	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Ethylbenzene	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Isopropylbenzene (Cumene)	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	m,p-Xylene	15.0	7.50 U	7.50 U	7.50 UJ	S
FEW4-MW105-(149.0) BA35723	N	Methyl acetate	15.0	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Methyl tert-butyl ether (MTBE)	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Methylcyclohexane	30.0	7.50 U	7.50 U	7.50 UJ	S
FEW4-MW105-(149.0) BA35723	N	Methylene chloride	30.0	15.0 U	15.0 U	15.0 UJ	S
FEW4-MW105-(149.0) BA35723	N	o-Xylene	7.50	3.80 U	3.80 U	3.80 UJ	S
FEW4-MW105-(149.0) BA35723	N	Styrene	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Tetrachloroethene (PCE)	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Toluene	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	trans-1,2-Dichloroethene	7.50	3.00 U	3.00 U	3.00 UJ	S

## Data Validation Report for 96780

**Table of Results with Modified Qualifiers**

FEW4-MW105-(149.0) BA35723	N	trans-1,3-Dichloropropene	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Trichloroethene (TCE)	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Trichlorofluoromethane	7.50	3.00 U	3.00 U	3.00 UJ	S
FEW4-MW105-(149.0) BA35723	N	Vinyl chloride	7.50	3.00 U	3.00 U	3.00 UJ	S

**Modified Qualifiers for test method SW8260C**

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
FEW4-MW105-(159.0) BA35724	N	1,1,1-Trichloroethane	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	1,1,2,2-Tetrachloroethane	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	1,1,2-Trichloro- 1,2,2trifluoroethane	12.0	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	1,1,2-Trichloroethane	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	1,1-Dichloroethane	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	1,1-Dichloroethene	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	1,2,3-Trichlorobenzene	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	1,2,4-Trichlorobenzene	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	1,2-Dibromo- 3chloropropane	12.0	6.20 U	6.20 UJ	6.20 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	1,2-Dibromoethane (EDB)	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	1,2-Dichlorobenzene	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	1,2-Dichloroethane	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	1,2-Dichloropropane	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	1,3-Dichlorobenzene	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	1,4-Dichlorobenzene	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	2-Butanone (MEK)	12.0	3.70 U	3.70 UJ	3.70 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	2-Hexanone	12.0	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	4-Methyl-2-pentanone (MIBK)	12.0	2.50 U	2.50 UJ	2.50 UJ	I/S

## Data Validation Report for 96780

**Table of Results with Modified Qualifiers**

FEW4-MW105-(159.0) BA35724	N	Acetone	12.0	9100	9100 J	6.20 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Benzene	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Bromochloromethane	12.0	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Bromodichloromethane	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Bromoform	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Bromomethane	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Carbon disulfide	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Carbon tetrachloride	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Chlorobenzene	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S

**Modified Qualifiers for test method SW8260C**

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
FEW4-MW105-(159.0) BA35724	N	Chloroethane	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Chloroform	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Chloromethane	12.0	6.20 U	6.20 UJ	6.20 UJ	C/I/S
FEW4-MW105-(159.0) BA35724	N	cis-1,2-Dichloroethene	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	cis-1,3-Dichloropropene	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Cyclohexane	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Dibromochloromethane	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Dichlorodifluoromethane	12.0	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Ethylbenzene	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Isopropylbenzene (Cumene)	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	m,p-Xylene	12.0	6.20 U	6.20 UJ	6.20 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Methyl acetate	12.0	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Methyl tert-butyl ether (MTBE)	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S

## Data Validation Report for 96780

**Table of Results with Modified Qualifiers**

FEW4-MW105-(159.0) BA35724	N	Methylcyclohexane	25.0	6.20 U	6.20 UJ	6.20 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Methylene chloride	25.0	12.0 U	12.0 UJ	12.0 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	o-Xylene	6.20	3.10 U	3.10 UJ	3.10 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Styrene	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Tetrachloroethene (PCE)	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Toluene	6.20	120	120 J	120 J	I/S
FEW4-MW105-(159.0) BA35724	N	trans-1,2-Dichloroethene	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	trans-1,3-Dichloropropene	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Trichloroethene (TCE)	6.20	960	960 J	960 J	I/S
FEW4-MW105-(159.0) BA35724	N	Trichlorofluoromethane	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(159.0) BA35724	N	Vinyl chloride	6.20	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(169.0)-FD BA35726	FD	Acetone	15.0	11.0 J	11.0 J	7.30 U	
FEW4-MW105-(179.0) BA35727	N	Acetone	15.0	16.0	16.0	7.40 U	
FEW4-MW105-(189.0) BA35728	N	Acetone	14.0	7.40 J	7.40 J	7.20 U	

**Modified Qualifiers for test method SW8260C**

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
FEW4-MW105-(79.0) BA35730	N	Acetone	14.0	6.30 J	6.30 J	7.10 U	
FEW4-MW105-(89.0) BA35731	N	1,1,1-Trichloroethane	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	1,1,2,2-Tetrachloroethane	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	1,1,2-Trichloro- 1,2,2trifluoroethane	13.0	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	1,1,2-Trichloroethane	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	1,1-Dichloroethane	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	1,1-Dichloroethene	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	1,2,3-Trichlorobenzene	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S



## Data Validation Report for 96780

**Table of Results with Modified Qualifiers**

FEW4-MW105-(89.0) BA35731	N	1,2,4-Trichlorobenzene	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	1,2-Dibromo-3chloropropane	13.0	6.30 U	6.30 UJ	6.30 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	1,2-Dibromoethane (EDB)	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	1,2-Dichlorobenzene	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	1,2-Dichloroethane	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	1,2-Dichloropropane	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	1,3-Dichlorobenzene	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	1,4-Dichlorobenzene	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	2-Butanone (MEK)	13.0	3.80 U	3.80 UJ	3.80 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	2-Hexanone	13.0	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	4-Methyl-2-pentanone (MIBK)	13.0	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Acetone	13.0	6000	6000 J	6.30 UJ	D3/I/S
FEW4-MW105-(89.0) BA35731	N	Benzene	6.30	250	250 J	250 J	D3/I/S
FEW4-MW105-(89.0) BA35731	N	Bromochloromethane	13.0	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Bromodichloromethane	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Bromoform	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Bromomethane	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Carbon disulfide	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Carbon tetrachloride	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S

### Modified Qualifiers for test method SW8260C

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
FEW4-MW105-(89.0) BA35731	N	Chlorobenzene	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Chloroethane	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Chloroform	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S

## Data Validation Report for 96780

**Table of Results with Modified Qualifiers**

FEW4-MW105-(89.0) BA35731	N	Chloromethane	13.0	6.30 U	6.30 UJ	6.30 UJ	C/I/S
FEW4-MW105-(89.0) BA35731	N	cis-1,2-Dichloroethene	6.30	310	310 J	310 J	D3/I/S
FEW4-MW105-(89.0) BA35731	N	cis-1,3-Dichloropropene	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Cyclohexane	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Dibromochloromethane	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Dichlorodifluoromethane	13.0	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Ethylbenzene	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Isopropylbenzene (Cumene)	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	m,p-Xylene	13.0	39.0	39.0 J	39.0 J	D3/I/S
FEW4-MW105-(89.0) BA35731	N	Methyl acetate	13.0	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Methyl tert-butyl ether (MTBE)	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Methylcyclohexane	25.0	6.30 U	6.30 UJ	6.30 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Methylene chloride	25.0	13.0 U	13.0 UJ	13.0 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	o-Xylene	6.30	19.0	19.0 J	19.0 J	D3/I/S
FEW4-MW105-(89.0) BA35731	N	Styrene	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Tetrachloroethene (PCE)	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Toluene	6.30	220	220 J	220 J	D3/I/S
FEW4-MW105-(89.0) BA35731	N	trans-1,2-Dichloroethene	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	trans-1,3-Dichloropropene	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Trichloroethene (TCE)	6.30	16000	16000 J	16000 J	D3/I/S
FEW4-MW105-(89.0) BA35731	N	Trichlorofluoromethane	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0) BA35731	N	Vinyl chloride	6.30	2.50 U	2.50 UJ	2.50 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,1,1-Trichloroethane	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,1,2,2-Tetrachloroethane	6.60	2.60 U	2.60 X	2.60 UJ	I/S

## Data Validation Report for 96780

### Table of Results with Modified Qualifiers

#### Modified Qualifiers for test method SW8260C

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
FEW4-MW105-(89.0)-FD BA35732	FD	1,1,2-Trichloro- 1,2,2trifluoroethane	13.0	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,1,2-Trichloroethane	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,1-Dichloroethane	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,1-Dichloroethene	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2,3-Trichlorobenzene	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2,4-Trichlorobenzene	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2-Dibromo- 3chloropropane	13.0	6.60 U	6.60 X	6.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2-Dibromoethane (EDB)	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2-Dichlorobenzene	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2-Dichloroethane	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,2-Dichloropropane	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,3-Dichlorobenzene	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	1,4-Dichlorobenzene	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	2-Butanone (MEK)	13.0	4.00 U	4.00 X	4.00 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	2-Hexanone	13.0	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	4-Methyl-2-pentanone (MIBK)	13.0	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Acetone	13.0	21000	21000 J	6.60 UJ	D3/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Benzene	6.60	760	760 J	760 J	D3/I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Bromochloromethane	13.0	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Bromodichloromethane	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Bromoform	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Bromomethane	6.60	2.60 U	2.60 X	2.60 UJ	I/S

## Data Validation Report for 96780

**Table of Results with Modified Qualifiers**

FEW4-MW105-(89.0)-FD BA35732	FD	Carbon disulfide	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Carbon tetrachloride	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Chlorobenzene	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Chloroethane	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Chloroform	6.60	2.60 U	2.60 X	2.60 UJ	I/S

## Data Validation Report for 96780

### Table of Results with Modified Qualifiers

#### Modified Qualifiers for test method SW8260C

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
FEW4-MW105-(89.0)-FD BA35732	FD	Chloromethane	13.0	6.60 U	6.60 X	6.60 UJ	C//I/S
FEW4-MW105-(89.0)-FD BA35732	FD	cis-1,2-Dichloroethene	6.60	2.60 U	2.60 X	2.60 U	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	cis-1,3-Dichloropropene	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Cyclohexane	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Dibromochloromethane	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Dichlorodifluoromethane	13.0	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Ethylbenzene	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Isopropylbenzene (Cumene)	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	m,p-Xylene	13.0	130	130 J	130 J	D3//I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Methyl acetate	13.0	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Methyl tert-butyl ether (MTBE)	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Methylcyclohexane	26.0	6.60 U	6.60 X	6.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Methylene chloride	26.0	13.0 U	13.0 X	13.0 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	o-Xylene	6.60	58.0	58.0 J	58.0 J	D3//I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Styrene	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Tetrachloroethene (PCE)	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Toluene	6.60	700	700 J	700 J	D3//I/S
FEW4-MW105-(89.0)-FD BA35732	FD	trans-1,2-Dichloroethene	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	trans-1,3-Dichloropropene	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Trichloroethene (TCE)	6.60	50000	50000 J	50000 J	D3//I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Trichlorofluoromethane	6.60	2.60 U	2.60 X	2.60 UJ	I/S
FEW4-MW105-(89.0)-FD BA35732	FD	Vinyl chloride	6.60	2.60 U	2.60 X	2.60 UJ	I/S

## Data Validation Report for 96780

### Review Questions

FEW4-MW105-(99.0) BA35733	N	Acetone	15.0	13.0 J	13.0 J	7.40 U
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Analytes not found in project samples are reported as not detected at the limit of detection (LOD) unless blank contamination occurs and then the sample may be reported as not detected at the (LOQ) based on the sample concentration.

In instances where no LOD is provided, results are reported down to the LOQ.

Trace values are not included in the qualified results table unless additional reason codes are associated.

### Reason Code Definitions

Code	Definition
C	LCS Recovery
D3	Field Duplicate RPD
I	Surrogate recovery outside project limits.
M	MS Recovery
S	Internal standard
Z	LCS RPD

### Flag Code and Definitions

Flag	Definition
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

### Bias

-	The result may be biased low
+	The result may be biased high

Note - The bias field is a separate field; however, it is an integral part of the final flag (qualifier) on the sample result

Method: SW8260C (Volatile Organic Compounds by GC/MS)

Review Questions	Yes	No	NA	Comment
Were all samples documented correctly on the chain-of-custody (COC)?	•			
Did samples listed on COCs match the sample labels?	•			
Were samples relinquished properly on the COC?	•			
Were all samples properly preserved?	•			

## Data Validation Report for 96780

Were sampling dates/times, date and time of laboratory receipt of samples, and sample conditions upon receipt at the laboratory (including preservation, pH, and temperature) are documented?	•	
Were sample results reported with percent moisture correction if required?	•	
Were analytical methods performed and analysis dates present?	•	
Were all requested target analytes reported?	•	
Were QAPP specified laboratory PQLs achieved?	•	
Were holding times met?	•	
Were trip blanks analyzed at the proper frequency and in control?	•	
Were field blanks analyzed at the proper frequency and in control?	•	
Were equipment blanks analyzed at the proper frequency and in control?	•	
Was a method blank prepared and analyzed with each batch?	•	
Were target analytes in the method blank less than DL?	•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•	
Were LCS/LCSD recoveries within project acceptance limits?	•	210716S-35719 LCS - 268140: Chloromethane 44.5% recovery was less than the 50% lower control limit.
Was the LCS/LCSD RPD within project acceptance limits?	•	210716S-35719 LCS - 268140: Chloromethane 64% RPD was greater than the 20% RPD control limit.
Was a MS/MSD pair prepared with each batch?	•	Matrix spike duplicate samples were collected for FEW4-MW105-(109.0).
Were MS/MSD recoveries within project acceptance limits?	•	1,1,2-Trichloro-1,2,2-trifluoroethane 138%/143% recovery was greater than the 136% upper control limit;  Bromochloromethane 76% recovery was less than the 78% lower control limit;  Cyclohexane 136%/140% recovery was greater than the 131% upper control limit;  Methyl acetate 41.3%/40.3% recovery was less than the 53% lower control limit;  Methylcyclohexane 135%/141% recovery was greater than the 133% upper control limit.  Trichloroethene: the ADR noted 124% recovery, the lab noted 122% with an upper control limit of 123%.
Was the MS/MSD RPD within project acceptance limits?	•	

## Data Validation Report for 96780

### Review Questions

Method: SW8260C (Volatile Organic Compounds by GC/MS)

Review Questions	Yes	No	NA	Comment
If ISM was used for sample collection, were laboratory triplicates analyzed and within project acceptance limits?			•	
Were surrogate recoveries within project acceptance limits?		•		Several samples had surrogate recoveries were outside control limits due to low internal standard recoveries.
Were field replicates (duplicates, triplicates, etc.) analyzed at the proper frequency and in control?		•		Field duplicate samples were collected for FEW4MW105-(169.0) and FEW4-MW105-(89.0).  FEW4-MW105-(89.0): acetone 111% RPD, benzene 101% RPD, cis-1,2-dichloroethene 310% RPD, m,p-xylene 91% RPD, o-xylene 39% RPD, toluene 104% RPD, trichloroethene 103% RPD  FEW4-MW105-(169.0): Acetone ND/11J ug/kg
Were reported sample concentrations within calibration range?	•			
Was the GC/MS system properly tuned based on method criteria?	•			
Was instrument tuning completed every 12 hours during sample analysis?	•			
Was the Calibration within project acceptance criteria?	•			
Was a ICV performed after each ICAL prior to sample analysis and within project acceptance criteria?		•		Thor 0714T10: Bromomethane 87% was greater than the 20% control limit. Bromomethane was not detected in the associated sample.
Were CCVs run at the required frequency and within project acceptance criteria?		•		Thor Ending CCV 0714T35: Bromomethane 170% was outside the upper control limit. Bromomethane was not detected in the associated sample.
Were internal standard retention times and area criteria within project acceptance criteria?		•		Internal standards had low responses in the following samples:  FEW4-MW105-(129.0) FEW4-MW105-(139.0) FEW4-MW105-(149.0) FEW4-MW105-(159.0) FEW4-MW105-(89.0) FEW4-MW105-(89.0)-FD
Were internal standards spiked for every sample, standard, and QC sample?	•			
Were instrument run logs present and filled out appropriately?		•		Run logs for reanalysis of samples due to low internal standards not provided.
Were sample preparation sheets present and filled out appropriately?			•	
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were DoD QSM corrective actions followed if deviations were noted?	•			



## Data Validation Report for 96780

### Review Questions

Method: SW8260C (Volatile Organic Compounds by GC/MS)

Review Questions	Yes	No	NA	Comment
Were any data recommended for exclusion in the data validation process?	.			<p>Detections of common lab contaminants that have not historically been seen at the site, including 2-butanone, acetone, and methylene chloride have been revised to non-detect at the direction of the USACE-Omaha Project Chemist citing professional judgment.</p> <p>This includes the acetone results for samples FEW4-MW105-(109.0), FEW4-MW105-(119.0), FEW4-MW105-(129.0), FEW4-MW105-(139.0), FEW4-MW105-(149.0), FEW4-MW105-(159.0), FEW4-MW105-(169.0)-FD, FEW4-MW105(179.0), FEW4-MW105-(189.0), FEW4-MW105-(79.0), FEW4-MW105-(89.0), FEW4-MW105(89.0)-FD, and FEW4-MW105-(99.0); and the 2butanone results for FEW4-MW105-(109.0).</p>

**Automated Data Review Detail Report for 96780**

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## Sample Summary

								SW8260C
Location	Field Sample ID	Date	Time	Sample Type	Matrix	SBD	SED	
FEW4-MW105	FEW4-MW105-(109.0)	07-08-2021	1652	N	SO	109.00	109.00	X
FEW4-MW105	FEW4-MW105-(109.0)-MS	07-08-2021	1652	MS	SO	109.00	109.00	X
FEW4-MW105	FEW4-MW105-(109.0)-MSD	07-08-2021	1652	SD	SO	109.00	109.00	X
FEW4-MW105	FEW4-MW105-(119.0)	07-08-2021	1656	N	SO	119.00	119.00	X
FEW4-MW105	FEW4-MW105-(129.0)	07-09-2021	0814	N	SO	129.00	129.00	X
FEW4-MW105	FEW4-MW105-(139.0)	07-09-2021	0820	N	SO	139.00	139.00	X
FEW4-MW105	FEW4-MW105-(149.0)	07-09-2021	0843	N	SO	149.00	149.00	X
FEW4-MW105	FEW4-MW105-(159.0)	07-09-2021	0845	N	SO	159.00	159.00	X
FEW4-MW105	FEW4-MW105-(169.0)	07-09-2021	0911	N	SO	169.00	169.00	X
FEW4-MW105	FEW4-MW105-(169.0)-FD	07-09-2021	0911	FD	SO	169.00	169.00	X
FEW4-MW105	FEW4-MW105-(179.0)	07-09-2021	0920	N	SO	179.00	179.00	X
FEW4-MW105	FEW4-MW105-(189.0)	07-09-2021	1002	N	SO	189.00	189.00	X
FEW4-MW105	FEW4-MW105-(69.0)	07-08-2021	1120	N	SO	69.00	69.00	X
FEW4-MW105	FEW4-MW105-(79.0)	07-08-2021	1310	N	SO	79.00	79.00	X
FEW4-MW105	FEW4-MW105-(89.0)	07-08-2021	1540	N	SO	89.00	89.00	X
FEW4-MW105	FEW4-MW105-(89.0)-FD	07-08-2021	1540	FD	SO	89.00	89.00	X
FEW4-MW105	FEW4-MW105-(99.0)	07-08-2021	1647	N	SO	99.00	99.00	X



Total 17

Batch Report

Test Method: SW8260C		Analysis Batch: 268140								
Location	Matrix	Field Sample ID	Lab Sample ID	Calibration Run#/ Ref	Dil'n	Collection Date/Time	Extraction Date/Time	Analysis Date/Time	Prep/Leach Batch	Sample Type
LABQC	SQ	BS-T210716AS-268140	BS-T210716AS-268140		1/1	7/16/2021 18:00	7/16/2021 18:00	7/16/2021 18:00	268140/	BS
LABQC	SQ	BD-T210716AS-268140	BD-T210716AS-268140		1/1	7/16/2021 18:25	7/16/2021 18:25	7/16/2021 18:25	268140/	BD

**Automated Data Review Detail Report for 96780**

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LABQC	SQ	LB-T210716AS-268140	LB-T210716AS-268140	1/1	7/16/2021 19:15	7/16/2021 19:15	7/16/2021 19:15	268140/	LB
FEW4-MW105	SO	FEW4-MW105-(109.0)	BA35719	1/1	7/8/2021 16:52	7/16/2021 19:39	7/16/2021 19:39	268140/	N
FEW4-MW105	SO	FEW4-MW105-(129.0)	BA35721	1/1	7/9/2021 08:14	7/16/2021 20:04	7/16/2021 20:04	268140/	N
FEW4-MW105	SO	FEW4-MW105-(139.0)	BA35722	1/1	7/9/2021 08:20	7/16/2021 20:29	7/16/2021 20:29	268140/	N
FEW4-MW105	SO	FEW4-MW105-(149.0)	BA35723	1/1	7/9/2021 08:43	7/16/2021 20:54	7/16/2021 20:54	268140/	N
FEW4-MW105	SO	FEW4-MW105-(159.0)	BA35724	1/1	7/9/2021 08:45	7/16/2021 21:19	7/16/2021 21:19	268140/	N
FEW4-MW105	SO	FEW4-MW105-(169.0)	BA35725	1/1	7/9/2021 09:11	7/16/2021 21:43	7/16/2021 21:43	268140/	N
FEW4-MW105	SO	FEW4-MW105-(169.0)-FD	BA35726	1/1	7/9/2021 09:11	7/16/2021 22:08	7/16/2021 22:08	268140/	FD
FEW4-MW105	SO	FEW4-MW105-(179.0)	BA35727	1/1	7/9/2021 09:20	7/16/2021 22:33	7/16/2021 22:33	268140/	N
FEW4-MW105	SO	FEW4-MW105-(189.0)	BA35728	1/1	7/9/2021 10:02	7/16/2021 22:58	7/16/2021 22:58	268140/	N
FEW4-MW105	SO	FEW4-MW105-(69.0)	BA35729	1/1	7/8/2021 11:20	7/16/2021 23:23	7/16/2021 23:23	268140/	N
FEW4-MW105	SO	FEW4-MW105-(79.0)	BA35730	1/1	7/8/2021 13:10	7/16/2021 23:48	7/16/2021 23:48	268140/	N
FEW4-MW105	SO	FEW4-MW105-(89.0)	BA35731	1/1	7/8/2021 15:40	7/17/2021 00:12	7/17/2021 00:12	268140/	N
FEW4-MW105	SO	FEW4-MW105-(89.0)-FD	BA35732	1/1	7/8/2021 15:40	7/17/2021 00:37	7/17/2021 00:37	268140/	FD
FEW4-MW105	SO	FEW4-MW105-(99.0)	BA35733	1/1	7/8/2021 16:47	7/17/2021 01:02	7/17/2021 01:02	268140/	N

Test Method: SW8260C      Analysis Batch: 268140

**Automated Data Review Detail Report for 96780**

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Location	Matrix	Field Sample ID	Lab Sample ID	Calibration Ref	Run#/ Dil'n	Collection Date/Time	Extraction Date/Time	Analysis Date/Time	Prep/Leach Batch	Sample Type
FEW4-MW105	SO	FEW4-MW105-(109.0)-MS	BA35719MS		1/1	7/8/2021 16:52	7/17/2021 03:06	7/17/2021 03:06	268140/	MS
FEW4-MW105	SO	FEW4-MW105-(109.0)-MSD	BA35719MSD		1/1	7/8/2021 16:52	7/17/2021 03:31	7/17/2021 03:31	268140/	SD

Test Method: SW8260C      Analysis Batch: 268141

Location	Matrix	Field Sample ID	Lab Sample ID	Calibration Ref	Run#/ Dil'n	Collection Date/Time	Extraction Date/Time	Analysis Date/Time	Prep/Leach Batch	Sample Type
LABQC	SQ	BS-T210714AS-268141	BS-T210714AS-268141		1/1	7/14/2021 15:10	7/14/2021 15:10	7/14/2021 15:10	268141/	BS
LABQC	SQ	BD-T210714AS-268141	BD-T210714AS-268141		1/1	7/14/2021 15:34	7/14/2021 15:34	7/14/2021 15:34	268141/	BD
LABQC	SQ	LB-T210714AS-268141	LB-T210714AS-268141		1/1	7/14/2021 16:24	7/14/2021 16:24	7/14/2021 16:24	268141/	LB
FEW4-MW105	SO	FEW4-MW105-(119.0)	BA35720		1/1	7/8/2021 16:56	7/14/2021 23:52	7/14/2021 23:52	268141/	N

**Field Batch Report**

--No Records Found--

## Automated Data Review Detail Report for 96780

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MS Mismatch Report --No Records Found--

Section to identify Matrix Spike mismatches where parent sample differs from MS by dilution.

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## QC Outlier Report

Test Method: SW8260C		Extraction Method: SW5035		Leach Method: NONE							
QC Element	Sample ID/ Lab Sample ID	Run#/ Dil'n	Analyte	Result (Units)	Qualifier	Warning Limits	Control Limits	Reason	Comment	Rule	Action Level
Field Duplicate RPD	FEW4-MW105-(89.0)-FD (N) / BA35732	1 / 1.00	Acetone	111.1 (rpd)	J/None	< 50	< 50	D3			
Field Duplicate RPD	FEW4-MW105-(89.0)-FD (N) / BA35732	1 / 1.00	Benzene	101.0 (rpd)	J/None	< 50	< 50	D3			
Field Duplicate RPD	FEW4-MW105-(89.0)-FD (N) / BA35732	1 / 1.00	cis-1,2-Dichloroethene	310.0 (ug/kg)	J/None	< 6.3	< 6.3	D3			
Field Duplicate RPD	FEW4-MW105-(89.0)-FD (N) / BA35732	1 / 1.00	m,p-Xylene	91.00 (ug/kg)	J/None	< 13	< 13	D3			
Field Duplicate RPD	FEW4-MW105-(89.0)-FD (N) / BA35732	1 / 1.00	o-Xylene	39.00 (ug/kg)	J/None	< 6.3	< 6.3	D3			
Field Duplicate RPD	FEW4-MW105-(89.0)-FD (N) / BA35732	1 / 1.00	Toluene	104.3 (rpd)	J/None	< 50	< 50	D3			
Field Duplicate RPD	FEW4-MW105-(89.0)-FD (N) / BA35732	1 / 1.00	Trichloroethene (TCE)	103.0 (rpd)	J/None	< 50	< 50	D3			
LCS Recovery	BD-T210716AS-268140 (BD) / BD-T210716AS-268140	1 / 1.00	Chloromethane	45.00 (percent)	J/UJ	50 - 136	50 - 136	C			
LCS RPD	BD-T210716AS-268140 (BD) / BD-T210716AS-268140	1 / 1.00	Chloromethane	64.02 (rpd)	J/None	< 20	< 20	Z			
MS Recovery	FEW4-MW105-(109.0)-MS (MS) / BA35719MS	1 / 1.00	1,1,2-Trichloro-1,2,2-trifluoroethane	138.0 (percent)	J/None	66 - 136	66 - 136	M			
MS Recovery	FEW4-MW105-(109.0)-MS (MS) / BA35719MS	1 / 1.00	Bromochloromethane	76.00 (percent)	J/X	78 - 125	78 - 125	M			
MS Recovery	FEW4-MW105-(109.0)-MS (MS) / BA35719MS	1 / 1.00	Cyclohexane	136.0 (percent)	J/None	67 - 131	67 - 131	M			
MS Recovery	FEW4-MW105-(109.0)-MS (MS) / BA35719MS	1 / 1.00	Methyl acetate	41.00 (percent)	J/X	53 - 144	53 - 144	M			

**Automated Data Review Detail Report for 96780**

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MS Recovery	FEW4-MW105-(109.0)-MS (MS) / BA35719MS	1 / 1.00	Methylcyclohexane	135.0 (percent)	J/None	66 - 133	66 - 133	M
MS Recovery	FEW4-MW105-(109.0)-MSD (SD) / BA35719MSD	1 / 1.00	1,1,2-Trichloro-1,2,2-trifluoroethane	143.0 (percent)	J/None	66 - 136	66 - 136	M

Test Method: SW8260C      Extraction Method: SW5035      Leach Method: NONE

QC Element	Sample ID/ Lab Sample ID	Run#/ Dil'n	Analyte	Result (Units)	Qualifier	Warning Limits	Control Limits	Reason	Comment	Rule	Action Level
MS Recovery	FEW4-MW105-(109.0)-MSD (SD) / BA35719MSD	1 / 1.00	Cyclohexane	140.0 (percent)	J/None	67 - 131	67 - 131	M			
MS Recovery	FEW4-MW105-(109.0)-MSD (SD) / BA35719MSD	1 / 1.00	Methyl acetate	40.00 (percent)	J/X	53 - 144	53 - 144	M			
MS Recovery	FEW4-MW105-(109.0)-MSD (SD) / BA35719MSD	1 / 1.00	Methylcyclohexane	141.0 (percent)	J/None	66 - 133	66 - 133	M			
MS Recovery	FEW4-MW105-(109.0)-MSD (SD) / BA35719MSD	1 / 1.00	Trichloroethene (TCE)	124.0 (percent)	J/None	77 - 123	77 - 123	M			
Surrogate	FEW4-MW105-(119.0) (N) / BA35720	1 / 1.00	Dibromofluoromethane	124.0 (percent)	J/None	78 - 119	10 - 119	I			
Surrogate	FEW4-MW105-(129.0) (N) / BA35721	1 / 1.00	1,2-Dichloroethane-d4	157.0 (percent)	J/None	71 - 136	10 - 136	I			
Surrogate	FEW4-MW105-(129.0) (N) / BA35721	1 / 1.00	1-Bromo-4-fluorobenzene (4- Bromofluorobenzene)	149.0 (percent)	J/None	79 - 119	10 - 119	I			
Surrogate	FEW4-MW105-(129.0) (N) / BA35721	1 / 1.00	Dibromofluoromethane	131.0 (percent)	J/None	78 - 119	10 - 119	I			
Surrogate	FEW4-MW105-(129.0) (N) / BA35721	1 / 1.00	Toluene-d8	55.00 (percent)	J/UJ	85 - 116	10 - 116	I			
Surrogate	FEW4-MW105-(139.0) (N) / BA35722	1 / 1.00	1-Bromo-4-fluorobenzene (4- Bromofluorobenzene)	193.0 (percent)	J/None	79 - 119	10 - 119	I			



**Automated Data Review Detail Report for 96780**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Draft Final LT &amp; PM UFP-QAPP Addendum 1

**QC Outlier Report**

Surrogate	FEW4-MW105-(139.0) (N) / BA35722	1 / 1.00	Dibromofluoromethane	27.00 (percent)	J/UJ	78 - 119	10 - 119	I
Surrogate	FEW4-MW105-(139.0) (N) / BA35722	1 / 1.00	Toluene-d8	56.00 (percent)	J/UJ	85 - 116	10 - 116	I
Surrogate	FEW4-MW105-(159.0) (N) / BA35724	1 / 1.00	1,2-Dichloroethane-d4	154.0 (percent)	J/None	71 - 136	10 - 136	I
Surrogate	FEW4-MW105-(159.0) (N) / BA35724	1 / 1.00	1-Bromo-4-fluorobenzene (4- Bromofluorobenzene)	137.0 (percent)	J/None	79 - 119	10 - 119	I
Surrogate	FEW4-MW105-(159.0) (N) / BA35724	1 / 1.00	Toluene-d8	57.00 (percent)	J/UJ	85 - 116	10 - 116	I
Surrogate	FEW4-MW105-(89.0) (N) / BA35731	1 / 1.00	1,2-Dichloroethane-d4	157.0 (percent)	J/None	71 - 136	10 - 136	I

Test Method: SW8260C      Extraction Method: SW5035      Leach Method: NONE

QC Element	Sample ID/ Lab Sample ID	Run#/ Dil'n	Analyte	Result (Units)	Qualifier	Warning Limits	Control Limits	Reason	Comment	Rule	Action Level
Surrogate	FEW4-MW105-(89.0) (N) / BA35731	1 / 1.00	1-Bromo-4-fluorobenzene (4- Bromofluorobenzene)	138.0 (percent)	J/None	79 - 119	10 - 119	I			
Surrogate	FEW4-MW105-(89.0) (N) / BA35731	1 / 1.00	Dibromofluoromethane	57.00 (percent)	J/UJ	78 - 119	10 - 119	I			
Surrogate	FEW4-MW105-(89.0) (N) / BA35731	1 / 1.00	Toluene-d8	52.00 (percent)	J/UJ	85 - 116	10 - 116	I			
Surrogate	FEW4-MW105-(89.0)-FD (FD) / BA35732	1 / 1.00	1,2-Dichloroethane-d4	42.00 (percent)	J/UJ	71 - 136	10 - 136	I			
Surrogate	FEW4-MW105-(89.0)-FD (FD) / BA35732	1 / 1.00	1-Bromo-4-fluorobenzene (4- Bromofluorobenzene)	128.0 (percent)	J/None	79 - 119	10 - 119	I			
Surrogate	FEW4-MW105-(89.0)-FD (FD) / BA35732	1 / 1.00	Dibromofluoromethane	0.000 (percent)	J/X	78 - 119	10 - 119	I			
Surrogate	FEW4-MW105-(89.0)-FD (FD) / BA35732	1 / 1.00	Toluene-d8	52.00 (percent)	J/UJ	85 - 116	10 - 116	I			

## Automated Data Review Detail Report for 96780

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

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### QC Outlier Report

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Rule is the multiplier used when blank contamination occurs to determine action level.

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**Automated Data Review Detail Report for 96780**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Draft Final LT &amp; PM UFP-QAPP Addendum 1

**Qualified Results**

Test Method: SW8260C		Extraction Method: SW5035		Leach Method: NONE						
FieldSample ID	LabSample ID	Matrix	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(109.0)	BA35719	S	N	2-Butanone (MEK)	14.0	5.20 J	5.20 J		ug/kg	TR
FEW4-MW105-(109.0)	BA35719	S	N	Acetone	14.0	7.60 J	7.60 J		ug/kg	TR
FEW4-MW105-(109.0)	BA35719	S	N	Bromochloromethane	14.0	2.90 U	2.90 X		ug/kg	M
FEW4-MW105-(109.0)	BA35719	S	N	Chloromethane	14.0	7.20 U	7.20 UJ		ug/kg	C
FEW4-MW105-(109.0)	BA35719	S	N	Methyl acetate	14.0	2.90 U	2.90 X		ug/kg	M
FEW4-MW105-(109.0)	BA35719	S	N	Trichloroethene (TCE)	7.20	57.0	57.0 J	+	ug/kg	M
FEW4-MW105-(119.0)	BA35720	S	N	Acetone	14.0	13.0 J	13.0 J	+	ug/kg	I/TR
FEW4-MW105-(119.0)	BA35720	S	N	Trichloroethene (TCE)	6.80	67.0	67.0 J	+	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1,1,1-Trichloroethane	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1,1,2,2-Tetrachloroethane	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1,1,2-Trichloro-1,2,2trifluoroethane	14.0	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1,1,2-Trichloroethane	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1,1-Dichloroethane	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1,1-Dichloroethene	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1,2,3-Trichlorobenzene	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1,2,4-Trichlorobenzene	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1,2-Dibromo-3-chloropropane	14.0	6.90 U	6.90 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1,2-Dibromoethane (EDB)	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1,2-Dichlorobenzene	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1,2-Dichloroethane	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1,2-Dichloropropane	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1,3-Dichlorobenzene	6.90	2.70 U	2.70 UJ		ug/kg	I

**Automated Data Review Detail Report for 96780**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Draft Final LT &amp; PM UFP-QAPP Addendum 1

**Qualified Results**

FEW4-MW105-(129.0)	BA35721	S	N	1,4-Dichlorobenzene	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	2-Butanone (MEK)	14.0	4.10 U	4.10 UJ	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	2-Hexanone	14.0	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	4-Methyl-2-pentanone (MIBK)	14.0	2.70 U	2.70 UJ	ug/kg	I

Test Method: SW8260C		Extraction Method: SW5035		Leach Method: NONE						
FieldSample ID	LabSample ID	Matrix	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(129.0)	BA35721	S	N	Acetone	14.0	14000	14000 J		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Benzene	6.90	140	140 J		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Bromochloromethane	14.0	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Bromodichloromethane	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Bromoform	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Bromomethane	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Carbon disulfide	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Carbon tetrachloride	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Chlorobenzene	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Chloroethane	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Chloroform	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Chloromethane	14.0	6.90 U	6.90 UJ		ug/kg	C/I
FEW4-MW105-(129.0)	BA35721	S	N	cis-1,2-Dichloroethene	6.90	190	190 J		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	cis-1,3-Dichloropropene	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Cyclohexane	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Dibromochloromethane	6.90	2.70 U	2.70 UJ		ug/kg	I

**Automated Data Review Detail Report for 96780**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

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FEW4-MW105-(129.0)	BA35721	S	N	Dichlorodifluoromethane	14.0	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Ethylbenzene	6.90	26.0	26.0 J	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Isopropylbenzene (Cumene)	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	m,p-Xylene	14.0	38.0	38.0 J	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Methyl acetate	14.0	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Methyl tert-butyl ether (MTBE)	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Methylcyclohexane	27.0	6.90 U	6.90 UJ	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Methylene chloride	27.0	14.0 U	14.0 UJ	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	o-Xylene	6.90	17.0	17.0 J	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Styrene	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Tetrachloroethene (PCE)	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Toluene	6.90	130	130 J	ug/kg	I

Test Method: SW8260C      Extraction Method: SW5035      Leach Method: NONE

FieldSample ID	LabSample ID	Matrix	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(129.0)	BA35721	S	N	trans-1,2-Dichloroethene	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	trans-1,3-Dichloropropene	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Trichloroethene (TCE)	6.90	22000	22000 J		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Trichlorofluoromethane	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	Vinyl chloride	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	1,1,1-Trichloroethane	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	1,1,2,2-Tetrachloroethane	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	1,1,2-Trichloro-1,2,2trifluoroethane	14.0	2.70 U	2.70 UJ		ug/kg	I

**Automated Data Review Detail Report for 96780**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

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**US Army Corps  
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FEW4-MW105-(139.0)	BA35722	S	N	1,1,2-Trichloroethane	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	1,1-Dichloroethane	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	1,1-Dichloroethene	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	1,2,3-Trichlorobenzene	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	1,2,4-Trichlorobenzene	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	1,2-Dibromo-3-chloropropane	14.0	6.90 U	6.90 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	1,2-Dibromoethane (EDB)	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	1,2-Dichlorobenzene	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	1,2-Dichloroethane	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	1,2-Dichloropropane	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	1,3-Dichlorobenzene	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	1,4-Dichlorobenzene	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	2-Butanone (MEK)	14.0	4.10 U	4.10 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	2-Hexanone	14.0	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	4-Methyl-2-pentanone (MIBK)	14.0	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Acetone	14.0	29000	29000 J	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Benzene	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Bromochloromethane	14.0	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Bromodichloromethane	6.90	2.70 U	2.70 UJ	ug/kg	I

Test Method: SW8260C      Extraction Method: SW5035      Leach Method: NONE

FieldSample ID	LabSample ID	Matrix	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(139.0)	BA35722	S	N	Bromoform	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Bromomethane	6.90	2.70 U	2.70 UJ		ug/kg	I

**Automated Data Review Detail Report for 96780**

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FEW4-MW105-(139.0)	BA35722	S	N	Carbon disulfide	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Carbon tetrachloride	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Chlorobenzene	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Chloroethane	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Chloroform	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Chloromethane	14.0	6.90 U	6.90 UJ	ug/kg	C/I
FEW4-MW105-(139.0)	BA35722	S	N	cis-1,2-Dichloroethene	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	cis-1,3-Dichloropropene	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Cyclohexane	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Dibromochloromethane	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Dichlorodifluoromethane	14.0	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Ethylbenzene	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Isopropylbenzene (Cumene)	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	m,p-Xylene	14.0	6.90 U	6.90 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Methyl acetate	14.0	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Methyl tert-butyl ether (MTBE)	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Methylcyclohexane	27.0	6.90 U	6.90 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Methylene chloride	27.0	14.0 U	14.0 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	o-Xylene	6.90	56.0	56.0 J	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Styrene	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Tetrachloroethene (PCE)	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Toluene	6.90	410	410 J	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	trans-1,2-Dichloroethene	6.90	2.70 U	2.70 UJ	ug/kg	I

**Automated Data Review Detail Report for 96780**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

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**Qualified Results**

FEW4-MW105-(139.0)	BA35722	S	N	trans-1,3-Dichloropropene	6.90	2.70 U	2.70 UJ	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Trichloroethene (TCE)	6.90	51000	51000 J	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	Trichlorofluoromethane	6.90	2.70 U	2.70 UJ	ug/kg	I

Test Method: SW8260C      Extraction Method: SW5035      Leach Method: NONE

FieldSample ID	LabSample ID	Matrix	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(139.0)	BA35722	S	N	Vinyl chloride	6.90	2.70 U	2.70 UJ		ug/kg	I
FEW4-MW105-(149.0)	BA35723	S	N	Acetone	15.0	9.70 J	9.70 J		ug/kg	TR
FEW4-MW105-(149.0)	BA35723	S	N	Chloromethane	15.0	7.50 U	7.50 UJ		ug/kg	C
FEW4-MW105-(159.0)	BA35724	S	N	1,1,1-Trichloroethane	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	1,1,2,2-Tetrachloroethane	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	1,1,2-Trichloro-1,2,2trifluoroethane	12.0	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	1,1,2-Trichloroethane	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	1,1-Dichloroethane	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	1,1-Dichloroethene	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	1,2,3-Trichlorobenzene	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	1,2,4-Trichlorobenzene	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	1,2-Dibromo-3-chloropropane	12.0	6.20 U	6.20 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	1,2-Dibromoethane (EDB)	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	1,2-Dichlorobenzene	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	1,2-Dichloroethane	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	1,2-Dichloropropane	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	1,3-Dichlorobenzene	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	1,4-Dichlorobenzene	6.20	2.50 U	2.50 UJ		ug/kg	I

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B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Draft Final LT &amp; PM UFP-QAPP Addendum 1

**US Army Corps  
of Engineers®****Qualified Results**

FEW4-MW105-(159.0)	BA35724	S	N	2-Butanone (MEK)	12.0	3.70 U	3.70 UJ	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	2-Hexanone	12.0	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	4-Methyl-2-pentanone (MIBK)	12.0	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Acetone	12.0	9100	9100 J	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Benzene	6.20	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Bromochloromethane	12.0	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Bromodichloromethane	6.20	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Bromoform	6.20	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Bromomethane	6.20	2.50 U	2.50 UJ	ug/kg	I

Test Method: SW8260C		Extraction Method: SW5035		Leach Method: NONE						
FieldSample ID	LabSample ID	Matrix	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(159.0)	BA35724	S	N	Carbon disulfide	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Carbon tetrachloride	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Chlorobenzene	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Chloroethane	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Chloroform	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Chloromethane	12.0	6.20 U	6.20 UJ		ug/kg	C/I
FEW4-MW105-(159.0)	BA35724	S	N	cis-1,2-Dichloroethene	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	cis-1,3-Dichloropropene	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Cyclohexane	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Dibromochloromethane	6.20	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Dichlorodifluoromethane	12.0	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Ethylbenzene	6.20	2.50 U	2.50 UJ		ug/kg	I

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B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

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**US Army Corps  
of Engineers®****Qualified Results**

FEW4-MW105-(159.0)	BA35724	S	N	Isopropylbenzene (Cumene)	6.20	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	m,p-Xylene	12.0	6.20 U	6.20 UJ	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Methyl acetate	12.0	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Methyl tert-butyl ether (MTBE)	6.20	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Methylcyclohexane	25.0	6.20 U	6.20 UJ	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Methylene chloride	25.0	12.0 U	12.0 UJ	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	o-Xylene	6.20	3.10 U	3.10 UJ	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Styrene	6.20	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Tetrachloroethene (PCE)	6.20	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Toluene	6.20	120	120 J	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	trans-1,2-Dichloroethene	6.20	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	trans-1,3-Dichloropropene	6.20	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Trichloroethene (TCE)	6.20	960	960 J	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Trichlorofluoromethane	6.20	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	Vinyl chloride	6.20	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(169.0)	BA35725	S	N	Chloromethane	15.0	7.40 U	7.40 UJ	ug/kg	C

Test Method: SW8260C      Extraction Method: SW5035      Leach Method: NONE

FieldSample ID	LabSample ID	Matrix	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(169.0)-FD	BA35726	S	FD	Acetone	15.0	11.0 J	11.0 J		ug/kg	TR
FEW4-MW105-(169.0)-FD	BA35726	S	FD	Chloromethane	15.0	7.30 U	7.30 UJ		ug/kg	C
FEW4-MW105-(179.0)	BA35727	S	N	Chloromethane	15.0	7.40 U	7.40 UJ		ug/kg	C
FEW4-MW105-(189.0)	BA35728	S	N	Acetone	14.0	7.40 J	7.40 J		ug/kg	TR

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**Qualified Results**

FEW4-MW105-(189.0)	BA35728	S	N	Chloromethane	14.0	7.20 U	7.20 UJ	ug/kg	C
FEW4-MW105-(69.0)	BA35729	S	N	Chloromethane	13.0	6.60 U	6.60 UJ	ug/kg	C
FEW4-MW105-(79.0)	BA35730	S	N	Acetone	14.0	6.30 J	6.30 J	ug/kg	TR
FEW4-MW105-(79.0)	BA35730	S	N	Chloromethane	14.0	7.10 U	7.10 UJ	ug/kg	C
FEW4-MW105-(89.0)	BA35731	S	N	1,1,1-Trichloroethane	6.30	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	1,1,2,2-Tetrachloroethane	6.30	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	1,1,2-Trichloro-1,2,2trifluoroethane	13.0	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	1,1,2-Trichloroethane	6.30	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	1,1-Dichloroethane	6.30	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	1,1-Dichloroethene	6.30	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	1,2,3-Trichlorobenzene	6.30	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	1,2,4-Trichlorobenzene	6.30	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	1,2-Dibromo-3-chloropropane	13.0	6.30 U	6.30 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	1,2-Dibromoethane (EDB)	6.30	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	1,2-Dichlorobenzene	6.30	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	1,2-Dichloroethane	6.30	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	1,2-Dichloropropane	6.30	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	1,3-Dichlorobenzene	6.30	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	1,4-Dichlorobenzene	6.30	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	2-Butanone (MEK)	13.0	3.80 U	3.80 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	2-Hexanone	13.0	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	4-Methyl-2-pentanone (MIBK)	13.0	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Acetone	13.0	6000	6000 J	ug/kg	D3/I

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**Qualified Results**

Test Method: SW8260C		Extraction Method: SW5035		Leach Method: NONE						
FieldSample ID	LabSample ID	Matrix	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(89.0)	BA35731	S	N	Benzene	6.30	250	250 J		ug/kg	D3/I
FEW4-MW105-(89.0)	BA35731	S	N	Bromochloromethane	13.0	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Bromodichloromethane	6.30	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Bromoform	6.30	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Bromomethane	6.30	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Carbon disulfide	6.30	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Carbon tetrachloride	6.30	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Chlorobenzene	6.30	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Chloroethane	6.30	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Chloroform	6.30	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Chloromethane	13.0	6.30 U	6.30 UJ		ug/kg	C/I
FEW4-MW105-(89.0)	BA35731	S	N	cis-1,2-Dichloroethene	6.30	310	310 J		ug/kg	D3/I
FEW4-MW105-(89.0)	BA35731	S	N	cis-1,3-Dichloropropene	6.30	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Cyclohexane	6.30	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Dibromochloromethane	6.30	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Dichlorodifluoromethane	13.0	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Ethylbenzene	6.30	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Isopropylbenzene (Cumene)	6.30	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	m,p-Xylene	13.0	39.0	39.0 J		ug/kg	D3/I
FEW4-MW105-(89.0)	BA35731	S	N	Methyl acetate	13.0	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Methyl tert-butyl ether (MTBE)	6.30	2.50 U	2.50 UJ		ug/kg	I

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FEW4-MW105-(89.0)	BA35731	S	N	Methylcyclohexane	25.0	6.30 U	6.30 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Methylene chloride	25.0	13.0 U	13.0 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	o-Xylene	6.30	19.0	19.0 J	ug/kg	D3/I
FEW4-MW105-(89.0)	BA35731	S	N	Styrene	6.30	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Tetrachloroethene (PCE)	6.30	2.50 U	2.50 UJ	ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Toluene	6.30	220	220 J	ug/kg	D3/I
FEW4-MW105-(89.0)	BA35731	S	N	trans-1,2-Dichloroethene	6.30	2.50 U	2.50 UJ	ug/kg	I

Test Method: SW8260C		Extraction Method: SW5035		Leach Method: NONE						
FieldSample ID	LabSample ID	Matrix	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(89.0)	BA35731	S	N	trans-1,3-Dichloropropene	6.30	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Trichloroethene (TCE)	6.30	16000	16000 J		ug/kg	D3/I
FEW4-MW105-(89.0)	BA35731	S	N	Trichlorofluoromethane	6.30	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(89.0)	BA35731	S	N	Vinyl chloride	6.30	2.50 U	2.50 UJ		ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,1,1-Trichloroethane	6.60	2.60 U	2.60 X		ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,1,2,2-Tetrachloroethane	6.60	2.60 U	2.60 X		ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,1,2-Trichloro-1,2,2trifluoroethane	13.0	2.60 U	2.60 X		ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,1,2-Trichloroethane	6.60	2.60 U	2.60 X		ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,1-Dichloroethane	6.60	2.60 U	2.60 X		ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,1-Dichloroethene	6.60	2.60 U	2.60 X		ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,2,3-Trichlorobenzene	6.60	2.60 U	2.60 X		ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,2,4-Trichlorobenzene	6.60	2.60 U	2.60 X		ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,2-Dibromo-3-chloropropane	13.0	6.60 U	6.60 X		ug/kg	I

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## Qualified Results

FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,2-Dibromoethane (EDB)	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,2-Dichlorobenzene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,2-Dichloroethane	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,2-Dichloropropane	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,3-Dichlorobenzene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,4-Dichlorobenzene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	2-Butanone (MEK)	13.0	4.00 U	4.00 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	2-Hexanone	13.0	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	4-Methyl-2-pentanone (MIBK)	13.0	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Acetone	13.0	21000	21000 J	ug/kg	D3/I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Benzene	6.60	760	760 J	ug/kg	D3/I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Bromochloromethane	13.0	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Bromodichloromethane	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Bromoform	6.60	2.60 U	2.60 X	ug/kg	I

Test Method: SW8260C      Extraction Method: SW5035      Leach Method: NONE

FieldSample ID	LabSample ID	Matrix	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Bromomethane	6.60	2.60 U	2.60 X		ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Carbon disulfide	6.60	2.60 U	2.60 X		ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Carbon tetrachloride	6.60	2.60 U	2.60 X		ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Chlorobenzene	6.60	2.60 U	2.60 X		ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Chloroethane	6.60	2.60 U	2.60 X		ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Chloroform	6.60	2.60 U	2.60 X		ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Chloromethane	13.0	6.60 U	6.60 X		ug/kg	C/I

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## Qualified Results

FEW4-MW105-(89.0)-FD	BA35732	S	FD	cis-1,2-Dichloroethene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	cis-1,3-Dichloropropene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Cyclohexane	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Dibromochloromethane	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Dichlorodifluoromethane	13.0	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Ethylbenzene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Isopropylbenzene (Cumene)	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	m,p-Xylene	13.0	130	130 J	ug/kg	D3/I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Methyl acetate	13.0	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Methyl tert-butyl ether (MTBE)	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Methylcyclohexane	26.0	6.60 U	6.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Methylene chloride	26.0	13.0 U	13.0 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	o-Xylene	6.60	58.0	58.0 J	ug/kg	D3/I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Styrene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Tetrachloroethene (PCE)	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Toluene	6.60	700	700 J	ug/kg	D3/I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	trans-1,2-Dichloroethene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	trans-1,3-Dichloropropene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Trichloroethene (TCE)	6.60	50000	50000 J	ug/kg	D3/I

Test Method: SW8260C      Extraction Method: SW5035      Leach Method: NONE

FieldSample ID	LabSample ID	Matrix	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Trichlorofluoromethane	6.60	2.60 U	2.60 X		ug/kg	I



Qualified Results

FEW4-MW105-(89.0)-FD	BA35732	S	FD	Vinyl chloride	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(99.0)	BA35733	S	N	Acetone	15.0	13.0 J	13.0 J	ug/kg	TR
FEW4-MW105-(99.0)	BA35733	S	N	Chloromethane	15.0	7.40 U	7.40 UJ	ug/kg	C

Qualified analytes in samples are reported as estimated, not detected (UJ) at the Limit of Detection (LOD).



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**Detected Results**

Test Method: SW8260C		Extraction Method: SW5035		Leach Method: NONE						
FieldSample ID	LabSample ID	Matrix	Type	Dilution	Analyte	LOQ	Lab Result	Qualified Result	Units	Reason
FEW4-MW105-(109.0)	BA35719	S	N	1	2-Butanone (MEK)	14.0	5.20 J	5.20 J	ug/kg	TR
FEW4-MW105-(109.0)	BA35719	S	N	1	Acetone	14.0	7.60 J	7.60 J	ug/kg	TR
FEW4-MW105-(109.0)	BA35719	S	N	1	Trichloroethene (TCE)	7.20	57.0	57.0 J	ug/kg	M
FEW4-MW105-(119.0)	BA35720	S	N	1	Acetone	14.0	13.0 J	13.0 J	ug/kg	I/TR
FEW4-MW105-(119.0)	BA35720	S	N	1	Trichloroethene (TCE)	6.80	67.0	67.0 J	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1	Acetone	14.0	14000	14000 J	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1	Benzene	6.90	140	140 J	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1	cis-1,2-Dichloroethene	6.90	190	190 J	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1	Ethylbenzene	6.90	26.0	26.0 J	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1	m,p-Xylene	14.0	38.0	38.0 J	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1	o-Xylene	6.90	17.0	17.0 J	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1	Toluene	6.90	130	130 J	ug/kg	I
FEW4-MW105-(129.0)	BA35721	S	N	1	Trichloroethene (TCE)	6.90	22000	22000 J	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	1	Acetone	14.0	29000	29000 J	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	1	o-Xylene	6.90	56.0	56.0 J	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	1	Toluene	6.90	410	410 J	ug/kg	I
FEW4-MW105-(139.0)	BA35722	S	N	1	Trichloroethene (TCE)	6.90	51000	51000 J	ug/kg	I
FEW4-MW105-(149.0)	BA35723	S	N	1	Acetone	15.0	9.70 J	9.70 J	ug/kg	TR
FEW4-MW105-(159.0)	BA35724	S	N	1	Acetone	12.0	9100	9100 J	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	1	Toluene	6.20	120	120 J	ug/kg	I
FEW4-MW105-(159.0)	BA35724	S	N	1	Trichloroethene (TCE)	6.20	960	960 J	ug/kg	I
FEW4-MW105-(169.0)-FD	BA35726	S	FD	1	Acetone	15.0	11.0 J	11.0 J	ug/kg	TR

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FEW4-MW105-(179.0)	BA35727	S	N	1	Acetone	15.0	16.0	16.0	ug/kg	
FEW4-MW105-(189.0)	BA35728	S	N	1	Acetone	14.0	7.40 J	7.40 J	ug/kg	TR
FEW4-MW105-(79.0)	BA35730	S	N	1	Acetone	14.0	6.30 J	6.30 J	ug/kg	TR
FEW4-MW105-(89.0)	BA35731	S	N	1	Acetone	13.0	6000	6000 J	ug/kg	D3/I
FEW4-MW105-(89.0)	BA35731	S	N	1	Benzene	6.30	250	250 J	ug/kg	D3/I

**Detected Results**

Test Method: SW8260C		Extraction Method: SW5035		Leach Method: NONE						
FieldSample ID	LabSample ID	Matrix	Type	Dilution	Analyte	LOQ	Lab Result	Qualified Result	Units	Reason
FEW4-MW105-(89.0)	BA35731	S	N	1	cis-1,2-Dichloroethene	6.30	310	310 J	ug/kg	D3/I
FEW4-MW105-(89.0)	BA35731	S	N	1	m,p-Xylene	13.0	39.0	39.0 J	ug/kg	D3/I
FEW4-MW105-(89.0)	BA35731	S	N	1	o-Xylene	6.30	19.0	19.0 J	ug/kg	D3/I
FEW4-MW105-(89.0)	BA35731	S	N	1	Toluene	6.30	220	220 J	ug/kg	D3/I
FEW4-MW105-(89.0)	BA35731	S	N	1	Trichloroethene (TCE)	6.30	16000	16000 J	ug/kg	D3/I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1	Acetone	13.0	21000	21000 J	ug/kg	D3/I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1	Benzene	6.60	760	760 J	ug/kg	D3/I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1	m,p-Xylene	13.0	130	130 J	ug/kg	D3/I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1	o-Xylene	6.60	58.0	58.0 J	ug/kg	D3/I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1	Toluene	6.60	700	700 J	ug/kg	D3/I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1	Trichloroethene (TCE)	6.60	50000	50000 J	ug/kg	D3/I
FEW4-MW105-(99.0)	BA35733	S	N	1	Acetone	15.0	13.0 J	13.0 J	ug/kg	TR
FEW4-MW105-(99.0)	BA35733	S	N	1	Trichloroethene (TCE)	7.40	74.0	74.0	ug/kg	

**Rejected Results**

Test Method: SW8260C		Extraction Method: SW5035		Leach Method: NONE						
FieldSample ID	LabSample ID	Matrix	Type		Analyte	LOQ	Lab Result	Qualified Result	Units	Reason

**Automated Data Review Detail Report for 96780**

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FEW4-MW105-(109.0)	BA35719	S	N	Bromochloromethane	14.0	2.90 U	2.90 X	ug/kg	M
FEW4-MW105-(109.0)	BA35719	S	N	Methyl acetate	14.0	2.90 U	2.90 X	ug/kg	M
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,1,1-Trichloroethane	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,1,2,2-Tetrachloroethane	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,1,2-Trichloro-1,2,2-trifluoroethane	13.0	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,1,2-Trichloroethane	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,1-Dichloroethane	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,1-Dichloroethene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,2,3-Trichlorobenzene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,2,4-Trichlorobenzene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,2-Dibromo-3-chloropropane	13.0	6.60 U	6.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,2-Dibromoethane (EDB)	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,2-Dichlorobenzene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,2-Dichloroethane	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,2-Dichloropropane	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,3-Dichlorobenzene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	1,4-Dichlorobenzene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	2-Butanone (MEK)	13.0	4.00 U	4.00 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	2-Hexanone	13.0	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	4-Methyl-2-pentanone (MIBK)	13.0	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Bromochloromethane	13.0	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Bromodichloromethane	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Bromoform	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Bromomethane	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Carbon disulfide	6.60	2.60 U	2.60 X	ug/kg	I

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FEW4-MW105-(89.0)-FD	BA35732	S	FD	Carbon tetrachloride	6.60	2.60 U	2.60 X	ug/kg	I
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**Rejected Results**

Test Method: SW8260C	Extraction Method: SW5035	Leach Method: NONE
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FieldSample ID	LabSample ID	Matrix	Type	Analyte	LOQ	Lab Result	Qualified Result	Units	Reason
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Chlorobenzene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Chloroethane	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Chloroform	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Chloromethane	13.0	6.60 U	6.60 X	ug/kg	C/I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	cis-1,2-Dichloroethene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	cis-1,3-Dichloropropene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Cyclohexane	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Dibromochloromethane	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Dichlorodifluoromethane	13.0	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Ethylbenzene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Isopropylbenzene (Cumene)	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Methyl acetate	13.0	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Methyl tert-butyl ether (MTBE)	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Methylcyclohexane	26.0	6.60 U	6.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Methylene chloride	26.0	13.0 U	13.0 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Styrene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Tetrachloroethene (PCE)	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	trans-1,2-Dichloroethene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	trans-1,3-Dichloropropene	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Trichlorofluoromethane	6.60	2.60 U	2.60 X	ug/kg	I
FEW4-MW105-(89.0)-FD	BA35732	S	FD	Vinyl chloride	6.60	2.60 U	2.60 X	ug/kg	I

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Facility: B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study  
 Event: FE Warren Site 4 FS DGI  
 SDG: 96795  
 Guidance Document: F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2  
 Prime Contractor: URS Group, Inc.  
 Project Manager: Robert Mallisee  
 Contract Laboratory(ies): Agriculture & Priority Pollutants Laboratories, Inc., Clovis, CA  
 Data Review Contractor: URS Group, Inc.  
 Data Review Level: S2AVEM  
 Primary Data Reviewer: Gary Torf, Project Chemist  
 Date Submitted: November 30, 2021

Field Sample ID	Lab Sample ID	Matrix Type/Type Code	SW8260C
FEW4-MW107-TEMP	BA35788	Water Field Sample/N	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at S2AVEM data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the F.E. Warren Atlas Site 4 - Draft Final LT & PM UFP-QAPP Addendum 1 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by URS Group, Inc.; analyses were performed by Agriculture & Priority Pollutants Laboratories, Inc., Clovis, CA and were reported under sample delivery group (SDG) 96795. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

Lab Blank

## Data Validation Report for 96795

LCS Recovery

LCS RPD

Prep Hold Time

Surrogate

Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 51 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency (X qualifier). Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

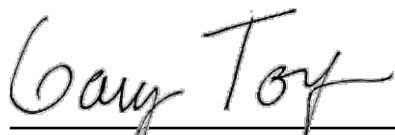
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Analytical Method	Data Reviewer Comment
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SW8260C	No additional comments; see Checklist for detail.
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November 30, 2021

Reviewed by Gary Torf, Project Chemist, URS Group, Inc.

As the Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of the reported sample results and method quality control data between the two deliverables.

## Data Validation Report for 96795

No Outliers were associated with this sample delivery group.

### Qualified Results

No results associated with this sample delivery group required qualification.

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### Trace Results

No results associated with this sample delivery group are considered trace.

---

### Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

---

### Reason Code Definitions

Code	Definition
TR	Trace Level Detect

---



## Data Validation Report for 96795

There are no Flag Code definitions to display.

---

### Bias

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-	The result may be biased low
---	------------------------------

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+	The result may be biased high
---	-------------------------------

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Note - The bias field is a separate field; however, it is an integral part of the final flag (qualifier) on the sample result

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## Data Validation Report for 96795

### Review Questions

Method: SW8260C (Volatile Organic Compounds by GC/MS)

Review Questions	Yes	No	NA	Comment
Were all samples documented correctly on the chain-of-custody (COC)?	•			
Did samples listed on COCs match the sample labels?	•			
Were samples relinquished properly on the COC?	•			
Were all samples properly preserved?	•			
Were sampling dates/times, date and time of laboratory receipt of samples, and sample conditions upon receipt at the laboratory (including preservation, pH, and temperature) are documented?	•			
Were sample results reported with percent moisture correction if required?			•	
Were analytical methods performed and analysis dates present?	•			
Were all requested target analytes reported?	•			
Were QAPP specified laboratory PQLs achieved?	•			
Were holding times met?	•			
Were trip blanks analyzed at the proper frequency and in control?			•	
Were field blanks analyzed at the proper frequency and in control?			•	
Were equipment blanks analyzed at the proper frequency and in control?			•	
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than DL?	•			
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	

## Data Validation Report for 96795

If ISM was used for sample collection, were laboratory triplicates analyzed and within project acceptance limits?	•
Were surrogate recoveries within project acceptance limits?	•
Were field replicates (duplicates, triplicates, etc.) analyzed at the proper frequency and in control?	•
Were reported sample concentrations within calibration range?	•
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•
Were DoD QSM corrective actions followed if deviations were noted?	•
Were any data recommended for exclusion in the data validation process?	•

Sample Summary								SW8260C
Location	Field Sample ID	Date	Time	Sample Type	Matrix	SBD	SED	
FEW4-MW107	FEW4-MW107-TEMP	07-10-2021	1714	N	WG	0.00	0.00	X
Total								1

## Automated Data Review Detail Report for 96795

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F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2



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### Batch Report

Test Method: SW8260C

Analysis Batch: 266106

Location	Matrix	Field Sample ID	Lab Sample ID	Calibration Ref	Run#/ Dil'n	Collection Date/Time	Extraction Date/Time	Analysis Date/Time	Prep/Leach Batch	Sample Type
LABQC	WQ	BS-T2107191AW-266106	BS-T2107191AW266106		1/1	7/19/2021 15:10	7/19/2021 15:10	7/19/2021 15:10	266106/	BS
LABQC	WQ	BD-T2107191AW-266106	BD-T2107191AW266106		1/1	7/19/2021 15:34	7/19/2021 15:34	7/19/2021 15:34	266106/	BD
LABQC	WQ	LB-T2107191AW-266106	LB-T2107191AW266106		1/1	7/19/2021 15:59	7/19/2021 15:59	7/19/2021 15:59	266106/	LB
FEW4-MW107	WG	FEW4-MW107-TEMP	BA35788		1/1	7/10/2021 17:14	7/19/2021 19:18	7/19/2021 19:18	266106/	N

## Automated Data Review Detail Report for 96795

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2



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### Field Batch Report

--No Records Found--

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### MS Mismatch Report

--No Records Found--

Section to identify Matrix Spike mismatches where parent sample differs from MS by dilution.

---

### QC Outliers Report

--No Records Found--

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Qualified Results

--No Records Found--

Detected Results

Test Method: SW8260C		Extraction Method: SW5030		Leach Method: NONE						
FieldSample ID	LabSample ID	Matrix	Type	Dilution	Analyte	LOQ	Lab Result	Qualified Result	Units	Reason
FEW4-MW107-TEMP	BA35788	W	N	1	Toluene	1.00	1.10	1.10	ug/l	
FEW4-MW107-TEMP	BA35788	W	N	1	Trichloroethene (TCE)	1.00	3.60	3.60	ug/l	

Rejected Results

--No Records Found--



Facility: B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study  
 Event: FE Warren Site 4 FS DGI  
 SDG: 96848  
 Guidance Document: F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2  
 Prime Contractor: URS Group, Inc.  
 Project Manager: Robert Mallisee  
 Contract Laboratory(ies): Agriculture & Priority Pollutants Laboratories, Inc., Clovis, CA  
 Data Review Contractor: URS Group, Inc.  
 Data Review Level: S2AVEM  
 Primary Data Reviewer: November 30, 2021  
 Date Submitted: November 30, 2021

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW8260C
FEW4-IDW-EFF1	BA36235	Water	Field Sample/N	X
FEW4-IDW-INF1	BA36236	Water	Field Sample/N	X
FEW4-IDW-INT1	BA36237	Water	Field Sample/N	X
FEW4-MW105-TEMP	BA36238	Water	Field Sample/N	X
FEW4-MW54B-TEMP	BA36239	Water	Field Sample/N	X
FEW4-TB01	BA36240	Water	Trip Blank/TB	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at S2AVEM data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the F.E. Warren Atlas Site 4 - Draft Final LT & PM UFP-QAPP Addendum 1 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by URS Group, Inc.; analyses were performed by Agriculture & Priority Pollutants Laboratories, Inc., Clovis, CA and were reported under sample delivery group (SDG) 96848. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the



## Data Validation Report for 96848

automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

Lab Blank  
LCS Recovery  
LCS RPD  
Prep Hold Time  
Surrogate  
Test Hold Time  
Trip Blank

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 1 results (0.33%) out of the 306 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency (X qualifier). Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

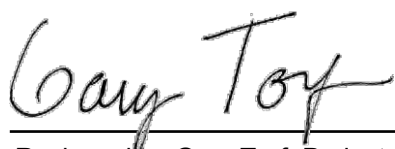
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Analytical Method	Data Reviewer Comment
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SW8260C	No additional comments; see Checklist for detail.
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November 30, 2021

Reviewed by Gary Torf, Project Chemist, URS Group, Inc.

As the Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of the reported sample results and method quality control data between the two deliverables.

## Data Validation Report for 96848

### Quality Control Outliers for test method SW8260C, LCS RPD

The objective of laboratory control sample/laboratory control sample duplicate (LCS/LCSD) RPD analysis is to demonstrate acceptable method precision by the laboratory at the time of analysis. LCS/LCSD analyses are also performed to generate data that determines the long-term precision of the analytical method on various matrices. Non-homogenous samples can impact the apparent method precision. Summary forms were evaluated and compared to electronic data deliverables. Laboratory control sample/laboratory control sample duplicate RPD results that were outside of the acceptance criteria are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
BD-T210722AW-266349 (BD)/ BD-T210722AW-266349	1,2- Dibromoethane (EDB)	20.27	< 20	< 20	rpd	J/None	Z	
BD-T210722AW-266349 (BD)/ BD-T210722AW-266349	1,2- Dichlorobenzene	21.90	< 20	< 20	rpd	J/None	Z	
BD-T210722AW-266349 (BD)/ BD-T210722AW-266349	1,4- Dichlorobenzene	21.14	< 20	< 20	rpd	J/None	Z	
BD-T210722AW-266349 (BD)/ BD-T210722AW-266349	Bromochlorometha ne	22.11	< 20	< 20	rpd	J/None	Z	
BD-T210722AW-266349 (BD)/ BD-T210722AW-266349	Bromodichloromet hane	22.02	< 20	< 20	rpd	J/None	Z	
BD-T210722AW-266349 (BD)/ BD-T210722AW-266349	Bromoform	20.90	< 20	< 20	rpd	J/None	Z	
BD-T210722AW-266349 (BD)/ BD-T210722AW-266349	Chlorobenzene	20.53	< 20	< 20	rpd	J/None	Z	
BD-T210722AW-266349 (BD)/ BD-T210722AW-266349	cis-1,3- Dichloropropene	20.64	< 20	< 20	rpd	J/None	Z	
BD-T210722AW-266349 (BD)/ BD-T210722AW-266349	Dibromochloromet hane	22.64	< 20	< 20	rpd	J/None	Z	
BD-T210722AW-266349 (BD)/ BD-T210722AW-266349	Ethylbenzene	21.92	< 20	< 20	rpd	J/None	Z	
BD-T210722AW-266349 (BD)/ BD-T210722AW-266349	m,p-Xylene	21.08	< 20	< 20	rpd	J/None	Z	
BD-T210722AW-266349 (BD)/ BD-T210722AW-266349	Methylcyclohexan e	22.33	< 20	< 20	rpd	J/None	Z	
BD-T210722AW-266349 (BD)/ BD-T210722AW-266349	Tetrachloroethene (PCE)	22.12	< 20	< 20	rpd	J/None	Z	
BD-T210722AW-266349 (BD)/ BD-T210722AW-266349	Trichlorofluoromet hane	22.53	< 20	< 20	rpd	J/None	Z	

## Data Validation Report for 96848

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results. Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

### Qualified Results associated with the LCS RPD for SW8260C

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias Units	Reason
FEW4-MW54B-TEMP BA36239	N	m,p-Xylene	2.00	1.20 J	1.20 J	ug/l	Z/TR

Analytes not found in project samples are reported as not detected at the limit of detection (LOD) unless blank contamination occurs and then the sample may be reported as not detected at the (LOQ) based on the sample concentration. In instances where no LOD is provided, results are reported down to the LOQ.

### Table of All Qualified Results

Test Method: SW8260C

Extraction Method: SW5030

FieldSample ID / LabSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias Units	Reason
FEW4-MW54B-TEMP BA36239	N	m,p-Xylene	2.00	1.20 J	1.20 J	ug/l	Z/TR

Analytes not found in project samples are reported as not detected at the limit of detection (LOD) unless blank contamination occurs and then the sample may be reported as not detected at the (LOQ) based on the sample concentration.

In instances where no LOD is provided, results are reported down to the LOQ.

Trace values are not included in the qualified results table unless additional reason codes are associated.

## Data Validation Report for 96848

### Table of All Trace Results

Test Method: SW8260C Extraction Method: SW5030

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW54B-TEMP	N	m,p-Xylene	2.00	1.20 J	1.20 J		ug/L	Z/TR
FEW4-MW54B-TEMP	N	o-Xylene	1.00	0.610 J	0.610 J		ug/L	TR

## Data Validation Report for 96848

### Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

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#### Reason Code Definitions

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Code	Definition
TR	Trace Level Detect
Z	LCS RPD

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#### Flag Code and Definitions

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Flag	Definition
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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#### Bias

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-	The result may be biased low
+	The result may be biased high

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Note - The bias field is a separate field; however, it is an integral part of the final flag (qualifier) on the sample result

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#### Review Questions

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Method: SW8260C (Volatile Organic Compounds by GC/MS)

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Review Questions	Yes	No	NA	Comment
Were all samples documented correctly on the chain-of-custody (COC)?	•			
Did samples listed on COCs match the sample labels?	•			
Were samples relinquished properly on the COC?	•			
Were all samples properly preserved?	•			

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## Data Validation Report for 96848

Were sampling dates/times, date and time of laboratory receipt of samples, and sample conditions upon receipt at the laboratory (including preservation, pH, and temperature) are documented?	•
Were sample results reported with percent moisture correction if required?	•
Were analytical methods performed and analysis dates present?	•
Were all requested target analytes reported?	•
Were QAPP specified laboratory PQLs achieved?	•
Were holding times met?	•
Were trip blanks analyzed at the proper frequency and in control?	•
Were field blanks analyzed at the proper frequency and in control?	•
Were equipment blanks analyzed at the proper frequency and in control?	•
Was a method blank prepared and analyzed with each batch?	•
Were target analytes in the method blank less than DL?	•
Was an LCS/LCSD pair prepared and analyzed with each batch?	•
Were LCS/LCSD recoveries within project acceptance limits?	•
Was the LCS/LCSD RPD within project acceptance limits?	•
Was a MS/MSD pair prepared with each batch?	•
Were MS/MSD recoveries within project acceptance limits?	•
Was the MS/MSD RPD within project acceptance limits?	•
If ISM was used for sample collection, were laboratory triplicates analyzed and within project acceptance limits?	•
Were surrogate recoveries within project acceptance limits?	•
Were field replicates (duplicates, triplicates, etc.) analyzed at the proper frequency and in control?	•
Were reported sample concentrations within calibration range?	•
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•
Were DoD QSM corrective actions followed if deviations were noted?	•

## Data Validation Report for 96848

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Were any data recommended for exclusion in the data validation process?

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# Automated Data Review Detail Report for 96848

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2



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## Sample Summary

								SW8260C
Location	Field Sample ID	Date	Time	Sample Type	Matrix	SBD	SED	
FEW4-IDW-EFF	FEW4-IDW-EFF1	07-14-2021	0940	N	WW	0.00	0.00	X
FEW4-IDW-INF	FEW4-IDW-INF1	07-14-2021	0930	N	WW	0.00	0.00	X
FEW4-IDW-INT	FEW4-IDW-INT1	07-14-2021	0935	N	WW	0.00	0.00	X
FEW4-MW105	FEW4-MW105-TEMP	07-13-2021	1545	N	WG	0.00	0.00	X
FEW4-MW54B	FEW4-MW54B-TEMP	07-15-2021	0924	N	WG	0.00	0.00	X
FIELDQC	FEW4-TB01	07-13-2021	0800	TB	WQ	0.00	0.00	X
Total								6



**Automated Data Review Detail Report for 96848**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2

**US Army Corps  
of Engineers®****Batch Report**

Test Method: SW8260C

Analysis Batch: 266199

Location	Matrix	Field Sample ID	Lab Sample ID	Calibration Ref	Run#/ Dil'n	Collection Date/Time	Extraction Date/Time	Analysis Date/Time	Prep/Leach Batch	Sample Type
LABQC	WQ	BS-T210720AW-266199	BS-T210720AW-266199		1/1	7/20/2021 10:21	7/20/2021 10:21	7/20/2021 10:21	266199/	BS
LABQC	WQ	BD-T210720AW-266199	BD-T210720AW-266199		1/1	7/20/2021 10:46	7/20/2021 10:46	7/20/2021 10:46	266199/	BD
LABQC	WQ	LB-T210720AW-266199	LB-T210720AW-266199		1/1	7/20/2021 11:10	7/20/2021 11:10	7/20/2021 11:10	266199/	LB
FEW4-IDW-EFF	WW	FEW4-IDW-EFF1	BA36235		1/4	7/14/2021 09:40	7/20/2021 19:00	7/20/2021 19:00	266199/	N
FEW4-IDW-INF	WW	FEW4-IDW-INF1	BA36236		1/4	7/14/2021 09:30	7/20/2021 19:25	7/20/2021 19:25	266199/	N

Test Method: SW8260C

Analysis Batch: 266340

Location	Matrix	Field Sample ID	Lab Sample ID	Calibration Ref	Run#/ Dil'n	Collection Date/Time	Extraction Date/Time	Analysis Date/Time	Prep/Leach Batch	Sample Type
LABQC	WQ	BS-T210726AW-266340	BS-T210726AW-266340		2/1	7/26/2021 11:05	7/26/2021 11:05	7/26/2021 11:05	266340/	BS
LABQC	WQ	BD-T210726AW-266340	BD-T210726AW-266340		2/1	7/26/2021 11:30	7/26/2021 11:30	7/26/2021 11:30	266340/	BD
LABQC	WQ	LB-T210726AW-266340	LB-T210726AW-266340		2/1	7/26/2021 13:08	7/26/2021 13:08	7/26/2021 13:08	266340/	LB
FEW4-MW105	WG	FEW4-MW105-TEMP	BA36238		2/20	7/13/2021 15:45	7/26/2021 16:52	7/26/2021 16:52	266340/	N

Test Method: SW8260C

Analysis Batch: 266349

**Automated Data Review Detail Report for 96848**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

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Location	Matrix	Field Sample ID	Lab Sample ID	Calibration Ref	Run#/ Dil'n	Collection Date/Time	Extraction Date/Time	Analysis Date/Time	Prep/Leach Batch	Sample Type
LABQC	WQ	BS-T210722AW-266349	BS-T210722AW-266349		1/1	7/22/2021 14:57	7/22/2021 14:57	7/22/2021 14:57	266349/	BS
LABQC	WQ	BD-T210722AW-266349	BD-T210722AW-266349		1/1	7/22/2021 15:21	7/22/2021 15:21	7/22/2021 15:21	266349/	BD

Test Method: SW8260C      Analysis Batch: 266349

Location	Matrix	Field Sample ID	Lab Sample ID	Calibration Ref	Run#/ Dil'n	Collection Date/Time	Extraction Date/Time	Analysis Date/Time	Prep/Leach Batch	Sample Type
LABQC	WQ	LB-T210722AW-266349	LB-T210722AW-266349		1/1	7/22/2021 17:00	7/22/2021 17:00	7/22/2021 17:00	266349/	LB
FIELDQC	WQ	FEW4-TB01	BA36240		1/1	7/13/2021 08:00	7/22/2021 17:50	7/22/2021 17:50	266349/	TB
FEW4-IDW-INT	WW	FEW4-IDW-INT1	BA36237		1/1	7/14/2021 09:35	7/22/2021 18:15	7/22/2021 18:15	266349/	N
FEW4-MW105	WG	FEW4-MW105-TEMP	BA36238		1/1	7/13/2021 15:45	7/22/2021 18:40	7/22/2021 18:40	266349/	N
FEW4-MW54B	WG	FEW4-MW54B-TEMP	BA36239		1/1	7/15/2021 09:24	7/22/2021 19:05	7/22/2021 19:05	266349/	N

**Automated Data Review Detail Report for 96848**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2

**Field Batch Report**

Test Method: SW8260C		Extraction Method: SW5030		Leach Method: NONE				
EBLOT	TBLOT	ABLOT	LOCID	Matrix	FLDSAMPID	LABSAMPID	LOGDATE	SACODE
	13072101		FEW4-IDW-EFF	WW	FEW4-IDW-EFF1	BA36235	7/14/2021 09:40	N
	13072101		FEW4-IDW-INF	WW	FEW4-IDW-INF1	BA36236	7/14/2021 09:30	N
	13072101		FEW4-IDW-INT	WW	FEW4-IDW-INT1	BA36237	7/14/2021 09:35	N
	13072101		FEW4-MW105	WG	FEW4-MW105-TEMP	BA36238	7/13/2021 15:45	N
	13072101		FEW4-MW54B	WG	FEW4-MW54B-TEMP	BA36239	7/15/2021 09:24	N
	13072101		FIELDQC	WQ	FEW4-TB01	BA36240	7/13/2021 08:00	TB

**MS Mismatch Report --No Records Found--**

Section to identify Matrix Spike mismatches where parent sample differs from MS by dilution.

**QC Outlier Report**

Test Method: SW8260C		Extraction Method: SW5030		Leach Method: NONE							
QC Element	Sample ID/ Lab Sample ID	Run#/ Dil'n	Analyte	Result (Units)	Qualifier	Warning Limits	Control Limits	Reason	Comment	Rule	Action Level
LCS RPD	BD-T210722AW-266349 (BD) / BD-T210722AW-266349	1 / 1.00	1,2-Dibromoethane (EDB)	20.27 (rpd)	J/None	< 20	< 20	Z			
LCS RPD	BD-T210722AW-266349 (BD) / BD-T210722AW-266349	1 / 1.00	1,2-Dichlorobenzene	21.90 (rpd)	J/None	< 20	< 20	Z			

**Automated Data Review Detail Report for 96848**

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2



LCS RPD	BD-T210722AW-266349 (BD) / BD-T210722AW-266349	1 / 1.00	1,4-Dichlorobenzene	21.14 (rpd)	J/None	< 20	< 20	Z
LCS RPD	BD-T210722AW-266349 (BD) / BD-T210722AW-266349	1 / 1.00	Bromochloromethane	22.11 (rpd)	J/None	< 20	< 20	Z
LCS RPD	BD-T210722AW-266349 (BD) / BD-T210722AW-266349	1 / 1.00	Bromodichloromethane	22.02 (rpd)	J/None	< 20	< 20	Z
LCS RPD	BD-T210722AW-266349 (BD) / BD-T210722AW-266349	1 / 1.00	Bromoform	20.90 (rpd)	J/None	< 20	< 20	Z
LCS RPD	BD-T210722AW-266349 (BD) / BD-T210722AW-266349	1 / 1.00	Chlorobenzene	20.53 (rpd)	J/None	< 20	< 20	Z
LCS RPD	BD-T210722AW-266349 (BD) / BD-T210722AW-266349	1 / 1.00	cis-1,3-Dichloropropene	20.64 (rpd)	J/None	< 20	< 20	Z
LCS RPD	BD-T210722AW-266349 (BD) / BD-T210722AW-266349	1 / 1.00	Dibromochloromethane	22.64 (rpd)	J/None	< 20	< 20	Z
LCS RPD	BD-T210722AW-266349 (BD) / BD-T210722AW-266349	1 / 1.00	Ethylbenzene	21.92 (rpd)	J/None	< 20	< 20	Z
LCS RPD	BD-T210722AW-266349 (BD) / BD-T210722AW-266349	1 / 1.00	m,p-Xylene	21.08 (rpd)	J/None	< 20	< 20	Z
LCS RPD	BD-T210722AW-266349 (BD) / BD-T210722AW-266349	1 / 1.00	Methylcyclohexane	22.33 (rpd)	J/None	< 20	< 20	Z
LCS RPD	BD-T210722AW-266349 (BD) / BD-T210722AW-266349	1 / 1.00	Tetrachloroethene (PCE)	22.12 (rpd)	J/None	< 20	< 20	Z
LCS RPD	BD-T210722AW-266349 (BD) / BD-T210722AW-266349	1 / 1.00	Trichlorofluoromethane	22.53 (rpd)	J/None	< 20	< 20	Z

Rule is the multiplier used when blank contamination occurs to determine action level.

**Qualified Results**

Test Method: SW8260C      Extraction Method: SW5030      Leach Method: NONE

**Automated Data Review Detail Report for 96848**  
B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study  
F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2



FieldSample ID	LabSample ID	Matrix	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
FEW4-MW54B-TEMP	BA36239	W	N	m,p-Xylene	2.00	1.20 J	1.20 J		ug/l	Z/TR
FEW4-MW54B-TEMP	BA36239	W	N	o-Xylene	1.00	0.610 J	0.610 J		ug/l	TR

Qualified analytes in samples are reported as estimated, not detected (UJ) at the Limit of Detection (LOD).

## Automated Data Review Detail Report for 96848

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2



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### Detected Results

Test Method: SW8260C		Extraction Method: SW5030		Leach Method: NONE						
FieldSample ID	LabSample ID	Matrix	Type	Dilution	Analyte	LOQ	Lab Result	Qualified Result	Units	Reason
FEW4-IDW-INF1	BA36236	W	N	4	Toluene	4.00	42.0	42.0	ug/l	
FEW4-IDW-INF1	BA36236	W	N	4	Trichloroethene (TCE)	4.00	9.50	9.50	ug/l	
FEW4-MW105-TEMP	BA36238	W	N	1	cis-1,2-Dichloroethene	1.00	1.80	1.80	ug/l	
FEW4-MW105-TEMP	BA36238	W	N	1	Toluene	1.00	2.10	2.10	ug/l	
FEW4-MW105-TEMP	BA36238	W	N	20	Trichloroethene (TCE)	20.0	140	140	ug/l	
FEW4-MW54B-TEMP	BA36239	W	N	1	m,p-Xylene	2.00	1.20 J	1.20 J	ug/l	Z/TR
FEW4-MW54B-TEMP	BA36239	W	N	1	o-Xylene	1.00	0.610 J	0.610 J	ug/l	TR

## Automated Data Review Detail Report for 96848

B08WY0467-02, F.E. Warren AFB, Site 4, Feasibility Study

F.E. Warren Atlas Site 4 - Data Gaps UFP-QAPP Addendum 2



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### Rejected Results

--No Records Found--

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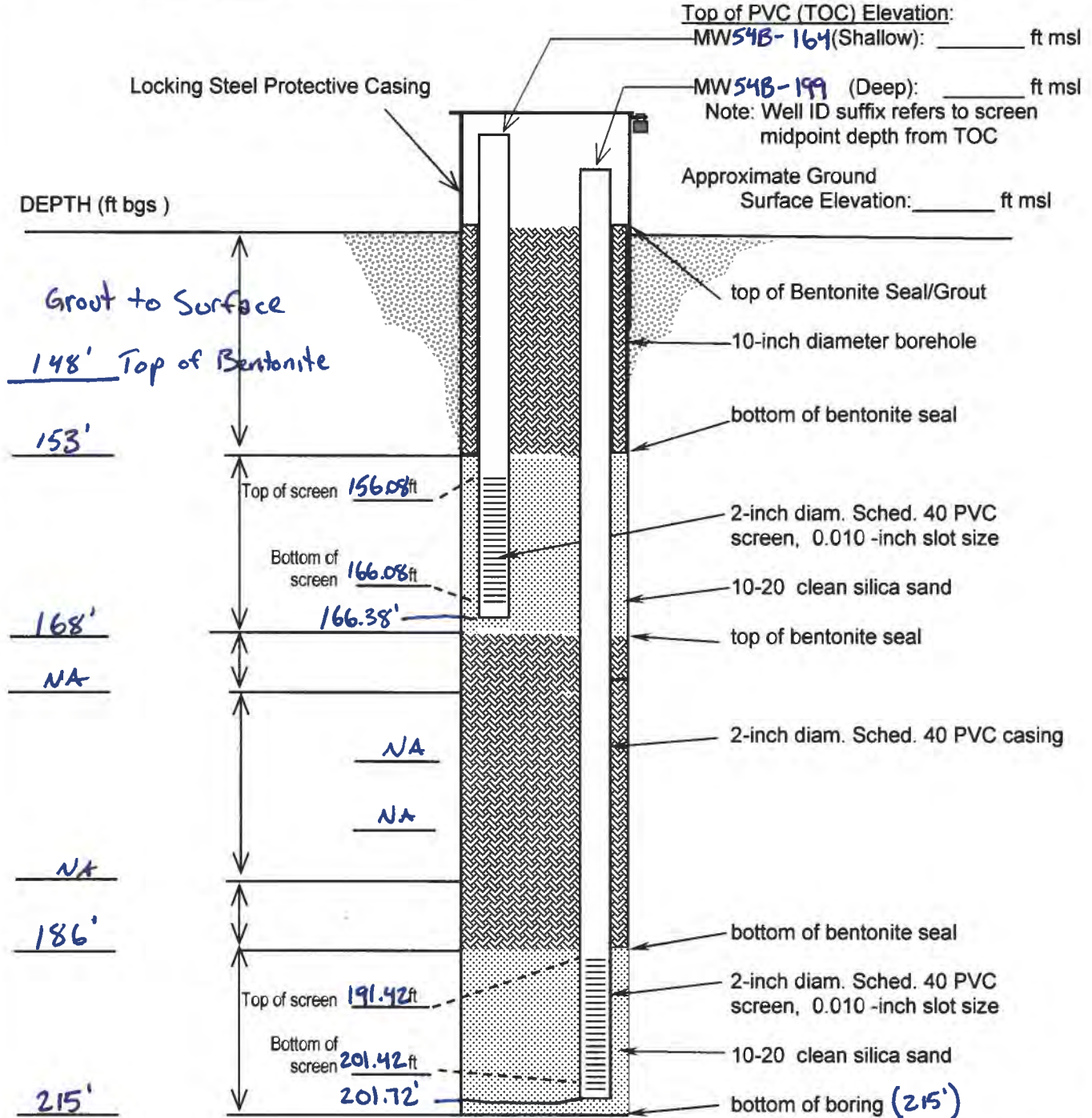




# **NESTED MONITORING WELL MW54B** **WELL CONSTRUCTION DETAILS**

Project: Atlas D Missile Site 4  
Data Gaps Investigation  
 Date Completed: 7-30-21  
 Location: Cheyenne, WY

Drilling Method: Sonic Coring/Casing Advance  
 Drilling Company: Yellow Jacket Drilling  
 Field Geologist: Jon Kinkade



REMARKS: Development Method: Surge and Bail with Development Rig, Pump with Mega Monsoon & Grubfos Rod, Flo 2  
Depth to Water After Completion: MW54B-164 = 152.32' bTOC MW54B-199 = 95.32' bTOC

Signature of Preparer: Jon Kinkade

## WELL DEVELOPMENT LOG

Pg. 1 of 3

Project Name: Atlas Site 4 Data Gap Investigation  
 Site Name: Atlas D Missile Site 4 – Cheyenne, WY  
 Development Date: 8-3-21

Project No.: 60613342  
 Field Crew: JWK, CC  
 Weather: 65°F Mostly Cloudy, Breezy

Analytical Instruments: pH: Hanna 98494  
 Temp: " "  
 D.O.: " "

Specific Conductivity: Hanna 98494  
 ORP: " "  
 Turbidity: LaMotte 2020 we

Well ID: MW54B-164 (SHALLOW)

Type of Well: Nested Monitoring Well

Casing Stickup: 2.23

## CASING VOLUME CALCULATION

Static Water Level: 152.32 bTOC

(TD(ft) – DTW(ft)) x gal/ft = 1 casing volume (gals)

Well Depth/Diameter: 168.65' / 2" bTOC

Time	Casing Volumes	Gallons Removed	Diss. Oxygen (mg/l)	ORP (mV)	Temp (°C)	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	PWL (ft TOC)
0850	Begin Surging								
0908	Stop Surging								
0910	Begin Bailing							Slightly Cloudy	
0930	Stop Bailing @ ~10 gal.							Slightly Cloudy	
1241	Pump on @ 164' bgs ~ 0.5 gal/min								
1246		2.5	1.17	-195.7	13.77	9.19	1041	Opaque Br.	159.08
1251		5.0	0.56	-233.7	13.24	9.16	1076	" "	159.51
1256		7.5	0.53	-241.8	12.95	9.23	1111	" "	159.54
1300	Pump off								
1313	Pump on @ 161' bgs ~ 0.25 gal/min								
1318		10.0	1.21	-210.6	14.06	9.10	1026	Opaque H. brown	155.40
1323		11.25	0.96	-228.5	14.51	9.04	1006	" " "	155.03
1328		12.5	0.87	-240.4	14.77	8.99	979	" " "	154.89
1333		15.0	0.94	-247.7	14.61	8.77	928	" " "	155.31
1348		17.5	1.02	-249.6	14.32	8.95	898	" " "	155.03
1358		20.0	1.08	-250.1	14.08	8.89	872	" " "	155.58
1408		22.5	1.20	-245.1	14.13	8.84	851	" " "	155.70
1428		27.5	1.34	-235.5	14.37	8.70	801	" " "	155.75
1448		32.5	1.47	-226.1	13.92	8.60	739	3400	155.84
1508		37.5	1.53	-218.5	13.96	8.49	700	3264	155.60

CONT. →

CONT. →

Development Equipment: Development Rig with Surge block & 20 ft. (1" dia) PVC bailer  
Mega Monsoon Pump, Hanna 98494, LaMotte 2020 we, Geotech WL Meter

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Signature(s): JWK



## WELL DEVELOPMENT LOG

Pg 2 of 3

Project Name: Atlas Site 4 Data Gap InvestigationProject No.: 60613342Site Name: Atlas D Missile Site 4 - Cheyenne, WYField Crew: JWK, CC, BMDevelopment Date: 8-3-21 / 8-4-21Weather: 64°F Cloudy, BreezyAnalytical Instruments: pH: Hanna 98494Specific Conductivity: Hanna 98494Temp: " "ORP: " "D.O.: " "Turbidity: LaMotte 2020 weWell ID: MW54B-164 (SHALLOW)Type of Well: Nested Monitoring WellCasing Stickup: 2.23'

## CASING VOLUME CALCULATION

Static Water Level: 152.32 bTOC(TD(ft) - DTW(ft)) x gal/ft = 1 casing volume (gals)Well Depth/Diameter: 168.65' / 2" bTOC

Time	Casing Volumes	Gallons Removed	Diss. Oxygen (mg/l)	ORP (mV)	Temp (°C)	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	PWL (ft TOC)
CONT.	@ 0.375 gal./min								
1518		41.25	1.72	-215.0	13.46	8.54	678	2944	156.65
1528		45.0	1.74	-208.2	13.41	8.45	663	2628	156.59
1538		48.75	1.79	-205.2	13.16	8.40	636	2455	156.78
1548		52.5	1.84	-200.6	13.00	8.34	620	2355	156.88
1558		56.25	1.84	-197.8	13.02	8.30	604	2122	156.70
1608		60.0	1.93	-194.0	13.06	8.27	585	—	—
1618		63.75	1.96	-191.5	13.02	8.25	576	1902	156.94
1628	@ .66 gal/min ~ 70.0								
1632	Pump OFF 72								
8-4-21 0738	Pump on @ 164 bps ~ 0.5 gal/min								
0748		77	0.63	-232.2	11.86	8.28	616	2586	157.83
0758		82	0.70	-245.9	11.99	8.20	585	1791	157.45
0808		87	1.04	-237.3	12.27	8.20	584	1657	157.71
0818		92	1.30	-227.3	11.96	8.22	571	1320	157.81
0828		97	1.51	-217.1	12.09	8.17	546	1095	157.75
0838		102	1.66	-208.5	12.44	8.11	521	906	157.62
0848		107	1.77	-198.1	12.96	7.91	495	723	157.61
0858		112	1.85	-190.0	13.41	7.76	472	193	156.91
0908		117	2.01	-183.3	13.38	7.73	464	160	157.63

Development Equipment: Development Rig with Surge block & 20ft. (1" dia) PVC bailer,  
Mega Monsoon Pump, Hanna 98494, LaMotte 2020 we, Geotech WL Meter

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Signature(s): J-KW

## WELL DEVELOPMENT LOG

Pg 3 of

Project Name: Atlas Site 4 Data Gap Investigation  
 Site Name: Atlas D Missile Site 4 - Cheyenne, WY  
 Development Date: 8-4-21 / 8-8-21

Project No.: 60613342  
 Field Crew: JWK, CC, BM  
 Weather: 65°F Mostly Sunny, Breezy

Analytical Instruments: pH: Hanna 98494  
 Temp: " "  
 D.O.: " "

Specific Conductivity: Hanna 98494  
 ORP: " "  
 Turbidity: LaMotte 2020 we

Well ID: MWS4B-164 (SHALLOW)

Type of Well: Nested Monitoring Well

Casing Stickup: \_\_\_\_\_

## CASING VOLUME CALCULATION

Static Water Level: 152.32 bTOC

(TD(ft) - DTW(ft)) x \_\_\_\_\_ gal/ft = 1 casing volume (gals)

Well Depth/Diameter: 168.65' / 2" bTOC

Time	Casing Volumes	Gallons Removed	Diss. Oxygen (mg/l)	ORP (mV)	Temp (°C)	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	PWL (ft TOC)
CONT.									
0918		122	2.10	-177.8	12.95	7.70	451	113	157.95
0928		127	2.20	-172.0	13.04	7.71	438	87	158.02
0938		132	2.28	-167.1	13.21	7.55	416	94.9	157.86
0940 Pump off		133							
8-8-21 1442 Pump on	Set (2)	163' bTOC		~ 0.8 gal./min					152.37
1447		137	0.39	-218.6	13.17	7.40	532	952 AU	158.45
1452		141	0.47	-218.0	13.17	7.46	489	99	158.69
1454 (2) 1.3 gal./min									
1457		146	0.64	-226.2	12.11	7.59	470	1008 AU	159.10
1503 (2) 1.5 gal./min									
1507		158	1.36	-197.6	12.21	7.77	461	1418 AU	160.65
1511 Pump off	WL ~1 ft. above pump								
1533 Pump on (2)	1.0 gal./min	2.21	-120.4	12.61	7.59	431	JWK		
1538		163	2.21	-120.4	12.61	7.59	431	70	157.57
1543		168	2.49	-105.3	12.97	7.59	414	70.7	157.65
1548		173	2.68	-100.7	13.00	7.57	407	54.6	157.53
1553		178	2.85	-96.2	13.00	7.67	402	49.3	157.60
1558		183	2.98	-91.0	13.10	7.68	399	27	157.57
1603		188	3.13	-87.0	13.04	7.68	399	53	157.65
1605 Pump off	DEVELOPMENT COMPLETE								JWK

Development Equipment: Development Rig with Surge block & 20 ft. (1" dia.) PVC boiler,  
Mega Monsoon Pump, Hanna 98494, LaMotte 2020we, Geotech WL Meter,  
GRONDFOS REDIFLO 2 pump (8-8-21)

Comments: 1511: Well dewatered to ~1 ft. above pump. 790g recharge in 13 min.

Signature(s): \_\_\_\_\_



# WELL DEVELOPMENT LOG

Pg. 1 of 2

Project Name: Atlas Site 4  
 Site Name: Atlas D Missile Site 4 - Cheyenne, WY  
 Development Date: 8-3-21

Project No.: 60613342  
 Field Crew: JWK, CC  
 Weather: 62°F Mostly Cloudy, Breezy

Analytical Instruments: pH: Hanna 98494  
 Temp: " "  
 D.O.: " "

Specific Conductivity: Hanna 98494  
 ORP: " "  
 Turbidity: LaMotte 2020 we

Well ID: MW54B-199 (DEEP)

Type of Well: Nested Monitoring Well

Casing Stickup: 2.11'

## CASING VOLUME CALCULATION

Static Water Level: 95.32' bTOC

(TD(ft) - DTW(ft)) x gal/ft = 1 casing volume (gals)

Well Depth/Diameter: 203.93' / 2" bTOC

Time	Casing Volumes	Gallons Removed	Diss. Oxygen (mg/l)	ORP (mV)	Temp (°C)	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	PWL (ft TOC)
0806	Begin Surging								
0826	Stop Surging								
0828	Begin Bailing							Clear	
0848	Stop Bailing @ 15 gal. Removed							Clear	
1022	Begin Pumping @ 200 ft. bgs								
1026	water to surface								
1031		7.5	5.36	121.0	10.71	6.97	276	14.9	
1036		15.0	5.34	66.5	10.78	7.02	276	3.94	
1046		30.0	5.33	45.7	10.75	7.21	277	3.65	
1050	Pump @ 198' bgs								
1056		45.0	5.32	32.7	10.82	7.35	277	2.03	
1106		60.0	5.31	26.1	10.90	7.47	277	1.06	120.4
1107	Pump @ 196' bgs								
1116		75.0	5.31	20.6	10.89	7.51	277	0.83	120.5
1118	Pump @ 194' bgs								
1126		90.0	5.31	17.8	10.97	7.54	277	0.98	120.5
1128	Pump @ 192' bgs								
1136		105.0	5.30	14.4	11.03	7.56	277	0.91	120.6
1138	Pump @ 190' bgs								
1146		120.0	5.25	30.0	11.14	7.59	277	3.43	120.6

~~1150 Pump @ 188' bgs JWK~~  
 CONT. 2

CONT. 2

Development Equipment: Development Rig with Surge block & 20-ft. (1" dia.) PVC Bailer, Mega Monsoon Pump, Hanna 98494, LaMotte 2020 we, GeoTech WL Meter

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Signature(s): JWK

Pg. 2 of 2

Project No.: 60613342

Field Crew: JWK, CC

Weather: 62°F Mostly Cloudy, Breezy

Specific Conductivity: Hanna 98494

ORP: " "

Turbidity: LaMotte 2020 we

Type of Well: Nested Monitoring Well

## CASING VOLUME CALCULATION

$$(TD(ft) - DTW(ft)) \times \text{gal/ft} = 1 \text{ casing volume (gals)}$$
$$(TD(ft) - DTW(ft)) \times \text{gal/ft} = 1 \text{ casing volume (gals)}$$

Development Equipment: Development Rig with Surge block & 20ft. (1" dia.) PVC bales,  
Mega Monsoon Pump, Hanna 98494, Lottotte 2020 wc, Geotech WL Meter

Comments: \_\_\_\_\_

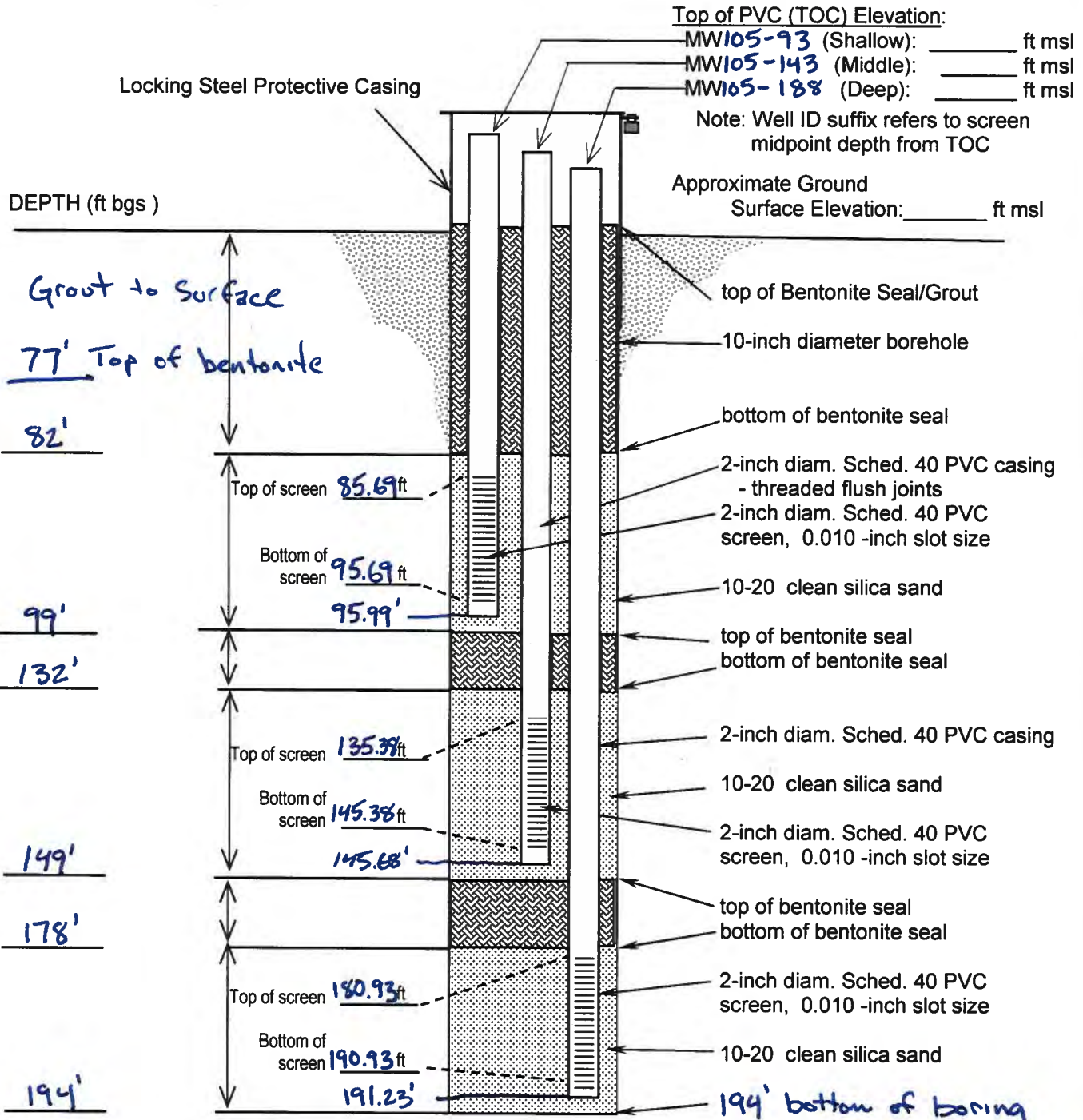
Signature(s): Dr. Kishor

**Signature(s):**

# NESTED MONITORING WELL MW105 WELL CONSTRUCTION DETAILS

Project: Atlas D Missile Site 4  
Data Gaps Investigation  
Date Completed: 8-1-21  
Location: Cheyenne, WY

Drilling Method: Sonic Coring/Casing Advance  
Drilling Company: Yellow Jacket Drilling  
Field Geologist: Jon Kinkade



## REMARKS:

Development Method: Surge and Bail with Development Prg. Pump with Mega Monsoon & Grundfos  
Depth to Water After Completion: MW105-93 = 75.97' bTOC MW105-143 = 75.92' bTOC MW105-188 = 75.58' bTOC RediFlo 2

Signature of Preparer: J. Kinkade



# WELL DEVELOPMENT LOG

Project Name: Atlas Site 4 Data Gap Investigation  
 Site Name: Atlas D Missile Site 4 - Cheyenne, WY  
 Development Date: 8-4-21

Project No.: 60613342  
 Field Crew: JWK, CC, BM, JH  
 Weather: 68°F Mostly Sunny, Breezy

Analytical Instruments: pH: Hanna 98494  
 Temp: " "  
 D.O: " "

Specific Conductivity: Hanna 98494  
 ORP: " "  
 Turbidity: LaMotte 2020 we

Well ID: MW105-93 (SHALLOW)  
 Casing Stickup: 2.25'  
 Static Water Level: 75.97' bTOC  
 Well Depth/Diameter: 98.08' / 2" bTOC

Type of Well: Nested Monitoring Well  
 CASING VOLUME CALCULATION  
 (TD(ft) - DTW(ft)) x gal/ft = 1 casing volume (gals)

Time	Casing Volumes	Gallons Removed	Diss. Oxygen (mg/l)	ORP (mV)	Temp (°C)	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	PWL (ft TOC)
1217	Begin Surging								
1232	End Surging								
1233	Begin Bailing							brown, cloudy	
1254	Stop Bailing @ 15 gal.							brown, slightly cloudy	
1305	Pump on @ 95' bgs	~ 1.1 gal./min							
1310		20.5	1.55	-266.5	13.58	8.18	589	opaque brown	86.77
1315		26.0	1.77	-257.8	13.47	7.95	568	" "	86.85
1320		31.5	1.97	-248.1	13.12	7.78	570	" "	86.94
1325	@ 1.2 gal/min	37.0	2.14	-239.9	13.36	7.61	574	light brown cloudy	86.65
1335		49.0	2.44	-223.4	13.25	7.40	576	" " "	87.12
1345		61.0	2.63	-211.4	12.95	7.28	604	" " "	87.50
1355		73.0	2.87	-202.7	12.26	7.22	603	1794	87.64
1405		85.0	2.99	-198.8	12.48	7.26	623	1116	87.20
1415		97.0	3.13	-195.0	12.25	7.27	624	706	87.50
1425		109.0	3.26	-191.1	11.99	7.39	599	124	87.55
1435		121.0	3.33	-185.1	12.37	7.42	587	81	87.55
1445		133.0	3.43	-180.4	12.68	7.26	561	65.0	87.42
1455		145.0	3.53	-176.4	12.17	7.24	555	25.4	87.42
1505		157.0	3.69	-170.2	12.20	7.30	533		87.68
1515		169.0	3.81	-166.4	12.23	7.33	514	31.7	87.77
1525		181.0	3.84	-162.0	12.37	7.21	506	32.1	87.71
1535		193.0	3.96	-158.1	12.50	7.22	485	37.7	87.71
1545		205.0	4.07	-154.4	12.01	7.24	478	23.1	87.63

Development Equipment: Development Rig with Surge block & 20 ft. (1" dia.) PVC  
bailer, Mega Monsoon Pump, Hanna 98494, LaMotte 2020 we, Geotech Wm Meter

Comments: 1454 Raise pump 2'; pump is @ 93' bgs  
1516 Raise pump 2'; pump @ 91' bgs  
1529 Raise pump 2'; pump is @ 88' bgs  
1546 Pump Off. DEVELOPMENT COMPLETE @ 1546 (8-4-21)

Signature(s): JWK



# WELL DEVELOPMENT LOG

Project Name: Atlas Site 4 Data Gap Investigation  
 Site Name: Atlas D Missile Site 4 - Cheyenne, WY  
 Development Date: 8-4-21 / 8-5-21

Project No.: 60613342  
 Field Crew: JWK, CC, BM, JH  
 Weather: 66°F Mostly Sunny, Breezy

Analytical Instruments: pH: Hanna 98494  
 Temp: " "  
 D.O: " "

Specific Conductivity: Hanna 98494  
 ORP: " "  
 Turbidity: LaMotte 2020 we

Well ID: MW105-143 (MIDDLE)  
 Casing Stickup: 2.17'  
 Static Water Level: 75.92' bTOC  
 Well Depth/Diameter: 146.64' / 2" bTOC

Type of Well: Nested Monitoring Well  
 CASING VOLUME CALCULATION  
 (TD(ft) - DTW(ft)) x gal/ft = 1 casing volume (gals)

Time	Casing Volumes	Gallons Removed	Diss. Oxygen (mg/l)	ORP (mV)	Temp (°C)	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	PWL (ft TOC)
8/4/21 1137	Begin Surging								
1152	Stop Surging								
1154	Begin Bailing								
1218	Stop Bailing @ 15 gal.							Slightly Cloudy	
1555	Pump on; pump placed at bottom of well screen; 1.9 gpm							Slightly Cloudy	
1605		34	1.42	-327.7	10.60	7.44	502	Brown / 514	110.58
1615		53	2.58	-277.2	10.69	7.26	477	85	112.06
1625	@ 1.8 gpm	72	3.42	-233.5	10.94	7.07	438	27.4	112.00
1635		90	4.05	-202.1	10.92	7.07	418	22.3	112.31
8/5/21 1436	Pump off; will continue development pumping tomorrow.								
0803	Resume pumping; pump on bottom of well screen								
0815	@ 1.3 gpm	109.6	3.06	-218.3	10.11	7.17	407	8.81	101.01
0825	@ 4 ft. off bottom	118.6	3.87	-188.3	10.22	7.24	406	5.45	102.15
0835	Twpk	132	4.72	-168.8	10.36	7.25	374	4.43	102.02
0845	6' off bottom	145	4.96	-160.7	10.53	7.23	369	3.71	101.63
0855		158	5.26	-149.8	10.50	7.21	365	1.34	101.72
0905		171	5.47	-140.6	10.57	7.19	366	4.63	102.08
0915		184	5.60	-135.3	10.67	7.20	356	1.33	102.30
0925		197	5.72	-129.0	10.76	7.16	354	1.58	102.28
0930	Pump off	203							

★ DEVELOPMENT COMPLETE ————— JWK

Development Equipment: Development Rig with Surge block & 20 ft. (1" dia) PVC bailer,  
Mega Monsoon Pump, Hanna 98494, LaMotte 2020 we, Geotech WL Meter

Comments: 8/4/2021 1545 - DTW = 73.93' TOL  
0816 Raise pump 2' off well bottom; 0830 Raise pump 2';  
0845 Raise pump 2'; 0905 Raise pump 3'; 0917 Raise pump 2'

Signature(s): JWK

# WELL DEVELOPMENT LOG

Pg. 1 of 2

Project Name: Atlas Site 4 Data Gap Investigation  
 Site Name: Atlas D Missile Site 4 - Cheyenne, WY  
 Development Date: 8-4-21 / 8-5-21 / 8-9-21

Project No.: 60613342  
 Field Crew: JWK, CC, BM  
 Weather: 63°F Mostly Sunny, Breezy

Analytical Instruments: pH: Hanna 98494  
 Temp: " "  
 D.O.: " "

Specific Conductivity: Hanna 98494  
 ORP: " "  
 Turbidity: LaMotte 2020 we

Well ID: MW105-188 (DEEP)

Type of Well: Nested Monitoring Well

Casing Stickup: 2.09'

## CASING VOLUME CALCULATION

Static Water Level: 75.75 bTOC (75.58 8-9-21) TD(ft) - DTW(ft)) x gal/ft = 1 casing volume (gals)

Well Depth/Diameter: 193.35' / 2" bTOC

Time	Casing Volumes	Gallons Removed	Diss. Oxygen (mg/l)	ORP (mV)	Temp (°C)	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	PWL (ft TOC)
1038	Begin Surging								
1052	Stop Surging								
1055	Begin Bailing							Slightly Cloudy	
1135	Stop Bailing (215 gal.)							Slightly Cloudy	
8-21 0938	Pump on. Set @ 190' bgs -								
0948		38	3.47	-265.7	10.56	7.29	342	643	161.20
0958	@ 0.75 gal/min	45.5	1.81	-325.9	11.33	7.17	395	81	169.70
1008	@ 0.65 gal/min	52.0	0.91	-346.6	11.44	7.11	448	27.4	164.90
1018		58.5	1.10	-356.4	11.36	7.10	486	18.1	162.98
1028	@ 0.75 gal/min	66.0	1.27	-336.7	11.38	7.09	493	30.5	164.44
1033	Pump shut off								
9-21 1421	Pump on. Set @ ~ 173' bTOC ~								75.58
1426		73	1.02	-300.1	10.42	7.21	482	57.2	114.25
1431		80	0.86	-288.0	10.61	7.20	495	696 AU	142.50
1436		87	1.26	-228.3	11.19	7.21	460	825 AU	163.38
1441		94	1.14	-226.0	11.89	7.20	452	855 AU	166.85
1446	@ 0.8 gal/min	98	1.11	-273.6	12.13	7.22	442	163	166.99
1451		102	1.35	-347.9	12.10	7.28	438	86.2	166.67
1456		106	1.58	-368.9	11.85	7.29	435	64.3	168.41
1501		110	1.74	-327.2	12.13	7.30	434	59.8	168.23

CONT. →

CONT. →

Development Equipment: Development Rig with Surge block & 20ft. (1" dia.) PVC bailer, Mega Moonsoon Pump, Hanna 98494, LaMotte 2020 we, Geotech WL Meter, Grundfos RediFlo 2 pump, Invertek controller

Comments: <sup>(8-5-21)</sup> 1020 Base Pump to 188' bgs; Pumped using Grundfos RediFlo 2 beginning 8-9-21

Signature(s):





## WELL DEVELOPMENT LOG

Pg. 2 of 2

Project Name: Atlas Site 4 Data Gap Investigation  
 Site Name: Atlas D Missile Site 4 - Cheyenne, WY  
 Development Date: 8-9-21

Project No.: 60613342  
 Field Crew: JWK  
 Weather: 84°F Mostly Cloudy, Hazy, Breezy

Analytical Instruments: pH: Hanna 98494  
 Temp: " "  
 D.O.: " "

Specific Conductivity: Hanna 98494  
 ORP: " "  
 Turbidity: LaMotte 2020 wle

Well ID: MW105-188 (DEEP)

Type of Well: Nested Monitoring Well

Casing Stickup: 2.09'

## CASING VOLUME CALCULATION

Static Water Level: 75.75' bTOC (75.58' 8-9-21) (TD(ft) - DTW(ft)) x gal/ft = 1 casing volume (gals)

Well Depth/Diameter: 193.35' / 2" bTOC

Time	Casing Volumes	Gallons Removed	Diss. Oxygen (mg/l)	ORP (mV)	Temp (°C)	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	PWL (ft TOC)
CONT.									
1506		114	1.91	-343.9	12.17	7.33	429	104.0	167.58
1511		118	2.18	-339.0	12.27	7.32	438	52.2	168.11
1516		122	2.28	-330.7	12.13	7.35	429	35.9	167.57
1521		126	2.51	-318.2	12.15	7.37	427	21.4	168.01
1531		134	2.74	-304.2	12.32	7.37	416	17.4	167.24
1541		142	3.05	-282.9	12.19	7.41	410	17.1	168.18
1551		150	3.29	-274.3	12.28	7.34	406	19.3	167.40
1601		158	3.58	-256.5	12.09	7.35	407	36.3	167.66
1611		166	3.76	-258.0	12.22	7.33	399	117	167.88
1621		174	3.86	-239.0	12.33	7.35	379	23.4	167.30
1631		182	4.01	-243.7	12.29	7.36	401	156	166.50
1641		190	4.14	-225.7	12.24	7.33	402	11.6	167.15
1651		198	4.26	-218.5	12.20	7.32	396	5.23	167.29
1653 PUMP OFF	DEVELOPMENT COMPLETE								

Development Equipment: See Pg. 1

Comments: 1514 lowered pump to ~178' bTOC; 1521 switched to 10 min readings after complete/drawdown stabilized; 1532 lowered pump to 181' bTOC; 1543 lowered pump to 183' bTOC; 1555 lowered pump to 185' bTOC; 1607 lowered pump to 187' bTOC; 1625 lowered pump to 190' bTOC

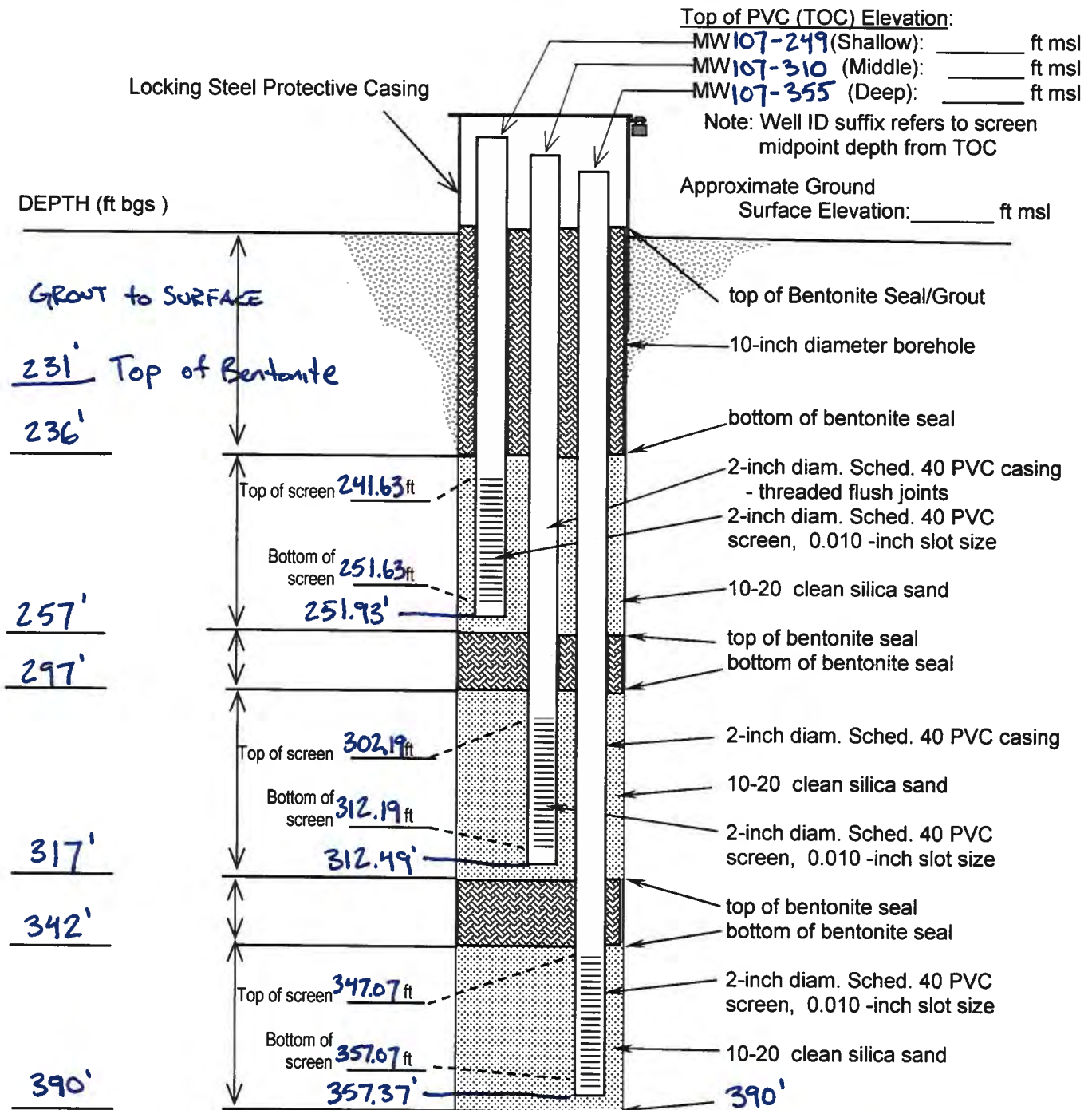
Signature(s):

JWK

# NESTED MONITORING WELL MW107 WELL CONSTRUCTION DETAILS

Project: Atlas D Missile Site 4  
Data Gaps Investigation  
 Date Completed: 7-19-21  
 Location: Cheyenne, WY

Drilling Method: Sonic Coring/Casing Advance  
 Drilling Company: Yellow Jacket Drilling  
 Field Geologist: JON KINKADE



REMARKS: \_\_\_\_\_  
 Development Method: SURGE and BAIL WITH DEVELOPMENT RIG, PUMP with GRINDER Redilo 2  
 Depth to Water After Completion: MW107-249 = 172.28 bTOC MW107-310 = 143.10 bTOC  
 MW107-355 = 142.05 bTOC  
 Signature of Preparer: J. Kinkade



# WELL DEVELOPMENT LOG

Project Name: Atlas Site 4  
 Site Name: Atlas D Missile Site 4 - Cheyenne, WY  
 Development Date: 8-2-21 / 8-8-21

Project No.: 60613342  
 Field Crew: JWK, CC, HY  
 Weather: 72°F Partly Cloudy, Hazy, Breezy  
8-5-21 75°F Sunny, Breezy/Windy  
 Specific Conductivity: Hanna 98494  
 ORP: " "  
 Turbidity: LaMotte 2020 we

Analytical Instruments: pH: Hanna 98494  
 Temp: " "  
 D.O.: " "

Well ID: MW107-249 (SHALLOW)

Casing Stickup: 2.27'

Static Water Level: 159.29' bTOC / 172.28' (8-8-21)

Well Depth/Diameter: 254.20' / 2" bTOC

Type of Well: NESTED MONITORING WELL

## CASING VOLUME CALCULATION

(TD(ft) - DTW(ft)) x        gal/ft = 1 casing volume (gals)

Time	Casing Volumes	Gallons Removed	Diss. Oxygen (mg/l)	ORP (mV)	Temp (°C)	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	PWL (ft TOC)
1116	Begin Development with Surge block								
1136	Stop Surging								
1150	Begin Boiling								
1330	Stop Boiling (2) 30 gal. removed								
1008	Pump on	set (2) ~ 220' bgs		~ 1.3 gal./min				brown, Cloudy	
1013		6.5	6.69	84.7	13.18	7.21	277	light brown, slightly cloudy	172.28
1018	1.6 gal./min	14.5	6.62	51.7	13.01	7.22	277	10.87	175.54
1023	1.7 gal./min	23	6.59	50.8	12.90	7.11	277	5.07	175.25
1033		40	6.58	52.8	12.84	7.02	277	2.07	175.46
1043		57	6.55	38.9	12.81	7.14	276	1.93	175.53
1053		74	6.51	36.5	12.79	7.25	277	2.31	175.63
1103		91	6.51	29.3	12.68	7.08	277	1.25	175.63
1113		108	6.50	27.7	12.70	7.31	277	1.45	175.63
1123		125	6.50	29.9	12.67	7.32	277	20.5	175.58
1133		142	6.49	-9.4	12.76	7.31	276	5.86	175.62
1143		159	6.51	18.6	12.61	7.37	277	18.1	175.46
1153		176	6.51	25.0	12.59	7.38	277	1.94	175.47
1203		193	6.51	20.5	12.57	7.33	278	1.68	175.42
1213		210	6.49	27.5	12.60	7.32	277	2.22	175.39
1223		227	6.52	27.2	12.56	7.37	277	1.13	175.40
1233		244	6.52	33.1	12.58	7.36	276	3.02	175.40
1235	PUMP OFF DEVELOPMENT COMPLETE								
								3.62	175.35

Development Equipment: Development Rig with Surge Block & 20ft. PVC  
boiler (1") GRUNDFOSS RedFlo 2 pump, Invertek controller, Hanna 98494,  
LaMotte 2020 we, Heron Dipper-T well Meter

Comments: 1034 lowered pump to ~225' bgs; 1054 lowered pump to ~230' bgs;  
1105 lowered pump to ~235' bgs; 1125 lowered pump to ~238' bgs; 1135 lowered pump to ~240' bgs;  
1146 lowered pump to ~243' bgs; 1156 lowered pump to ~247' bgs; 1215 lowered pump to ~250' bgs.

Signature(s): JWK

## WELL DEVELOPMENT LOG

Pg 1 of 2

Project Name: Atlas Site 4  
 Site Name: Atlas D Missile Site 4 - Cheyenne, WY  
 Development Date: 8-2-21

Project No.: 60613342  
 Field Crew: JWK, CC  
 Weather: 72°F Partly Cloudy, Hazy, Breezy

Analytical Instruments: pH: Hanna 98494  
 Temp: " "  
 D.O.: " "

Specific Conductivity: Hanna 98494  
 ORP: " "  
 Turbidity: LaMotte 2020 we

Well ID: MW107-310 (MIDDLE)

Type of Well: Nested Monitoring Well

Casing Stickup: 2.16'

## CASING VOLUME CALCULATION

Static Water Level: 143.36 bTOC (143.10: 8-7-21)

(TD(ft) - DTW(ft)) x gal/ft = 1 casing volume (gals)

Well Depth/Diameter: 314.65 / 2" bTOC

Time	Casing Volumes	Gallons Removed	Diss. Oxygen (mg/l)	ORP (mV)	Temp (°C)	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	PWL (ft TOC)
3/2/21 1547	Begin Surge								
1600	Stop Surge								
1601	Begin Bailing								
1630	Stop Bailing @ ~ 20 gal.							Slightly Cloudy	
3/7/21 0840	DTW = 143.10' TOC								143.10
0951	Begin pumping w/Redi-Flow II; pump placed ~ 280' hgs.							pumping at 2.1 gpm	
0956	7.5	4.41	4.41	67.2	12.91	7.03	222	11.1	176.08
1005	21	4.98	4.98	67.2	13.62	6.94	275	cloudy 91	173.40
1012	Check pump rate = ~ 1.2 gpm								
1015	34.5	3.51	3.51	25.2	13.83	7.20	489	OR	168.55
1025	46.5	3.25	3.25	-6.9	13.57	7.31	586	1,501	174.33
1035	~ 1.3 gpm 59.5	4.04	4.04	-9.9	13.92	7.34	457	1,232	181.67
1045	72.5	3.67	3.67	-13.5	14.06	7.53	556	> 4,000	178.18
1055	85.5	4.14	4.14	-14.0	13.62	7.44	516	1,924	177.05
1105	98.5	3.83	3.83	-30.0	13.97	7.45	454	1,659	171.43
1115	111.5	2.80	2.80	-34.2	13.91	7.53	536	3,509	171.71
1125	124.5	1.94	1.94	-51.6	13.84	7.61	831	> 4,000	170.47
1135	137.5	1.64	1.64	-67.9	13.55	7.64	1047	3,670	172.21
1145	150.5	1.75	1.75	-68.3	13.43	7.57	1060	1,784	172.55
1155	163.5	1.77	1.77	-67.5	13.55	7.55	1069	1,349	175.25

Development Equipment: Development Rig with Surge Block & 20ft. (1" dia.) PVC bailer,  
GRUNDFOS Redi-Flow 2 pump,  
OR = OVER-RANGE (> 4000 ntus)

Comments: 1014 increase in turbidity observed; water is brown

Signature(s):

JWK



# WELL DEVELOPMENT LOG

Project Name: Atlas Site 4 Data Gap Investigation  
 Site Name: Atlas D Missile Site 4 - Cheyenne, WY  
 Development Date: 8/7/2021

Project No.: 60613342  
 Field Crew: JH, JWK  
 Weather: Windy, Poor Air Quality/Hazy  
72°F

Analytical Instruments: pH: HANNA  
H198494  
 Temp: ↓  
 D.O: ↓

Specific Conductivity: H198494  
 ORP: ↓  
 Turbidity: LaMotte 2020 we

Well ID: MW107-310 (MIDDLE)  
 Casing Stickup: 2.16  
 Static Water Level: 143.10' TOC  
 Well Depth/Diameter: 314.65'/2" 6TOC

Type of Well: NESTED Monitoring  
 CASING VOLUME CALCULATION  
 (TD(ft) - DTW(ft)) x gal/ft = 1 casing volume (gals)

8/7/21  
continued

Time	Casing Volumes	Gallons Removed	Diss. Oxygen (mg/l)	ORP (mV)	Temp (°C)	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	PWL (ft TOC)
1205		176.5	1.74	-78.0	13.49	7.55	1089	811	172.62
1215		189.5	1.86	-65.3	13.55	7.52	1066	1,036	173.05
1225		192.5	2.00	-57.7	13.68	7.55	1010	2446	172.00
1240		<del>212</del> 205.5	2.20	-49.1	13.76	7.49	938	1,246	171.96
1255		231.5	2.52	-41.3	13.70	7.41	855	72	172.02
1310		251	2.65	-49.2	13.74	7.41	822	1100	172.22
1313	Lower pump 3ft; Adjust pump rate to 2gpm								
1325	1.6gpm	281	2.87	-68.9	13.63	7.38	751	780	182.38
1340		305	3.05	-46.1	13.66	7.47	701	2828	180.04
1355		329	3.14	-34.4	13.63	7.50	707	3384	179.86
1410		353	3.27	-14.1	13.60	7.57	645	3552	185.62
1425		377	3.01	-1.7	13.39	7.49	535	1264	190.22
1440		401	4.18	7.3	13.38	7.47	512	934	192.53
1443	Lower pump 3ft								
1455		425	4.32	7.1	13.23	7.45	497	146	197.03
1510		449	4.52	19.6	13.20	7.45	476	149	197.90
1525		473	4.59	23.9	13.19	7.46	477	68	199.25
1540		497	4.64	28.4	13.27	7.38	474	95	199.81
1550		521	4.70	32.3	13.25	7.37	456	63.1	200.93
1551	Stop pumping; 6 Hours of pumping Development Completed								

Development Equipment: See Page 1

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Signature(s): JWK

# WELL DEVELOPMENT LOG

Project Name: Atlas Site 4  
 Site Name: Atlas D Missile Site 4 - Cheyenne, WY  
 Development Date: 8-2-21 / 8-6-21

Project No.: 60613342  
 Field Crew: JWK, CC, JH  
 Weather: 75°F Mostly Sunny, Hazy, Breezy  
8-6-21 78°F Partly Cloudy, Breezy

Analytical Instruments: pH: Hanna 98494  
 Temp: " "  
 D.O.: " "

Specific Conductivity: Hanna 98494  
 ORP: " "  
 Turbidity: LaMotte 2020 we

Well ID: MW107-355 (DEEP)

Type of Well: Nested Monitoring Well


Casing Stickup: 2.14

## CASING VOLUME CALCULATION

Static Water Level: 142.53 ~~13.1~~ bTOC

(TD(ft) - DTW(ft)) x     gal/ft = 1 casing volume (gals)

Well Depth/Diameter: 359.10' / 2" bTOC  
359.51'

Time	Casing Volumes	Gallons Removed	Diss. Oxygen (mg/l)	ORP (mV)	Temp (°C)	pH	Sp. Cond. (µS/cm)	Turbidity (NTUs)	PWL (ft TOC)
1340	Begin Development with Surge Block								
1400	Stop Surging								
1402	Begin Bailing								
1545	Stop Bailing @ ~ 25 gal. Removed								
8-6-21 1545	Begin Pumping. Pump set @ 295' bgs ~ 2 gal/min								
1549	water to surface								
1557		10	0.59	60.0	12.47	7.17	538	52.6	145.66
1559		20	4.31	64.1	12.97	7.22	312	opaque brown	145.83
1604		30	5.01	73.3	12.83	7.21	293	692	145.90
1609		40	5.10	58.1	12.76	7.33	292	55.2	145.91
1619		60	5.24	30.4	12.80	7.38	291	17.9	145.95
1629		80	5.36	19.3	12.81	7.44	289	13.6	146.00
1639		100	5.41	16.5	12.80	7.47	290	12.6	146.05
1649		120	5.47	13.8	12.77	7.52	289	14.5	146.30
1659		140	5.50	14.9	12.78	7.53	289	10.18	146.32
1709		160	5.54	15.0	12.78	7.51	289	8.78	146.33
1719		180	5.54	15.8	12.79	7.51	289	6.05	146.34
DEVELOPMENT COMPLETE									
									

Development Equipment: Development Rig with Surge block & 20ft. (1" dia.)  
PVC bailer, GRUNDFOS RediFlo 2 pump, Invertek Controller, Hanna 98494,  
LaMotte 2020 we, Heron dipper-T w/ Meter

Comments: Switched to 10 min. readings after WL stabilized.

Signature(s):

JWK







**Petroleum Services Division**  
3437 Landco Dr.  
Bakersfield, California 93308  
Tel: 661-325-5657  
Fax: 661-325-5808  
www.corelab.com

October 11, 2021

Robert Mallisee  
AECOM - URS Group  
12120 Shamrock Plaza  
Suite 100  
Omaha, NE 68154

Subject: Atlas D Missile Site 4 - DG1  
Project: 60613342  
CL File No: 2104826

Dear Mr. Mallisee,

The attached file presents the final grain size and Atterberg limits results for the ten soil samples submitted from your Project #60613342.

Appropriate ASTM, EPA or API methodologies were used for this project and SOP's are available on request. The sample for this project is currently in storage and will be retained for thirty days past completion of testing at no charge. At the end of thirty days, the sample will be disposed. You may contact me regarding continued storage, disposal, or return of the sample.

Thank you for this opportunity to be of service to AECOM - URS Group. Please do not hesitate to contact us at (661-325-5657) if you have any questions regarding these results or if we can be of any additional service.

Sincerely,  
Core Laboratories LP

Chris Florence  
Sr. Core Analyst

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use this report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories. Core Laboratories assumes no responsibility and makes no warranty or representations, expressed or implied, as to the productivity, proper operations or profitability, however, of any oil, gas, coal or other mineral, property, well or sand in connection with which such report is used or relied upon for any reason whatsoever.





## SOIL PROPERTIES SUMMARY

(METHODOLOGY: ASTM D422/D4464M & ASTM D4316)

Petroleum Services

Company: AECOM - URS Group  
 Project Name: Atlas D Missile Site 4 - DG1  
 Project Number: 60613342

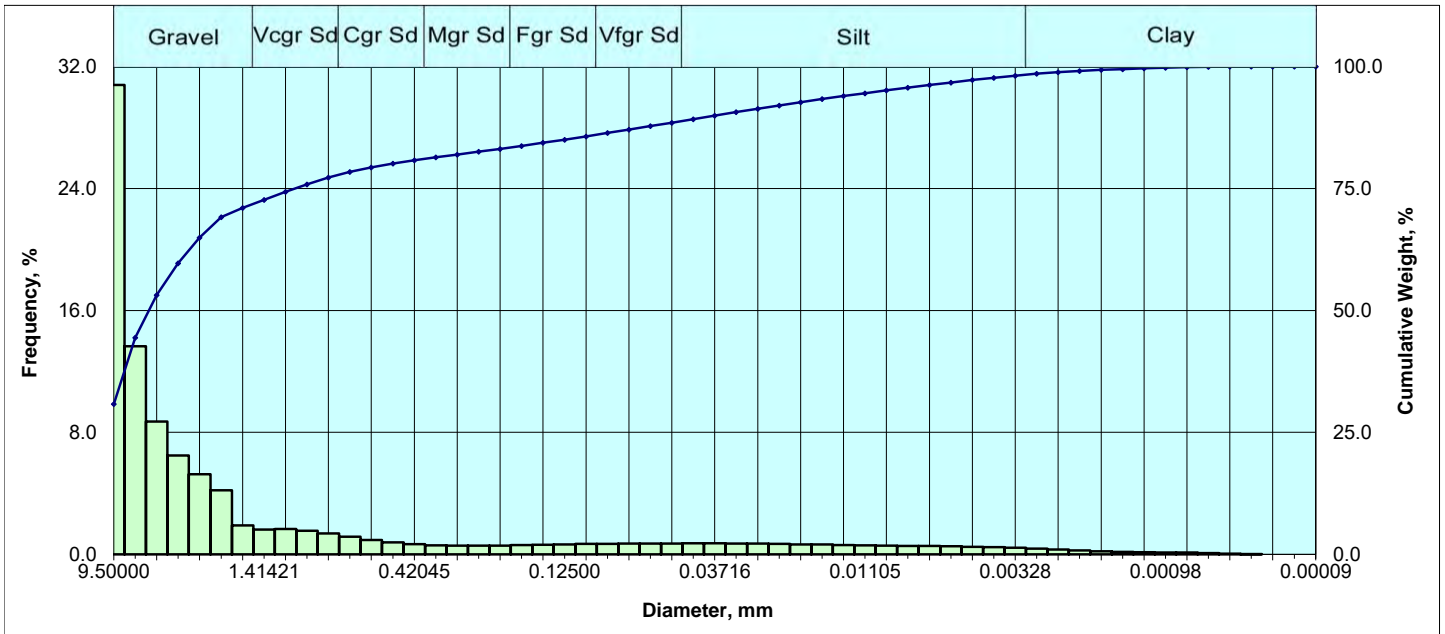
CL File No.: 2104826  
 Date: 10/11/2021

Sample ID	Grain Size Description** (Mean from Trask)	Median Grain Size, mm	Component Percentages**					Atterberg Limits		
			Gravel	Sand Sized			Silt & Clay	Liquid Limit LL	Plastic Limit PL	Plasticity Index PI
				Coarse	Medium	Fine				
FEW4-MW54B-160	Granule	5.3317	53.17	15.95	11.68	6.29	12.92		Non Plastic	
FEW4-MW54B-190	Coarse Grain Sand	3.2871	37.65	28.83	13.35	5.86	14.31	25	16	9
FEW4-MW54B-200	Silt	0.0113	2.78	1.71	0.67	8.96	85.89	42	18	24
FEW4-MW105-90	Fine Grain Sand	0.0796	8.14	3.94	3.15	36.78	47.99	32	22	10
FEW4-MW105-140	Silt	0.0370	0.00	0.20	0.00	25.35	74.44	36	27	9
FEW4-MW105-180	Silt	0.0287	0.00	0.29	0.34	26.88	72.48	49	38	15
FEW4-MW105-190	Silt	0.0275	0.00	0.00	0.00	21.90	78.10	44	31	13
FEW4-MW107-305	Granule	9.5746	80.47	6.19	3.47	3.35	6.52		Non Plastic	
FEW4-MW107-345	Silt	0.0096	0.00	0.07	0.00	6.88	93.04	46	18	26
FEW4-MW107-355	Silt	0.0339	1.82	5.47	0.26	16.95	75.50	47	22	25

\*\*USCS Scale



## Sieve and Laser Particle Size Analysis



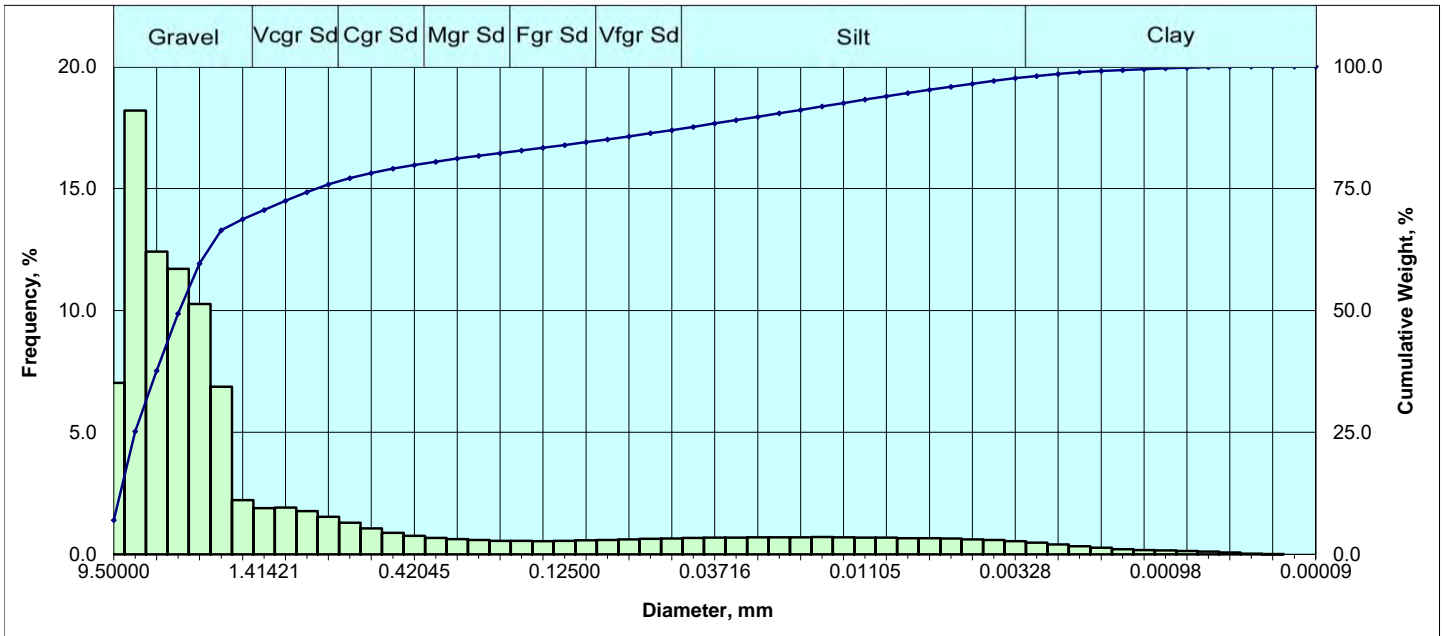
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[φ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.375000	9.50000	-3.25	30.798	30.80
	1/4 in.	0.250000	6.35000	-2.67	13.658	44.46
	4	0.187008	4.75000	-2.25	8.711	53.17
	6	0.131890	3.35000	-1.75	6.485	59.65
	8	0.092913	2.36000	-1.25	5.262	64.91
V Crse Sand	10	0.078740	2.00000	-1.00	4.198	69.11
	12	0.066212	1.68179	-0.75	1.908	71.02
	14	0.055678	1.41421	-0.50	1.632	72.65
	16	0.046819	1.18921	-0.25	1.669	74.32
Coarse Sand	18	0.039370	1.00000	0.00	1.556	75.88
	20	0.033108	0.84090	0.25	1.375	77.25
	25	0.027839	0.70711	0.50	1.156	78.41
	30	0.023410	0.59460	0.75	0.947	79.36
Medium Sand	35	0.019685	0.50000	1.00	0.776	80.13
	40	0.016553	0.42045	1.25	0.661	80.79
	45	0.013919	0.35355	1.50	0.592	81.39
	50	0.011705	0.29730	1.75	0.575	81.96
Fine Sand	60	0.009843	0.25000	2.00	0.572	82.53
	70	0.008277	0.21022	2.25	0.581	83.11
	80	0.006960	0.17678	2.50	0.616	83.73
	100	0.005852	0.14865	2.75	0.632	84.36
V. Fine Sand	120	0.004921	0.12500	3.00	0.653	85.01
	140	0.004138	0.10511	3.25	0.681	85.69
	170	0.003480	0.08839	3.50	0.685	86.38
	200	0.002926	0.07433	3.75	0.699	87.08
Silt	230	0.002461	0.06250	4.00	0.711	87.79
	270	0.002069	0.05256	4.25	0.709	88.50
	325	0.001740	0.04419	4.50	0.723	89.22
	400	0.001463	0.03716	4.75	0.722	89.94
	450	0.001230	0.03125	5.00	0.709	90.65
	500	0.001035	0.02628	5.25	0.709	91.36
	635	0.000870	0.02210	5.50	0.685	92.04
		0.000732	0.01858	5.75	0.657	92.70
		0.000615	0.01562	6.00	0.641	93.34
		0.000517	0.01314	6.25	0.609	93.95
		0.000435	0.01105	6.50	0.586	94.54
		0.000366	0.00929	6.75	0.573	95.11
		0.000308	0.00781	7.00	0.553	95.67
		0.000259	0.00657	7.25	0.542	96.21
Clay		0.000217	0.00552	7.50	0.529	96.74
		0.000183	0.00465	7.75	0.503	97.24
		0.000154	0.00391	8.00	0.475	97.71
		0.000129	0.00328	8.25	0.433	98.15
		0.000109	0.00276	8.50	0.379	98.53
		0.000091	0.00232	8.75	0.318	98.84
		0.000077	0.00195	9.00	0.258	99.10
		0.000065	0.00164	9.25	0.207	99.31
		0.000054	0.00138	9.50	0.168	99.48
		0.000046	0.00116	9.75	0.144	99.62
		0.000038	0.00098	10.00	0.128	99.75
		0.000032	0.00082	10.25	0.113	99.86
		0.000027	0.00069	10.50	0.089	99.95
		0.000023	0.00058	10.75	0.048	100.00
		0.000019	0.00049	11.00	0.000	100.00
		0.000016	0.00041	11.25	0.000	100.00
		0.000015	0.00038	11.50	0.000	100.00
		0.000003	0.00009	13.50	0.000	100.00

Sorting Statistics (Folk)				
Parameter		Trask	Inman	Folk
Median		Granule sized		
(in)		0.2099	0.2099	0.2099
(mm)		5.3317	5.3317	5.3317
Mean		Granule sized		
(in)		0.2324	0.0566	0.0876
(mm)		5.9034	1.4384	2.2261
Sorting		Very poor		
		3.110	3.127	3.168
Skewness		Strongly fine skewed		
		0.645	1.221	0.663
Kurtosis		Lepokurtic		
		0.348	0.693	1.326
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
69.11	18.68	9.93	2.29	12.21
Percentile [Weight, %]		Particle Diameter		
		[in.]	[mm]	[phi]
5		0.5843	14.8400	-3.8914
10		0.5435	13.8051	-3.7871
16		0.4946	12.5631	-3.6511
25		0.4213	10.7002	-3.4196
40		0.2905	7.3777	-2.8832
50		0.2099	5.3317	-2.4146
70		0.0729	1.8519	-0.8890
75		0.0436	1.1066	-0.1461
84		0.0065	0.1647	2.6023
90		0.0014	0.0367	4.7688
95		0.0004	0.0096	6.6976

\*\*All Grain Sizes Classed Using Wentworth Scale



### Sieve and Laser Particle Size Analysis



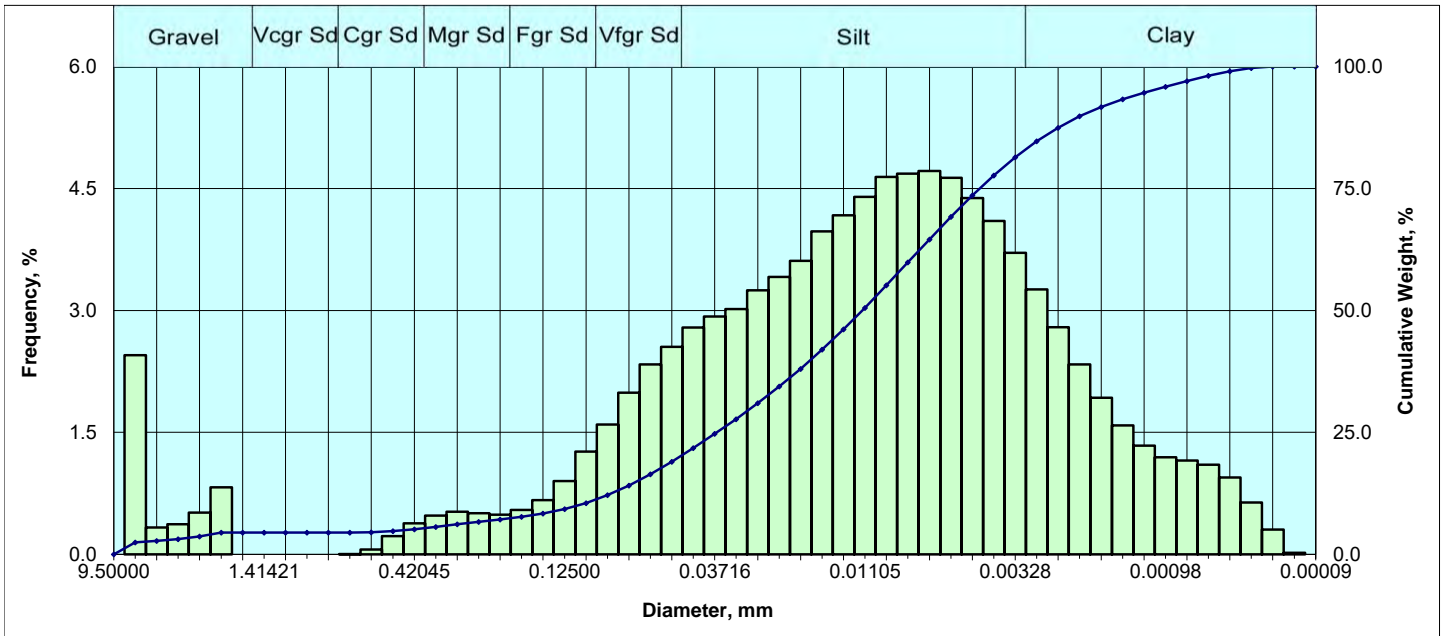
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[φ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.375000	9.50000	-3.25	7.036	7.04
	1/4 in.	0.250000	6.35000	-2.67	18.202	25.24
	4	0.187008	4.75000	-2.25	12.408	37.65
	6	0.131890	3.35000	-1.75	11.703	49.35
	8	0.092913	2.36000	-1.25	10.259	59.61
V Crse Sand	10	0.078740	2.00000	-1.00	6.869	66.48
	12	0.066212	1.68179	-0.75	2.223	68.70
	14	0.055678	1.41421	-0.50	1.895	70.59
	16	0.046819	1.18921	-0.25	1.921	72.51
Coarse Sand	18	0.039370	1.00000	0.00	1.769	74.28
	20	0.033108	0.84090	0.25	1.545	75.83
	25	0.027839	0.70711	0.50	1.291	77.12
	30	0.023410	0.59460	0.75	1.062	78.18
Medium Sand	35	0.019685	0.50000	1.00	0.883	79.06
	40	0.016553	0.42045	1.25	0.760	79.82
	45	0.013919	0.35355	1.50	0.676	80.50
	50	0.011705	0.29730	1.75	0.628	81.13
Fine Sand	60	0.009843	0.25000	2.00	0.588	81.72
	70	0.008277	0.21022	2.25	0.558	82.27
	80	0.006960	0.17678	2.50	0.551	82.82
	100	0.005852	0.14865	2.75	0.541	83.37
V. Fine Sand	120	0.004921	0.12500	3.00	0.548	83.91
	140	0.004138	0.10511	3.25	0.573	84.49
	170	0.003480	0.08839	3.50	0.587	85.07
	200	0.002926	0.07433	3.75	0.614	85.69
Silt	230	0.002461	0.06250	4.00	0.640	86.33
	270	0.002069	0.05256	4.25	0.649	86.98
	325	0.001740	0.04419	4.50	0.673	87.65
	400	0.001463	0.03716	4.75	0.683	88.33
	450	0.001230	0.03125	5.00	0.683	89.02
	500	0.001035	0.02628	5.25	0.705	89.72
	635	0.000870	0.02210	5.50	0.703	90.42
		0.000732	0.01858	5.75	0.699	91.12
		0.000615	0.01562	6.00	0.710	91.83
		0.000517	0.01314	6.25	0.696	92.53
		0.000435	0.01105	6.50	0.687	93.22
		0.000366	0.00929	6.75	0.685	93.90
		0.000308	0.00781	7.00	0.667	94.57
		0.000259	0.00657	7.25	0.658	95.23
Clay		0.000217	0.00552	7.50	0.645	95.87
		0.000183	0.00465	7.75	0.615	96.49
		0.000154	0.00391	8.00	0.586	97.07
		0.000129	0.00328	8.25	0.538	97.61
		0.000109	0.00276	8.50	0.476	98.09
		0.000091	0.00232	8.75	0.406	98.49
		0.000077	0.00195	9.00	0.333	98.82
		0.000065	0.00164	9.25	0.267	99.09
		0.000054	0.00138	9.50	0.214	99.31
		0.000046	0.00116	9.75	0.179	99.49
		0.000038	0.00098	10.00	0.157	99.64
		0.000032	0.00082	10.25	0.141	99.78
		0.000027	0.00069	10.50	0.117	99.90
		0.000023	0.00058	10.75	0.075	99.98
		0.000019	0.00049	11.00	0.024	100.00
		0.000016	0.00041	11.25	0.000	100.00
		0.000015	0.00038	11.50	0.000	100.00
		0.000003	0.00009	13.50	0.000	100.00

Sorting Statistics (Folk)				
Parameter		Trask	Inman	Folk
Median		Granule sized		
(in)		0.1294	0.1294	0.1294
(mm)		3.2871	3.2871	3.2871
Mean		Very coarse sand sized		
(in)		0.1440	0.0388	0.0579
(mm)		3.6587	0.9847	1.4716
Sorting		Very poor		
		2.627	3.013	3.122
Skewness		Strongly fine skewed		
		0.740	1.176	0.621
Kurtosis		Very leptokurtic		
		0.305	0.770	1.568
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
66.48	19.85	10.74	2.93	13.67
Percentile [Weight, %]		Particle Diameter		
		[in.]	[mm]	[phi]
5		0.4466	11.3447	-3.5039
10		0.3538	8.9870	-3.1678
16		0.3129	7.9487	-2.9907
25		0.2516	6.3911	-2.6761
40		0.1759	4.4683	-2.1597
50		0.1294	3.2871	-1.7168
70		0.0590	1.4980	-0.5831
75		0.0365	0.9263	0.1104
84		0.0048	0.1220	3.0353
90		0.0010	0.0246	5.3443
95		0.0003	0.0070	7.1591

\*\*All Grain Sizes Classed Using Wentworth Scale



### Sieve and Laser Particle Size Analysis



Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[φ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00
	1/4 in.	0.250000	6.35000	-2.67	2.448	2.45
	4	0.187008	4.75000	-2.25	0.329	2.78
	6	0.131890	3.35000	-1.75	0.370	3.15
	8	0.092913	2.36000	-1.25	0.514	3.66
V Crse Sand	10	0.078740	2.00000	-1.00	0.823	4.48
	12	0.066212	1.68179	-0.75	0.000	4.48
	14	0.055678	1.41421	-0.50	0.000	4.48
	16	0.046819	1.18921	-0.25	0.000	4.48
Coarse Sand	18	0.039370	1.00000	0.00	0.000	4.48
	20	0.033106	0.84090	0.25	0.000	4.48
	25	0.027839	0.70711	0.50	0.001	4.49
	30	0.023410	0.59460	0.75	0.061	4.55
Medium Sand	35	0.019685	0.50000	1.00	0.224	4.77
	40	0.016553	0.42045	1.25	0.382	5.15
	45	0.013919	0.35355	1.50	0.478	5.63
	50	0.011705	0.29730	1.75	0.524	6.15
Fine Sand	60	0.009843	0.25000	2.00	0.505	6.66
	70	0.008277	0.21022	2.25	0.487	7.15
	80	0.006960	0.17678	2.50	0.546	7.69
	100	0.005852	0.14865	2.75	0.669	8.36
V. Fine Sand	120	0.004921	0.12500	3.00	0.903	9.26
	140	0.004138	0.10511	3.25	1.265	10.53
	170	0.003480	0.08839	3.50	1.597	12.13
	200	0.002926	0.07433	3.75	1.988	14.11
Silt	230	0.002461	0.06250	4.00	2.337	16.45
	270	0.002069	0.05256	4.25	2.552	19.00
	325	0.001740	0.04419	4.50	2.789	21.79
	400	0.001463	0.03716	4.75	2.927	24.72
	450	0.001230	0.03125	5.00	3.016	27.74
	500	0.001035	0.02628	5.25	3.248	30.98
	635	0.000870	0.02210	5.50	3.412	34.40
		0.000732	0.01858	5.75	3.609	38.00
		0.000615	0.01562	6.00	3.972	41.98
		0.000517	0.01314	6.25	4.171	46.15
		0.000435	0.01105	6.50	4.399	50.55
		0.000366	0.00929	6.75	4.642	55.19
		0.000308	0.00781	7.00	4.682	59.87
		0.000259	0.00657	7.25	4.716	64.59
Clay		0.000217	0.00552	7.50	4.632	69.22
		0.000183	0.00465	7.75	4.383	73.60
		0.000154	0.00391	8.00	4.102	77.70
		0.000129	0.00328	8.25	3.707	81.41
		0.000109	0.00276	8.50	3.257	84.67
		0.000091	0.00232	8.75	2.795	87.46
		0.000077	0.00195	9.00	2.335	89.80
		0.000065	0.00164	9.25	1.927	91.73
		0.000054	0.00138	9.50	1.585	93.31
		0.000046	0.00116	9.75	1.336	94.65
		0.000038	0.00098	10.00	1.193	95.84
		0.000032	0.00082	10.25	1.155	96.99
		0.000027	0.00069	10.50	1.101	98.10
		0.000023	0.00058	10.75	0.945	99.04
		0.000019	0.00049	11.00	0.637	99.68
		0.000016	0.00041	11.25	0.305	99.98
		0.000015	0.00038	11.50	0.018	100.00
		0.000003	0.00009	13.50	0.000	100.00

Sorting Statistics (Folk)				
Parameter		Trask	Inman	Folk
Median		Silt sized		
(in)		0.0004	0.0004	0.0004
(mm)		0.0113	0.0113	0.0113
Mean		Silt sized		
(in)		0.0008	0.0005	0.0005
(mm)		0.0205	0.0136	0.0128
Sorting		Very poor		
		2.887	2.248	2.439
Skewness		Coarse skewed		
		1.122	-0.438	-0.173
Kurtosis		Lepokurtic		
		0.144	0.929	1.162
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
4.48	11.97	61.25	22.30	83.55
Percentile [Weight, %]		Particle Diameter		
		[in.]	[mm]	[phi]
5		0.0178	0.4522	1.1450
10		0.0045	0.1134	3.1401
16		0.0026	0.0648	3.9482
25		0.0014	0.0366	4.7715
40		0.0007	0.0171	5.8702
50		0.0004	0.0113	6.4665
70		0.0002	0.0054	7.5415
75		0.0002	0.0044	7.8304
84		0.0001	0.0029	8.4450
90		0.0001	0.0019	9.0241
95		0.0000	0.0011	9.8197

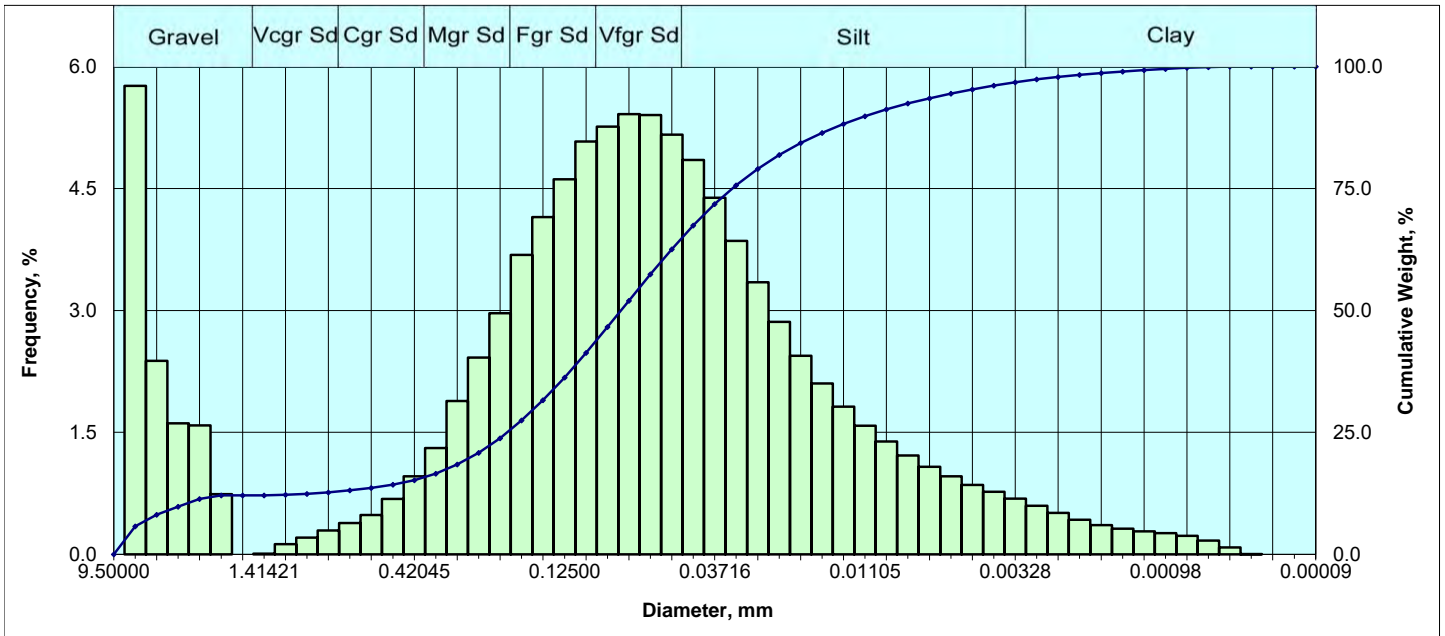
\*\*All Grain Sizes Classed Using Wentworth Scale



Company: AECOM - URS Group  
Project Name: Atlas D Missile Site 4 - DG1  
Project Number: 60613342

CL File No.: 2104826  
Sample ID: FEW4-MW105-90

### Sieve and Laser Particle Size Analysis



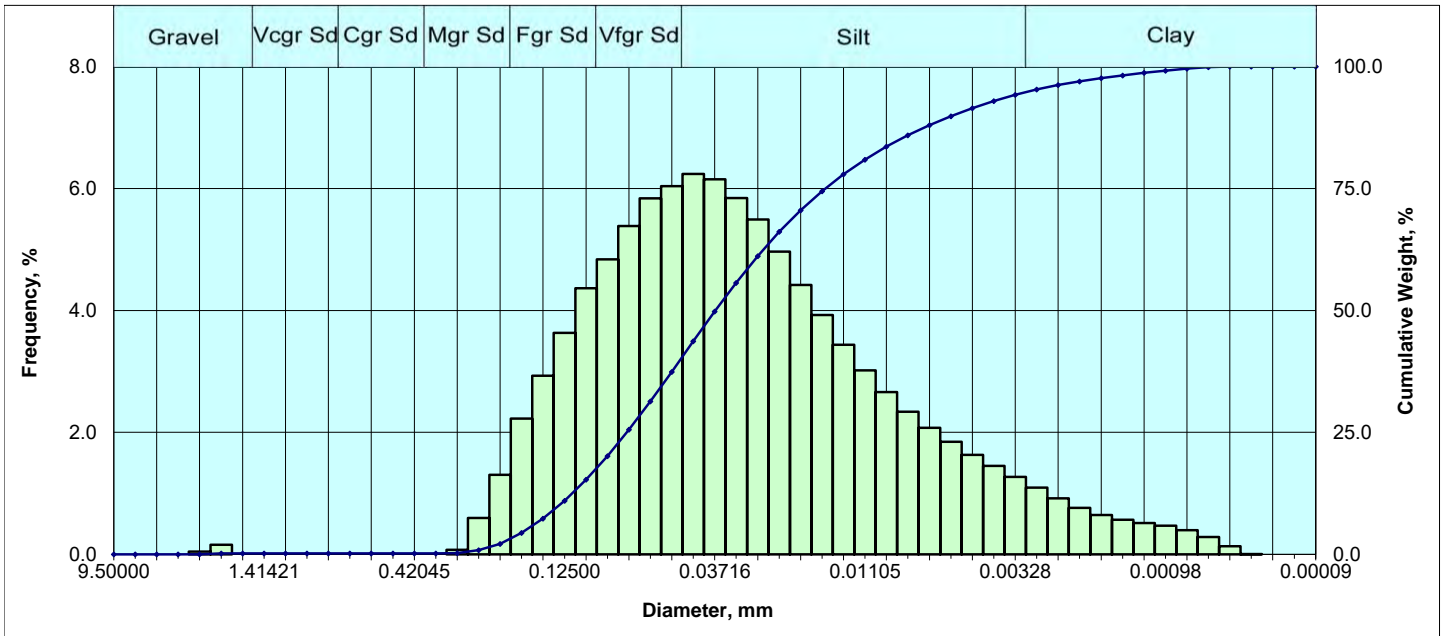
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[φ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00
	1/4 in.	0.250000	6.35000	-2.67	5.764	5.76
	4	0.187008	4.75000	-2.25	2.380	8.14
	6	0.131890	3.35000	-1.75	1.613	9.76
	8	0.092913	2.36000	-1.25	1.586	11.34
V Crse Sand	10	0.078740	2.00000	-1.00	0.740	12.08
	12	0.066212	1.68179	-0.75	0.000	12.08
	14	0.055678	1.41421	-0.50	0.009	12.09
	16	0.046819	1.18921	-0.25	0.125	12.22
	18	0.039370	1.00000	0.00	0.207	12.43
Coarse Sand	20	0.033106	0.84090	0.25	0.295	12.72
	25	0.027839	0.70711	0.50	0.386	13.11
	30	0.023410	0.59460	0.75	0.486	13.59
	35	0.019685	0.50000	1.00	0.683	14.28
	40	0.016553	0.42045	1.25	0.960	15.24
Medium Sand	45	0.013919	0.35355	1.50	1.307	16.54
	50	0.011705	0.29730	1.75	1.886	18.43
	60	0.009843	0.25000	2.00	2.419	20.85
	70	0.008277	0.21022	2.25	2.965	23.81
	80	0.006960	0.17678	2.50	3.684	27.50
Fine Sand	100	0.005852	0.14865	2.75	4.149	31.65
	120	0.004921	0.12500	3.00	4.613	36.26
	140	0.004138	0.10511	3.25	5.078	41.34
	170	0.003480	0.08839	3.50	5.261	46.60
	200	0.002926	0.07433	3.75	5.414	52.01
V. Fine Sand	230	0.002461	0.06250	4.00	5.405	57.42
	270	0.002069	0.05256	4.25	5.161	62.58
	325	0.001740	0.04419	4.50	4.851	67.43
	400	0.001463	0.03716	4.75	4.385	71.82
	450	0.001230	0.03125	5.00	3.856	75.67
Silt	500	0.001035	0.02628	5.25	3.345	79.02
	635	0.000870	0.02210	5.50	2.860	81.88
		0.000732	0.01858	5.75	2.441	84.32
		0.000615	0.01562	6.00	2.101	86.42
		0.000517	0.01314	6.25	1.815	88.23
		0.000435	0.01105	6.50	1.581	89.81
		0.000366	0.00929	6.75	1.388	91.20
		0.000308	0.00781	7.00	1.217	92.42
		0.000259	0.00657	7.25	1.077	93.50
		0.000217	0.00552	7.50	0.960	94.46
		0.000183	0.00465	7.75	0.855	95.31
		0.000154	0.00391	8.00	0.769	96.08
		0.000129	0.00328	8.25	0.684	96.76
		0.000109	0.00276	8.50	0.597	97.36
		0.000091	0.00232	8.75	0.510	97.87
Clay		0.000077	0.00195	9.00	0.426	98.30
		0.000065	0.00164	9.25	0.360	98.66
		0.000054	0.00138	9.50	0.315	98.97
		0.000046	0.00116	9.75	0.284	99.26
		0.000038	0.00098	10.00	0.261	99.52
		0.000032	0.00082	10.25	0.228	99.74
		0.000027	0.00069	10.50	0.171	99.92
		0.000023	0.00058	10.75	0.084	100.00
		0.000019	0.00049	11.00	0.001	100.00
		0.000016	0.00041	11.25	0.000	100.00
		0.000015	0.00038	11.50	0.000	100.00
		0.000003	0.00009	13.50	0.000	100.00

Sorting Statistics (Folk)				
Parameter		Trask	Inman	Folk
Median		Very fine sand sized		
(in)		0.0031	0.0031	0.0031
(mm)		0.0796	0.0796	0.0796
Mean		Very fine sand sized		
(in)		0.0046	0.0034	0.0033
(mm)		0.1159	0.0852	0.0833
Sorting		Very poor		
		2.486	2.162	2.659
Skewness		Coarse skewed		
		1.009	-0.557	-0.139
Kurtosis		Very leptokurtic		
		0.026	1.408	1.624
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
12.08	45.33	38.66	3.92	42.58
Percentile [Weight, %]		Particle Diameter		
		[in.]	[mm]	[phi]
5		0.2664	6.7676	-2.7586
10		0.1259	3.1982	-1.6773
16		0.0150	0.3813	1.3908
25		0.0079	0.1995	2.3259
40		0.0043	0.1104	3.1798
50		0.0031	0.0796	3.6519
70		0.0016	0.0401	4.6412
75		0.0013	0.0323	4.9532
84		0.0007	0.0190	5.7149
90		0.0004	0.0108	6.5310
95		0.0002	0.0050	7.6539

\*\*All Grain Sizes Classed Using Wentworth Scale



### Sieve and Laser Particle Size Analysis



Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[φ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00
	1/4 in.	0.250000	6.35000	-2.67	0.000	0.00
	4	0.187008	4.75000	-2.25	0.000	0.00
	6	0.131890	3.35000	-1.75	0.000	0.00
	8	0.092913	2.36000	-1.25	0.046	0.05
V Crse Sand	10	0.078740	2.00000	-1.00	0.159	0.20
	12	0.066212	1.68179	-0.75	0.000	0.20
	14	0.055678	1.41421	-0.50	0.000	0.20
	16	0.046819	1.18921	-0.25	0.000	0.20
	18	0.039370	1.00000	0.00	0.000	0.20
Coarse Sand	20	0.033106	0.84090	0.25	0.000	0.20
	25	0.027839	0.70711	0.50	0.000	0.20
	30	0.023410	0.59460	0.75	0.000	0.20
	35	0.019685	0.50000	1.00	0.000	0.20
	40	0.016553	0.42045	1.25	0.000	0.20
Medium Sand	45	0.013919	0.35355	1.50	0.000	0.20
	50	0.011705	0.29730	1.75	0.077	0.28
	60	0.009843	0.25000	2.00	0.595	0.88
	70	0.008277	0.21022	2.25	1.304	2.18
	80	0.006960	0.17678	2.50	2.227	4.41
Fine Sand	100	0.005852	0.14865	2.75	2.932	7.34
	120	0.004921	0.12500	3.00	3.633	10.97
V. Fine Sand	140	0.004138	0.10511	3.25	4.363	15.34
	170	0.003480	0.08839	3.50	4.840	20.18
	200	0.002926	0.07433	3.75	5.383	25.56
Silt	230	0.002461	0.06250	4.00	5.839	31.40
	270	0.002069	0.05256	4.25	6.040	37.44
	325	0.001740	0.04419	4.50	6.239	43.68
	400	0.001463	0.03716	4.75	6.150	49.83
	450	0.001230	0.03125	5.00	5.841	55.67
	500	0.001035	0.02628	5.25	5.492	61.16
	635	0.000870	0.02210	5.50	4.965	66.12
		0.000732	0.01858	5.75	4.421	70.55
		0.000615	0.01562	6.00	3.925	74.47
		0.000517	0.01314	6.25	3.438	77.91
		0.000435	0.01105	6.50	3.018	80.93
		0.000366	0.00929	6.75	2.663	83.59
		0.000308	0.00781	7.00	2.341	85.93
		0.000259	0.00657	7.25	2.075	88.01
		0.000217	0.00552	7.50	1.845	89.85
Clay		0.000183	0.00465	7.75	1.633	91.48
		0.000154	0.00391	8.00	1.452	92.94
		0.000129	0.00328	8.25	1.273	94.21
		0.000109	0.00276	8.50	1.095	95.30
		0.000091	0.00232	8.75	0.920	96.22
		0.000077	0.00195	9.00	0.763	96.99
		0.000065	0.00164	9.25	0.644	97.63
		0.000054	0.00138	9.50	0.569	98.20
		0.000046	0.00116	9.75	0.516	98.72
		0.000038	0.00098	10.00	0.469	99.18
		0.000032	0.00082	10.25	0.398	99.58
		0.000027	0.00069	10.50	0.286	99.87
		0.000023	0.00058	10.75	0.131	100.00
		0.000019	0.00049	11.00	0.001	100.00
		0.000016	0.00041	11.25	0.000	100.00
		0.000015	0.00038	11.50	0.000	100.00
		0.000003	0.00009	13.50	0.000	100.00

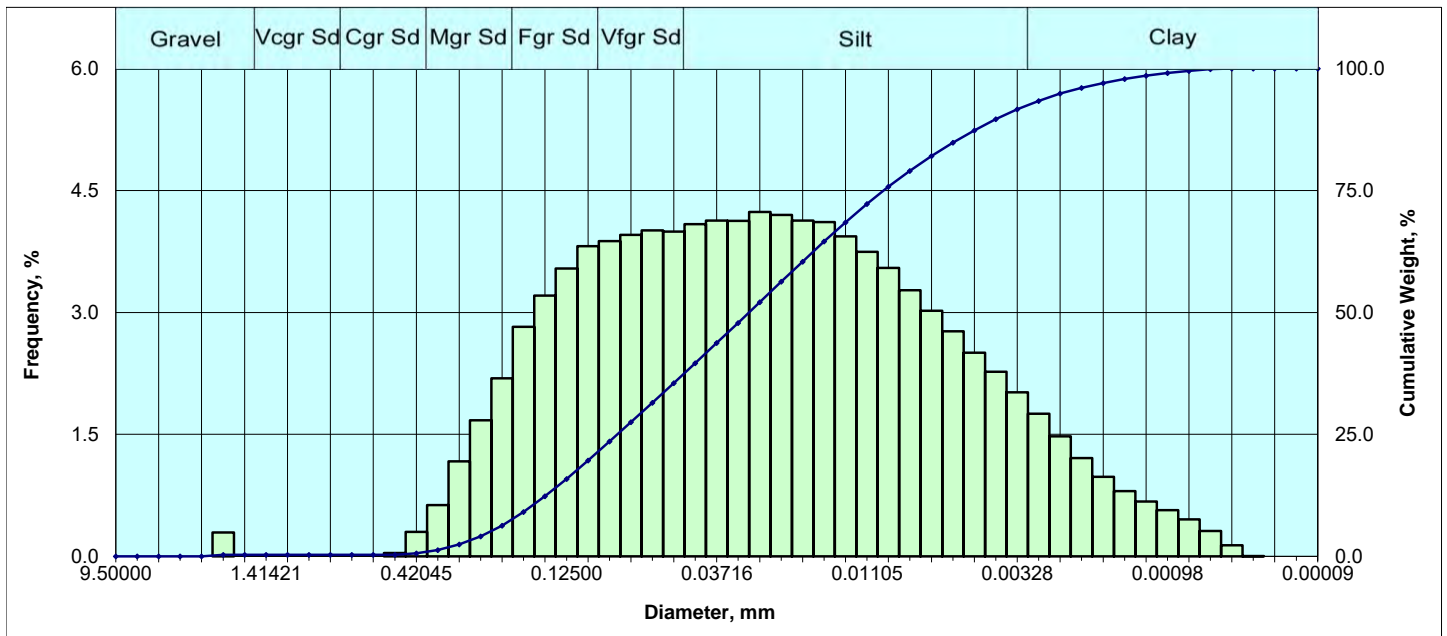
Sorting Statistics (Folk)				
Parameter		Trask	Inman	Folk
Median		Silt sized		
(in)		0.0015	0.0015	0.0015
(mm)		0.0370	0.0370	0.0370
Mean		Silt sized		
(in)		0.0018	0.0012	0.0013
(mm)		0.0455	0.0305	0.0325
Sorting		Poor		
		2.230	1.755	1.768
Skewness		Finely skewed		
		0.919	0.416	0.204
Kurtosis		Mesokurtic		
		0.240	0.675	1.041
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
0.20	31.19	61.54	7.06	68.60
Percentile [Weight, %]		Particle Diameter		
		[in.]	[mm]	[phi]
5		0.0067	0.1711	2.5471
10		0.0052	0.1313	2.9287
16		0.0040	0.1028	3.2818
25		0.0030	0.0758	3.7219
40		0.0019	0.0491	4.3475
50		0.0015	0.0370	4.7568
70		0.0007	0.0190	5.7167
75		0.0006	0.0152	6.0358
84		0.0004	0.0090	6.7909
90		0.0002	0.0054	7.5213
95		0.0001	0.0029	8.4264

\*\*All Grain Sizes Classed Using Wentworth Scale





### Sieve and Laser Particle Size Analysis



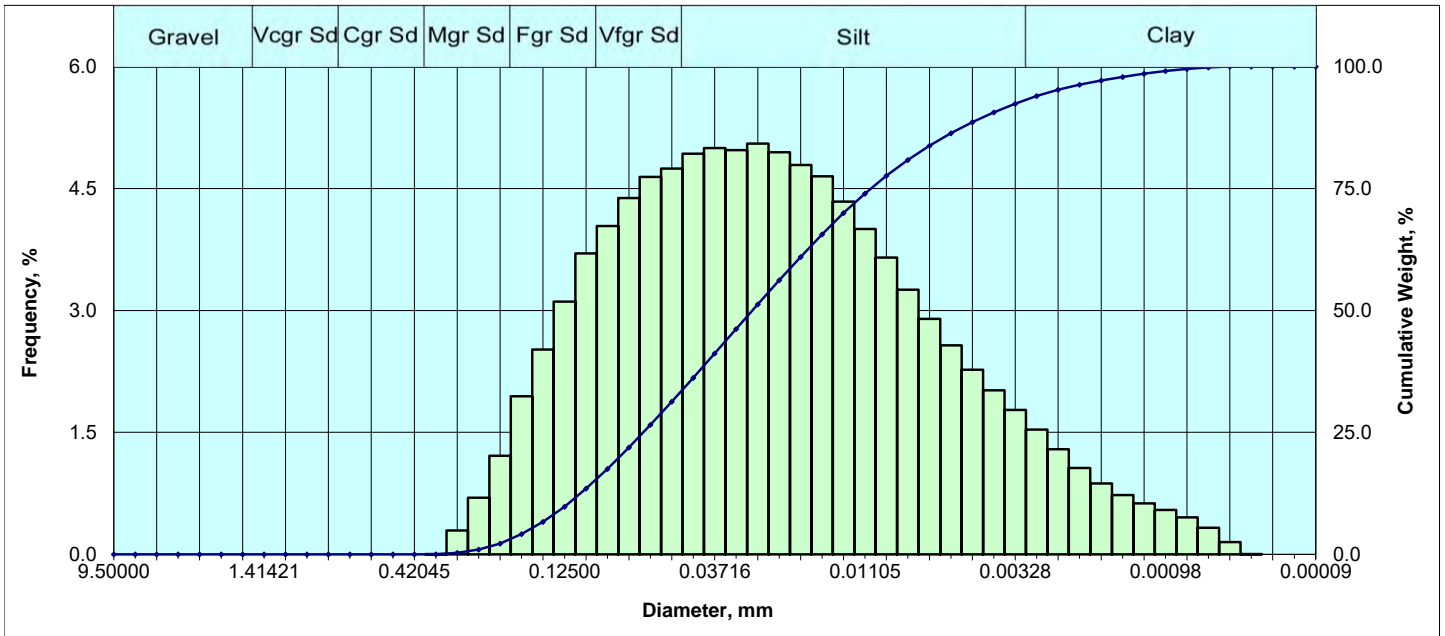
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[φ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00
	1/4 in.	0.250000	6.35000	-2.67	0.000	0.00
	4	0.187008	4.75000	-2.25	0.000	0.00
	6	0.131890	3.35000	-1.75	0.000	0.00
	8	0.092913	2.36000	-1.25	0.000	0.00
V Crse Sand	10	0.078740	2.00000	-1.00	0.292	0.29
	12	0.066212	1.68179	-0.75	0.000	0.29
	14	0.055678	1.41421	-0.50	0.000	0.29
	16	0.046819	1.18921	-0.25	0.000	0.29
Coarse Sand	18	0.039370	1.00000	0.00	0.000	0.29
	20	0.033106	0.84090	0.25	0.000	0.29
	25	0.027839	0.70711	0.50	0.000	0.29
	30	0.023410	0.59460	0.75	0.000	0.29
Medium Sand	35	0.019685	0.50000	1.00	0.040	0.33
	40	0.016553	0.42045	1.25	0.302	0.63
	45	0.013919	0.35355	1.50	0.632	1.27
	50	0.011705	0.29730	1.75	1.168	2.43
Fine Sand	60	0.009843	0.25000	2.00	1.674	4.11
	70	0.008277	0.21022	2.25	2.188	6.30
	80	0.006960	0.17678	2.50	2.824	9.12
	100	0.005852	0.14865	2.75	3.209	12.33
V. Fine Sand	120	0.004921	0.12500	3.00	3.539	15.87
	140	0.004138	0.10511	3.25	3.816	19.68
	170	0.003480	0.08839	3.50	3.878	23.56
	200	0.002926	0.07433	3.75	3.955	27.52
Silt	230	0.002461	0.06250	4.00	4.008	31.53
	270	0.002069	0.05256	4.25	3.993	35.52
	325	0.001740	0.04419	4.50	4.088	39.61
	400	0.001463	0.03716	4.75	4.130	43.74
	450	0.001230	0.03125	5.00	4.125	47.86
	500	0.001035	0.02628	5.25	4.235	52.10
	635	0.000870	0.02210	5.50	4.200	56.30
		0.000732	0.01858	5.75	4.131	60.43
		0.000615	0.01562	6.00	4.113	64.54
		0.000517	0.01314	6.25	3.935	68.47
		0.000435	0.01105	6.50	3.747	72.22
		0.000366	0.00929	6.75	3.548	75.77
		0.000308	0.00781	7.00	3.273	79.04
		0.000259	0.00657	7.25	3.022	82.06
		0.000217	0.00552	7.50	2.770	84.83
Clay		0.000183	0.00465	7.75	2.505	87.34
		0.000154	0.00391	8.00	2.271	89.61
		0.000129	0.00328	8.25	2.019	91.63
		0.000109	0.00276	8.50	1.755	93.38
		0.000091	0.00232	8.75	1.478	94.86
		0.000077	0.00195	9.00	1.208	96.07
		0.000065	0.00164	9.25	0.980	97.05
		0.000054	0.00138	9.50	0.803	97.85
		0.000046	0.00116	9.75	0.674	98.53
		0.000038	0.00098	10.00	0.569	99.10
		0.000032	0.00082	10.25	0.455	99.55
		0.000027	0.00069	10.50	0.313	99.86
		0.000023	0.00058	10.75	0.135	100.00
		0.000019	0.00049	11.00	0.001	100.00
		0.000016	0.00041	11.25	0.000	100.00
		0.000015	0.00038	11.50	0.000	100.00
		0.000003	0.00009	13.50	0.000	100.00

Sorting Statistics (Folk)				
Parameter		Trask	Inman	Folk
Median		Silt sized		
(in)		0.0011	0.0011	0.0011
(mm)		0.0287	0.0287	0.0287
Mean		Silt sized		
(in)		0.0018	0.0011	0.0011
(mm)		0.0465	0.0269	0.0275
Sorting		Very poor		
		2.934	2.206	2.115
Skewness		Near symmetrical		
		0.988	0.143	0.068
Kurtosis		Platykurtic		
		0.223	0.514	0.881
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
0.29	31.23	58.08	10.39	68.47
Percentile [Weight, %]		Particle Diameter		
		[in.]	[mm]	[phi]
5		0.0092	0.2338	2.0967
10		0.0067	0.1691	2.5643
16		0.0049	0.1243	3.0079
25		0.0033	0.0833	3.5859
40		0.0017	0.0435	4.5221
50		0.0011	0.0287	5.1208
70		0.0005	0.0123	6.3466
75		0.0004	0.0097	6.6920
84		0.0002	0.0058	7.4201
90		0.0001	0.0038	8.0451
95		0.0001	0.0023	8.7766

\*\*All Grain Sizes Classed Using Wentworth Scale



### Sieve and Laser Particle Size Analysis



Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[φ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00
	1/4 in.	0.250000	6.35000	-2.67	0.000	0.00
	4	0.187008	4.75000	-2.25	0.000	0.00
	6	0.131890	3.35000	-1.75	0.000	0.00
	8	0.092913	2.36000	-1.25	0.000	0.00
V Crse Sand	10	0.078740	2.00000	-1.00	0.000	0.00
	12	0.066212	1.68179	-0.75	0.000	0.00
	14	0.055678	1.41421	-0.50	0.000	0.00
	16	0.046819	1.18921	-0.25	0.000	0.00
Coarse Sand	18	0.039370	1.00000	0.00	0.000	0.00
	20	0.033106	0.84090	0.25	0.000	0.00
	25	0.027839	0.70711	0.50	0.000	0.00
	30	0.023410	0.59460	0.75	0.000	0.00
Medium Sand	35	0.019685	0.50000	1.00	0.000	0.00
	40	0.016553	0.42045	1.25	0.000	0.00
	45	0.013919	0.35355	1.50	0.003	0.00
	50	0.011705	0.29730	1.75	0.295	0.30
Fine Sand	60	0.009843	0.25000	2.00	0.698	1.00
	70	0.008277	0.21022	2.25	1.212	2.21
	80	0.006960	0.17678	2.50	1.943	4.15
	100	0.005852	0.14865	2.75	2.520	6.67
V. Fine Sand	120	0.004921	0.12500	3.00	3.108	9.78
	140	0.004138	0.10511	3.25	3.700	13.48
	170	0.003480	0.08839	3.50	4.039	17.52
	200	0.002926	0.07433	3.75	4.383	21.90
Silt	230	0.002461	0.06250	4.00	4.643	26.54
	270	0.002069	0.05256	4.25	4.745	31.29
	325	0.001740	0.04419	4.50	4.929	36.22
	400	0.001463	0.03716	4.75	4.996	41.22
	450	0.001230	0.03125	5.00	4.973	46.19
	500	0.001035	0.02628	5.25	5.054	51.24
	635	0.000870	0.02210	5.50	4.948	56.19
		0.000732	0.01858	5.75	4.787	60.98
		0.000615	0.01562	6.00	4.651	65.63
		0.000517	0.01314	6.25	4.338	69.97
		0.000435	0.01105	6.50	4.002	73.97
		0.000366	0.00929	6.75	3.650	77.62
		0.000308	0.00781	7.00	3.253	80.87
		0.000259	0.00657	7.25	2.895	83.77
Clay		0.000217	0.00552	7.50	2.570	86.34
		0.000183	0.00465	7.75	2.270	88.61
		0.000154	0.00391	8.00	2.019	90.63
		0.000129	0.00328	8.25	1.777	92.40
		0.000109	0.00276	8.50	1.536	93.94
		0.000091	0.00232	8.75	1.293	95.23
		0.000077	0.00195	9.00	1.062	96.29
		0.000065	0.00164	9.25	0.870	97.16
		0.000054	0.00138	9.50	0.728	97.89
		0.000046	0.00116	9.75	0.626	98.52
		0.000038	0.00098	10.00	0.546	99.06
		0.000032	0.00082	10.25	0.456	99.52
		0.000027	0.00069	10.50	0.327	99.85
		0.000023	0.00058	10.75	0.151	100.00
		0.000019	0.00049	11.00	0.001	100.00
		0.000016	0.00041	11.25	0.000	100.00
		0.000015	0.00038	11.50	0.000	100.00
		0.000003	0.00009	13.50	0.000	100.00

Sorting Statistics (Folk)				
Parameter		Trask	Inman	Folk
Median		Silt sized		
(in)		0.0011	0.0011	0.0011
(mm)		0.0275	0.0275	0.0275
Mean		Silt sized		
(in)		0.0015	0.0010	0.0010
(mm)		0.0385	0.0248	0.0256
Sorting		Poor		
		2.509	1.935	1.895
Skewness		Finely skewed		
		0.963	0.236	0.114
Kurtosis		Mesokurtic		
		0.233	0.582	0.945
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
0.00	26.54	64.08	9.37	73.46
Percentile [Weight, %]		Particle Diameter		
		[in.]	[mm]	[phi]
5		0.0066	0.1673	2.5794
10		0.0049	0.1238	3.0137
16		0.0037	0.0947	3.4008
25		0.0026	0.0664	3.9119
40		0.0015	0.0389	4.6851
50		0.0011	0.0275	5.1844
70		0.0005	0.0131	6.2520
75		0.0004	0.0106	6.5664
84		0.0003	0.0065	7.2709
90		0.0002	0.0041	7.9177
95		0.0001	0.0024	8.7020

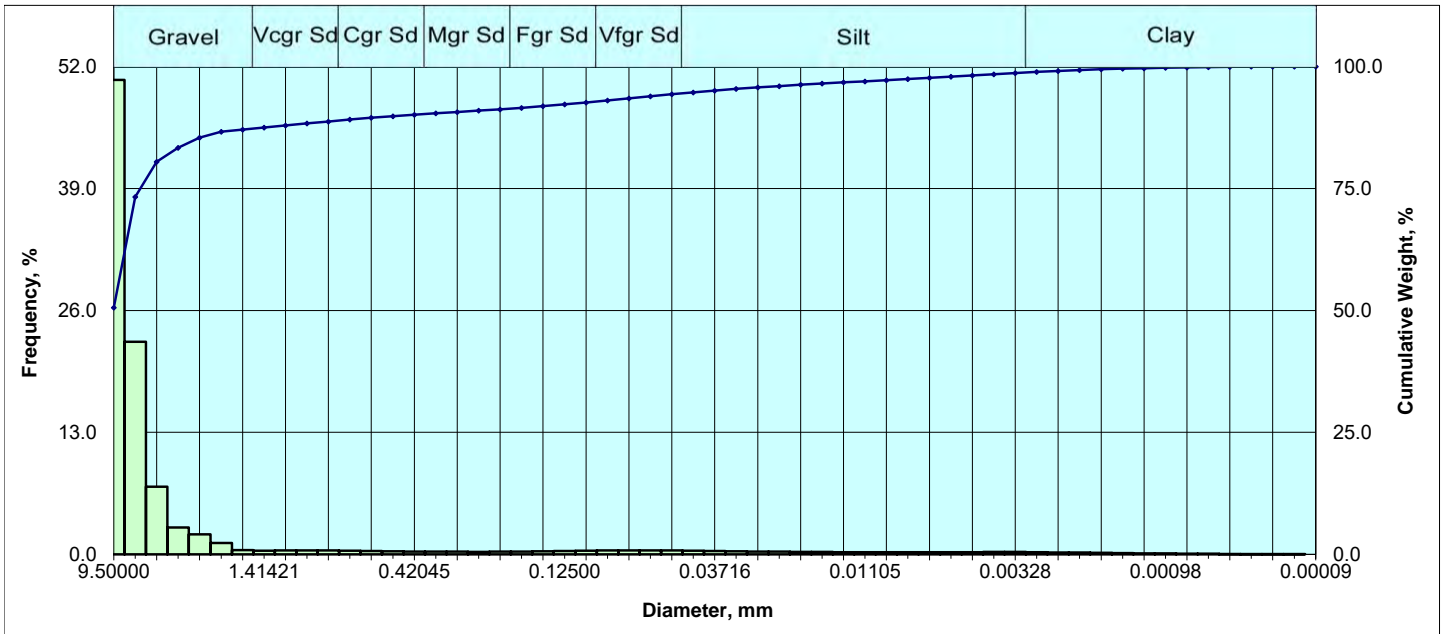
\*\*All Grain Sizes Classed Using Wentworth Scale



Company: AECOM - URS Group  
Project Name: Atlas D Missile Site 4 - DG1  
Project Number: 60613342

CL File No.: 2104826  
Sample ID: FEW4-MW107-305

### Sieve and Laser Particle Size Analysis



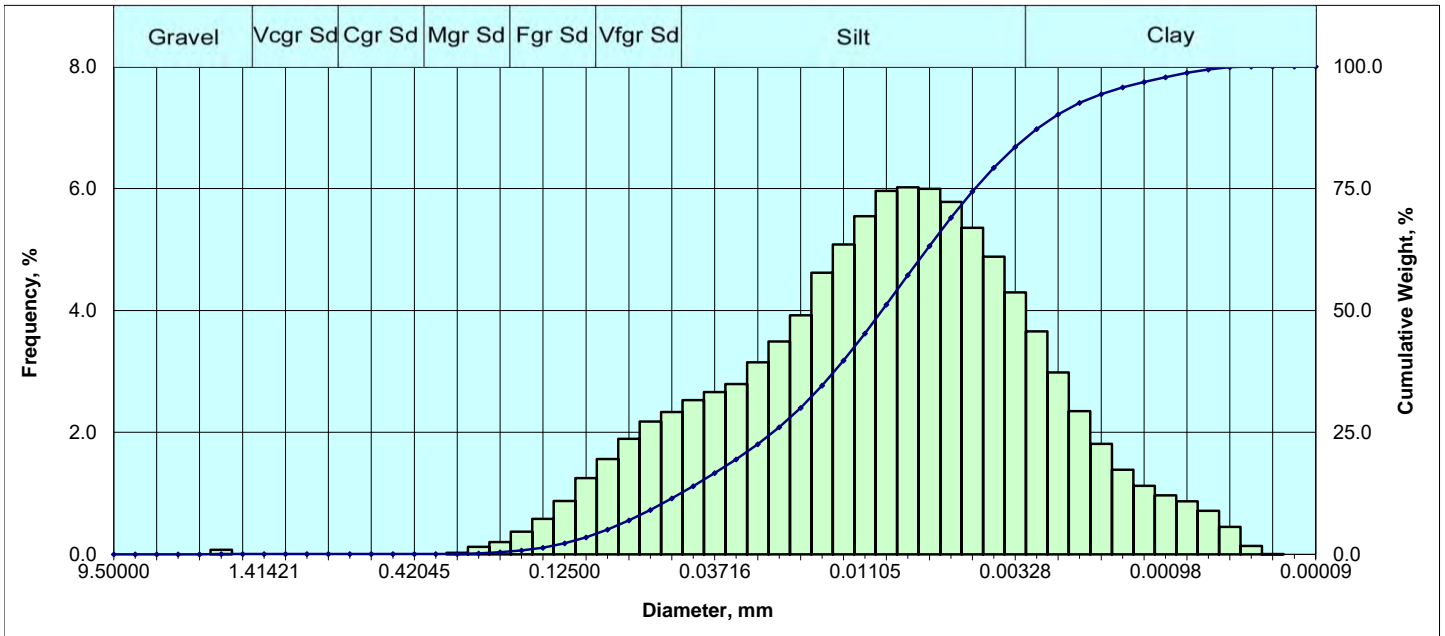
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[φ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.375000	9.50000	-3.25	50.592	50.59
	1/4 in.	0.250000	6.35000	-2.67	22.666	73.26
	4	0.187008	4.75000	-2.25	7.212	80.47
	6	0.131890	3.35000	-1.75	2.862	83.33
	8	0.092913	2.36000	-1.25	2.124	85.46
V Crse Sand	10	0.078740	2.00000	-1.00	1.202	86.66
	12	0.066212	1.68179	-0.75	0.437	87.10
	14	0.055678	1.41421	-0.50	0.391	87.49
	16	0.046819	1.18921	-0.25	0.425	87.91
Coarse Sand	18	0.039370	1.00000	0.00	0.423	88.34
	20	0.033106	0.84090	0.25	0.410	88.75
	25	0.027839	0.70711	0.50	0.386	89.13
	30	0.023410	0.59460	0.75	0.355	89.49
Medium Sand	35	0.019685	0.50000	1.00	0.331	89.82
	40	0.016553	0.42045	1.25	0.309	90.13
	45	0.013919	0.35355	1.50	0.288	90.42
	50	0.011705	0.29730	1.75	0.280	90.70
Fine Sand	60	0.009843	0.25000	2.00	0.275	90.97
	70	0.008277	0.21022	2.25	0.279	91.25
	80	0.006960	0.17678	2.50	0.305	91.56
	100	0.005852	0.14865	2.75	0.327	91.88
V. Fine Sand	120	0.004921	0.12500	3.00	0.357	92.24
	140	0.004138	0.10511	3.25	0.394	92.63
	170	0.003480	0.08839	3.50	0.413	93.05
	200	0.002926	0.07433	3.75	0.430	93.48
Silt	230	0.002461	0.06250	4.00	0.434	93.91
	270	0.002069	0.05256	4.25	0.418	94.33
	325	0.001740	0.04419	4.50	0.398	94.73
	400	0.001463	0.03716	4.75	0.367	95.09
	450	0.001230	0.03125	5.00	0.333	95.43
	500	0.001035	0.02628	5.25	0.306	95.73
	635	0.000870	0.02210	5.50	0.280	96.01
		0.000732	0.01858	5.75	0.259	96.27
		0.000615	0.01562	6.00	0.248	96.52
		0.000517	0.01314	6.25	0.236	96.75
		0.000435	0.01105	6.50	0.229	96.98
		0.000366	0.00929	6.75	0.229	97.21
Clay		0.000308	0.00781	7.00	0.227	97.44
		0.000259	0.00657	7.25	0.233	97.67
		0.000217	0.00552	7.50	0.241	97.92
		0.000183	0.00465	7.75	0.244	98.16
		0.000154	0.00391	8.00	0.251	98.41
		0.000129	0.00328	8.25	0.247	98.66
		0.000109	0.00276	8.50	0.233	98.89
		0.000091	0.00232	8.75	0.213	99.10
		0.000077	0.00195	9.00	0.183	99.29
		0.000065	0.00164	9.25	0.153	99.44
		0.000054	0.00138	9.50	0.124	99.56
		0.000046	0.00116	9.75	0.103	99.67
		0.000038	0.00098	10.00	0.089	99.76
		0.000032	0.00082	10.25	0.083	99.84
		0.000027	0.00069	10.50	0.073	99.91
		0.000023	0.00058	10.75	0.055	99.97
		0.000019	0.00049	11.00	0.028	99.99
		0.000016	0.00041	11.25	0.005	100.00
		0.000015	0.00038	11.50	0.000	100.00
		0.000003	0.00009	13.50	0.000	100.00

Sorting Statistics (Folk)				
Parameter		Trask	Inman	Folk
Median		Granule sized		
(in)		0.3770	0.3770	0.3770
(mm)		9.5746	9.5746	9.5746
Mean		Granule sized		
(in)		0.3679	0.2555	0.2909
(mm)		9.3442	6.4896	7.3879
Sorting		Poor		
		1.461	1.095	1.852
Skewness		Strongly fine skewed		
		0.910	3.321	0.678
Kurtosis		Extremely leptokurtic		
		0.239	2.934	3.228
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
86.66	7.25	4.50	1.59	6.09
Percentile [Weight, %]		Particle Diameter		
		[in.]	[mm]	[phi]
5		0.6002	15.2450	-3.9303
10		0.5754	14.6149	-3.8694
16		0.5456	13.8589	-3.7927
25		0.5010	12.7248	-3.6696
40		0.4266	10.8347	-3.4376
50		0.3770	9.5746	-3.2592
70		0.2678	6.8028	-2.7661
75		0.2348	5.9635	-2.5762
84		0.1196	3.0389	-1.6035
90		0.0178	0.4532	1.1417
95		0.0015	0.0389	4.6824

\*\*All Grain Sizes Classed Using Wentworth Scale



### Sieve and Laser Particle Size Analysis



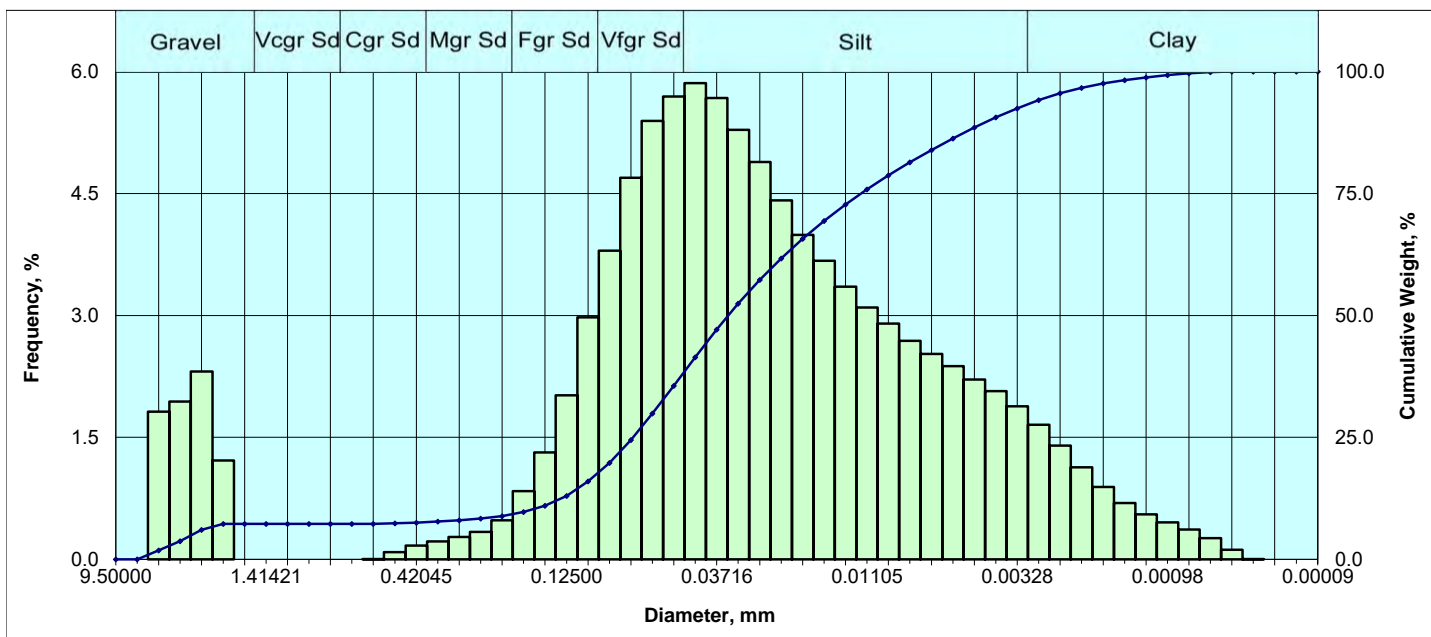
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[φ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00
	1/4 in.	0.250000	6.35000	-2.67	0.000	0.00
	4	0.187008	4.75000	-2.25	0.000	0.00
	6	0.131890	3.35000	-1.75	0.000	0.00
	8	0.092913	2.36000	-1.25	0.000	0.00
V Crse Sand	10	0.078740	2.00000	-1.00	0.073	0.07
	12	0.066212	1.68179	-0.75	0.000	0.07
	14	0.055678	1.41421	-0.50	0.000	0.07
	16	0.046819	1.18921	-0.25	0.000	0.07
Coarse Sand	18	0.039370	1.00000	0.00	0.000	0.07
	20	0.033108	0.84090	0.25	0.000	0.07
	25	0.027839	0.70711	0.50	0.000	0.07
	30	0.023410	0.59460	0.75	0.000	0.07
Medium Sand	35	0.019685	0.50000	1.00	0.000	0.07
	40	0.016553	0.42045	1.25	0.000	0.07
	45	0.013919	0.35355	1.50	0.000	0.07
	50	0.011705	0.29730	1.75	0.025	0.10
Fine Sand	60	0.009843	0.25000	2.00	0.121	0.22
	70	0.008277	0.21022	2.25	0.200	0.42
	80	0.006960	0.17678	2.50	0.372	0.79
	100	0.005852	0.14865	2.75	0.582	1.37
V. Fine Sand	120	0.004921	0.12500	3.00	0.874	2.25
	140	0.004138	0.10511	3.25	1.252	3.50
	170	0.003480	0.08839	3.50	1.561	5.06
	200	0.002926	0.07433	3.75	1.896	6.96
Silt	230	0.002461	0.06250	4.00	2.176	9.13
	270	0.002069	0.05256	4.25	2.336	11.47
	325	0.001740	0.04419	4.50	2.527	13.99
	400	0.001463	0.03716	4.75	2.663	16.66
	450	0.001230	0.03125	5.00	2.795	19.45
	500	0.001035	0.02628	5.25	3.147	22.60
	635	0.000870	0.02210	5.50	3.490	26.09
		0.000732	0.01858	5.75	3.922	30.01
		0.000615	0.01562	6.00	4.618	34.63
		0.000517	0.01314	6.25	5.081	39.71
		0.000435	0.01105	6.50	5.545	45.26
		0.000366	0.00929	6.75	5.960	51.22
		0.000308	0.00781	7.00	6.020	57.24
		0.000259	0.00657	7.25	5.997	63.23
Clay		0.000217	0.00552	7.50	5.780	69.01
		0.000183	0.00465	7.75	5.356	74.37
		0.000154	0.00391	8.00	4.884	79.25
		0.000129	0.00328	8.25	4.296	83.55
		0.000109	0.00276	8.50	3.659	87.21
		0.000091	0.00232	8.75	2.982	90.19
		0.000077	0.00195	9.00	2.348	92.54
		0.000065	0.00164	9.25	1.811	94.35
		0.000054	0.00138	9.50	1.389	95.74
		0.000046	0.00116	9.75	1.125	96.86
		0.000038	0.00098	10.00	0.969	97.83
		0.000032	0.00082	10.25	0.869	98.70
		0.000027	0.00069	10.50	0.714	99.41
		0.000023	0.00058	10.75	0.448	99.86
		0.000019	0.00049	11.00	0.137	100.00
		0.000016	0.00041	11.25	0.001	100.00
		0.000015	0.00038	11.50	0.000	100.00
		0.000003	0.00009	13.50	0.000	100.00

Sorting Statistics (Folk)				
Parameter		Trask	Inman	Folk
Median		Silt sized		
(in)		0.0004	0.0004	0.0004
(mm)		0.0096	0.0096	0.0096
Mean		Silt sized		
(in)		0.0006	0.0004	0.0004
(mm)		0.0140	0.0112	0.0107
Sorting		Poor		
		2.268	1.797	1.788
Skewness		Coarse skewed		
		1.069	-0.150	-0.105
Kurtosis		Mesokurtic		
		0.167	0.634	1.019
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
0.07	9.06	70.12	20.75	90.87
Percentile [Weight, %]		Particle Diameter		
		[in.]	[mm]	[phi]
5		0.0035	0.0890	3.4895
10		0.0023	0.0588	4.0879
16		0.0015	0.0389	4.6841
25		0.0009	0.0234	5.4172
40		0.0005	0.0130	6.2620
50		0.0004	0.0096	6.6953
70		0.0002	0.0054	7.5430
75		0.0002	0.0045	7.7800
84		0.0001	0.0032	8.2786
90		0.0001	0.0024	8.7328
95		0.0001	0.0015	9.3620

\*\*All Grain Sizes Classified Using Wentworth Scale



### Sieve and Laser Particle Size Analysis



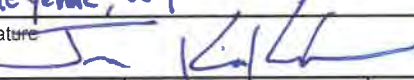
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[φ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.375000	9.50000	-3.25	0.000	0.00
	1/4 in.	0.250000	6.35000	-2.67	0.000	0.00
	4	0.187008	4.75000	-2.25	1.816	1.82
	6	0.131890	3.35000	-1.75	1.940	3.76
	8	0.092913	2.36000	-1.25	2.311	6.07
V Crse Sand	10	0.078740	2.00000	-1.00	1.217	7.28
	12	0.066212	1.68179	-0.75	0.000	7.28
	14	0.055678	1.41421	-0.50	0.000	7.28
	16	0.046819	1.18921	-0.25	0.000	7.28
	18	0.039370	1.00000	0.00	0.000	7.28
Coarse Sand	20	0.033106	0.84090	0.25	0.000	7.28
	25	0.027839	0.70711	0.50	0.000	7.28
	30	0.023410	0.59460	0.75	0.001	7.29
	35	0.019685	0.50000	1.00	0.088	7.37
	40	0.016553	0.42045	1.25	0.168	7.54
Medium Sand	45	0.013919	0.35355	1.50	0.221	7.76
	50	0.011705	0.29730	1.75	0.275	8.04
	60	0.009843	0.25000	2.00	0.339	8.38
	70	0.008277	0.21022	2.25	0.480	8.86
	80	0.006960	0.17678	2.50	0.840	9.70
Fine Sand	100	0.005852	0.14865	2.75	1.315	11.01
	120	0.004921	0.12500	3.00	2.017	13.03
	140	0.004138	0.10511	3.25	2.976	16.01
	170	0.003480	0.08839	3.50	3.798	19.80
	200	0.002926	0.07433	3.75	4.692	24.50
V. Fine Sand	230	0.002461	0.06250	4.00	5.394	29.89
	270	0.002069	0.05256	4.25	5.693	35.58
	325	0.001740	0.04419	4.50	5.858	41.44
	400	0.001463	0.03716	4.75	5.673	47.11
	450	0.001230	0.03125	5.00	5.284	52.40
Silt	500	0.001035	0.02628	5.25	4.889	57.29
	635	0.000870	0.02210	5.50	4.417	61.70
		0.000732	0.01858	5.75	3.991	65.69
		0.000615	0.01562	6.00	3.672	69.37
		0.000517	0.01314	6.25	3.354	72.72
		0.000435	0.01105	6.50	3.099	75.82
		0.000366	0.00929	6.75	2.900	78.72
		0.000308	0.00781	7.00	2.687	81.41
		0.000259	0.00657	7.25	2.526	83.93
		0.000217	0.00552	7.50	2.378	86.31
Clay		0.000183	0.00465	7.75	2.213	88.52
		0.000154	0.00391	8.00	2.068	90.59
		0.000129	0.00328	8.25	1.881	92.47
		0.000109	0.00276	8.50	1.657	94.13
		0.000091	0.00232	8.75	1.400	95.53
		0.000077	0.00195	9.00	1.132	96.66
		0.000065	0.00164	9.25	0.892	97.55
		0.000054	0.00138	9.50	0.693	98.25
		0.000046	0.00116	9.75	0.555	98.80
		0.000038	0.00098	10.00	0.455	99.26
		0.000032	0.00082	10.25	0.366	99.62
		0.000027	0.00069	10.50	0.259	99.88
		0.000023	0.00058	10.75	0.118	100.00
		0.000019	0.00049	11.00	0.001	100.00
		0.000016	0.00041	11.25	0.000	100.00
		0.000015	0.00038	11.50	0.000	100.00
		0.000003	0.00009	13.50	0.000	100.00

Sorting Statistics (Folk)				
Parameter		Trask	Inman	Folk
Median		Silt sized		
(in)		0.0013	0.0013	0.0013
(mm)		0.0339	0.0339	0.0339
Mean		Silt sized		
(in)		0.0017	0.0010	0.0011
(mm)		0.0424	0.0262	0.0286
Sorting		Very poor		
		2.512	2.004	2.539
Skewness		Near symmetrical		
		0.859	-0.650	-0.036
Kurtosis		Very leptokurtic		
		0.185	1.532	1.564
Component Percentages				
Gravel	Sand	Silt	Clay	Silt + Clay
7.28	22.61	60.70	9.41	70.11
Percentile [Weight, %]	Particle Diameter			
	[in.]	[mm]	[phi]	
5	0.1109	2.8170	-1.4942	
10	0.0067	0.1703	2.5538	
16	0.0041	0.1052	3.2495	
25	0.0029	0.0732	3.7716	
40	0.0018	0.0462	4.4344	
50	0.0013	0.0339	4.8812	
70	0.0006	0.0152	6.0441	
75	0.0005	0.0116	6.4296	
84	0.0003	0.0065	7.2566	
90	0.0002	0.0041	7.9240	
95	0.0001	0.0025	8.6503	

\*\*All Grain Sizes Classed Using Wentworth Scale



## CHAIN OF CUSTODY RECORD

Company <b>URS Group</b>						ANALYSIS REQUEST								PO#									
Address <b>12120 Shamrock Plaza Suite 100 Omaha NE 68154</b>						SOIL							FLUID										
Project Manager <b>Robert Mallisee</b> Phone <b>402-952-2501</b>						Number of Samples	Vadose Zone Suite	Saturated Zone Suite	Pore Fluid Saturation Suite	Moisture Content: ASTM D2216	Porosity: Total, API RP40	Porosity: Effective, ASTM D425M	Bulk Density: API RP40 / ASTM D2937	Hydraulic Conductivity: API RP40	Grain Size Distribution: ASTM D422/D4464M	Atterberg Limits: ASTM D4318	TOC; Walkley-Black	Fluid Properties Suite	Viscosity: ASTM D445	Density/Gravity: ASTM D1481	Pryo-Chromatography (Fingerprinting)	Turnaround Time 24 HR 48 HR 72 HR 5 Day Normal <input checked="" type="checkbox"/>	
Project Name <b>Affas D Missile Site 4 - DG1</b>							Fax	CL Bid No.															
Project No. <b>60613342</b> Email <b>robert.mallisee@aecom.com</b>							CL File No.																
Site Location <b>Cheyenne, WY</b>																							
Sampler Signature 																							
Sample ID	Date	Time	Depth, ft.																			Comments	
FEW4-MWS4B-160	7-11-21	1200	160	1								X	X										
FEW4-MWS4B-190	7-12-21	0800	190	1								X	X										
FEW4-MWS4B-200	7-12-21	0830	200	1								X	X										
FEW4-MWI05-90	7-8-21	1540	90	1								X	X										
FEW4-MWI05-140	7-9-21	0830	140	1								X	X										
FEW4-MWI05-180	7-9-21	0927	180	1								X	X										
FEW4-MWI05-190	7-9-21	1005	190	1								X	X										
FEW4-MWI07-305	7-10-21	1230	305	1								X	X										
FEW4-MWI07-345	7-10-21	1420	345	1								X	X										
FEW4-MWI07-355	7-10-21	1430	355	1								X	X										
1. Relinquished By:				2. Received By:				2. Relinquished By:				2. Received By:											
Company <b>AECOM (URS)</b>				Company				Company				Company											
Date      Time <b>8-26-21          1600</b>				Date            Time				Date            Time				Date            Time											



Job #2020287			WYOMING STATE PLANE COORDINATES EAST ZONE NAD83-2011 - OPUS - ELEVATIONS NAVD88 DATE OF SURVEY: AUG-9-2021 US SURVEY FEET				
			<b>MONITOR WELL #105</b>				
<u>POINT #</u>	<u>NORTHING</u>	<u>EASTING</u>	<u>LAT</u>	<u>LONG</u>	<u>ELEVATION</u>	<u>DESCRIPTION</u>	<u>GROUND ELEVATION</u>
809010	213680.563	661489.969	N41°05'11.52378"	W105°08'50.51574"	7275.43	MW 105 TOP LID	7272.5
					7275.41	MW 105 N RIM	
					7274.79	MW 105 TOC D	<u>CONCRETE ELEVATION</u>
					7274.87	MW 105 TOC M	7272.7
					7274.93	MW 105 TOC S	
			<b>MONITOR WELL #54B</b>				
<u>POINT #</u>	<u>NORTHING</u>	<u>EASTING</u>	<u>LAT</u>	<u>LONG</u>	<u>ELEVATION</u>	<u>DESCRIPTION</u>	<u>GROUND ELEVATION</u>
809023	209993.495	676453.83	N41°04'35.01273"	W105°05'35.13134"	6988.82	MON WELL 54 B TOP LID	6985.7
					6988.80	MON WELL 54 B N RIM	
					6988.12	MW 54B TOC D	<u>CONCRETE ELEVATION</u>
					6988.25	MW 54B TOC S	6986.0
			<b>INJ WELL 01</b>				
<u>POINT #</u>	<u>NORTHING</u>	<u>EASTING</u>	<u>LAT</u>	<u>LONG</u>	<u>ELEVATION</u>	<u>DESCRIPTION</u>	<u>GROUND ELEVATION</u>
809040	209013.008	693214.012	N41°04'25.12699"	W105°01'56.30043"	6718.22	WELL INJ 01 TOP NIPPLE	6716.4
			<b>MONITOR WELL #107</b>				
<u>POINT #</u>	<u>NORTHING</u>	<u>EASTING</u>	<u>LAT</u>	<u>LONG</u>	<u>ELEVATION</u>	<u>DESCRIPTION</u>	<u>GROUND ELEVATION</u>
809050	209559.025	698898.887	N41°04'30.42904"	W105°00'42.05914"	6686.77	MW 107 TOP LID	6683.9
					6686.76	MW 107 N LIP	
					6686.35	MW 107 TOC D	<u>CONCRETE ELEVATION</u>
					6686.38	MW 107 TOC M	6684.2
					6686.48	MW 107 TOC S	



DUCK CREEK STOCK WELL							
POINT #	NORTHING	EASTING	LAT	LONG	ELEVATION	DESCRIPTION	GROUND ELEVATION
809063	204140.65	721564.883	N41°03'36.38621"	W104°55'46.29126"	6454.95	DUCK CREEK STOCK WELL TOP LID	6451.5
					6454.44	DUCK CREEK STOCK WELL TOC N RIM	
							CONCRETE ELEVATION
							6451.7
PTI BUILDING							
POINT #	NORTHING	EASTING	LAT	LONG	ELEVATION	DESCRIPTION	GROUND ELEVATION
809036	208964.143	692485.59	N41°04'24.65514"	W105°02'05.81256"		BUILDING CORNER	6734.4
809037	208963.716	692474.279	N41°04'24.65108"	W105°02'05.96026"		BUILDING CORNER	
809038	208946.545	692475.095	N41°04'24.48140"	W105°02'05.94995"		BUILDING CORNER	CONCRETE ELEVATION
809039	208946.9	692486.078	N41°04'24.48474"	W105°02'05.80653"		BUILDING CORNER	6734.5
809028	208972.139	692484.887	N41°04'24.73416"	W105°02'05.82159"	6734.49	OUTSIDE CONCRETE CORNER	
809029	208971.74	692473.994	N41°04'24.73037"	W105°02'05.96382"	6734.54	OUTSIDE CONCRETE CORNER	





**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 6/22/2021  
**Weather:** Partly cloudy, 80° to 85° F, breeze  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Joseph Mastromarchi	Na Ali'i
Holly Young	Na Ali'i
Chris Hill	Yellow Jacket
Chris	Yellow Jacket
Estoban	Yellow Jacket
Tony	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	
5000 gal. Water Truck	
Box Truck	
Forklift	
Rental Truck	
Trailer	
Semi-Truck	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Unload drilling equipment and supplies at Building 3 and mobilize all necessary equipment and supplies to drilling location, MW107.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

None

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 6/23/2021  
**Weather:** Partly cloudy, 80° to 85° F, breeze  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Holly Young	Na Ali'i
Chris Hill	Yellow Jacket
Esteban Mendoza	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
MW107	0 feet bgs	109 feet bgs

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	
5000 gal. Water Truck	
Box Truck	
Yellow Jacket Crew Truck	
Forklift	
Rental Truck	
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	

**Brief Description of Work Performed:**

Began drilling at MW107. Reached depth of 109 feet bgs.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

None

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 6/23/2021  
**Weather:** Partly cloudy, 80° to 85° F, breeze  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Holly Young	Na Ali'i
Chris Hill	Yellow Jacket
Esteban Mendoza	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
MW107	109 ft bgs	148 ft bgs

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	
Box Truck	
Yellow Jacket Crew Truck	
Forklift	
Rental Truck	
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Continued drilling at MW107. Reached depth of 148 ft. bgs. Mobilized mud system to well location and performed maintenance.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting  
Halt work for lightning at 1600 hours.

**Problems Encountered and Corrective Action taken:**

None

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 6/25/2021  
**Weather:** Mostly cloudy, 60° to 65° F, breezy, rain/T-storms  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Holly Young	Na Ali'i
Chris Hill	Yellow Jacket
Esteban Mendoza	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
MW107	148 ft bgs	158 ft bgs

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	
Box Truck	
Yellow Jacket Crew Truck	
Forklift	
Rental Truck	
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	

**Brief Description of Work Performed:**

Continued drilling at MW107. Reached depth of 158 feet bgs. Advanced casing to 160 feet bgs.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

Stopped field activities for 3 hours 20 minutes due to lightning within ten miles.

**Problems Encountered and Corrective Action taken:**

None

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 6/26/2021  
**Weather:** Mostly cloudy, 60° to 65° F, breezy, rain showers  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Holly Young	Na Ali'i
Chris Hill	Yellow Jacket
Esteban Mendoza	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	
Box Truck	
Yellow Jacket Crew Truck	
Forklift	
Rental Truck	
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Troubleshoot and repair the mud system.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

Casing and core barrel would not advance without the mud system. The mud system was not starting. Drillers worked with mechanic to identify the problem and came up with a solution.

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 6/27/2021  
**Weather:** 53°-65°F Partly cloudy, Afternoon rain  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Holly Young	Na Ali'i
Chris Hill	Yellow Jacket
Esteban Mendoza	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
MW107	158 ft bgs	295 ft bgs

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	
Box Truck	
Yellow Jacket Crew Truck	
Forklift	
Rental Truck	
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Continued drilling at MW107. Reached depth of 295 feet bgs. Advanced casing to 225 feet bgs.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

Hose connection on the drill rig main pump failed. Drillers went to town to get a replacement.

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade



**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 6/28/2021  
**Weather:** 54°-64°F Partly cloudy, breezy, light afternoon rain  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Holly Young	Na Ali'i
Chris Hill	Yellow Jacket
Esteban Mendoza	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
MW107	295 ft bgs	355 ft bgs

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	
Box Truck	
Yellow Jacket Crew Truck	
Forklift	
Rental Truck	
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Continued drilling at MW107. Reached depth of 355 feet bgs and advanced casing to 335 feet bgs.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 6/29/2021  
**Weather:** 58°-72°F Mostly cloudy, Breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Jen Hussey	Na Ali'i
Chris Hill	Yellow Jacket
Esteban Mendoza	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
MW107	355 ft bgs	390 ft bgs

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	
Box Truck	
Yellow Jacket Crew Truck	
Forklift	
Rental Truck	
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Continued drilling at MW107. Reached total depth of 390 feet bgs and advanced casing to 390 feet bgs. Washed boring with approximately 4,000 gallons of water.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 6/30/2021  
**Weather:** 51°-74°F Clear, Sunny, Breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Jen Hussey	Na Ali'i
Chris Hill	Yellow Jacket
Esteban Mendoza	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
MW107-Temp	NA	NA

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	
Box Truck	
Yellow Jacket Crew Truck	
Forklift	
Rental Truck	
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
FEW4-IDW-RECIRC1	VOCs (8260C)

**Brief Description of Work Performed:**

Installed 4-inch temporary well at MW107. Collected sample from mud system used during drilling of MW107.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 7/1/2021  
**Weather:** 60°-64°F Cloudy, Breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Chris Hill	Yellow Jacket
Esteban Mendoza	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	
Yellow Jacket Crew Truck	
Forklift	
Rental Truck	
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Bailed approximately 200 gallons from MW107-TEMP.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 7/7/2021  
**Weather:** 63°-82°F Sunny, Calm  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Harman Guraya	Na Ali'i
Chris Hill	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	
Yellow Jacket Crew Truck	
Forklift	
Rental Truck	
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Bailed approximately 100 gallons from MW107-TEMP. Mobilized drill rig and all other equipment to MW105.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 7/8/2021  
**Weather:** 66°-90°F Mostly Sunny, Breezy, Afternoon Lightning  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Harman Guraya	Na Ali'i
Jen Hussey	Na Ali'i
Devon Gibson	Na Ali'i
Chris Hill	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
MW-105	0 ft bgs	120 ft bgs

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	
Yellow Jacket Crew Truck	
Forklift	
Rental Truck	
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
FEW4-MW105-(69.0)	8260C and Moisture Content
FEW4-MW105-(79.0)	8260C and Moisture Content
FEW4-MW105-(89.0)	8260C and Moisture Content
FEW4-MW105-(89.0)-FD	8260C and Moisture Content
FEW4-MW105-(99.0)	8260C and Moisture Content
FEW4-MW105-(109.0)	8260C and Moisture Content
FEW4-MW105-(109.0)-MS	8260C and Moisture Content
FEW4-MW105-(109.0)-MSD	8260C and Moisture Content
FEW4-MW105-(119.0)	8260C and Moisture Content

**Brief Description of Work Performed:**

Began drilling at MW-105, reached a depth of 120 ft bgs. Collected nine soil samples, including one duplicate and one MS/MSD.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

Two work delays due to lightning within ten miles, totaling 1.5 hours.

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 7/9/2021  
**Weather:** 66°-90°F Partly Cloudy, Breezy, Afternoon Lightning  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Harman Guraya	Na Ali'i
Jen Hussey	Na Ali'i
Devon Gibson	Na Ali'i
Chris Hill	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
MW-105	120 ft bgs	194 ft bgs

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Forklift	
Rental Truck	
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
FEW4-MW105-(129.0)	8260 C and Moisture Content
FEW4-MW105-(139.0)	8260 C and Moisture Content
FEW4-MW105-(149.0)	8260 C and Moisture Content
FEW4-MW105-(159.0)	8260 C and Moisture Content
FEW4-MW105-(169.0)	8260 C and Moisture Content
FEW4-MW105-(169.0)-FD	8260 C and Moisture Content
FEW4-MW105-(179.0)	8260 C and Moisture Content
FEW4-MW105-(189.0)	8260 C and Moisture Content

**Brief Description of Work Performed:**

Completed drilling at MW105, reached a total depth of 194 feet bgs. Collected eight soil samples, including one duplicate. Started temporary well development at MW107, pumped 165 gallons.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting  
Work delayed for 2.5 hours due to lightning within ten miles.

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 7/10/2021  
**Weather:** 59°-79°F Sunny, Breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Harman Guraya	Na Ali'i
Jen Hussey	Na Ali'i
Joseph Mastromarchi	Na Ali'i
Chris Hill	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
MW105-Temp	NA	NA

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Forklift	Mobile GAC Trailer
Rental Truck	Generator X 2
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
FEW4-MW107-Temp	VOCs 8260C

**Brief Description of Work Performed:**

Installed Temporary well at MW105. Bailed for 2 hours at MW105, approximately 250 gallons. Continued development at MW107, purged a total of 1,500 gallons. Collected development sample. Treated purged water through GAC system during development. Mobilized drill rig and equipment to MW54B.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade



**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 7/11/2021  
**Weather:** 55°-83°F Sunny, Calm  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Harman Guraya	Na Ali'i
Jen Hussey	Na Ali'i
Chris Hill	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
MW-54B	0 ft bgs	177 ft bgs

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Forklift	Mobile GAC Trailer
Rental Truck	Generator X 2
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes

**Brief Description of Work Performed:**

Began drilling at MW-54B, reached a depth of 177 feet bgs. Completed development of temporary well at MW107.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 7/12/2021  
**Weather:** 59°-84°F Sunny, Hazy, Breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Harman Guraya	Na Ali'i
Bill Sheldon	Na Ali'i
Joseph Mastromarchi	Na Ali'i
Chris Hill	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
MW54B	177 ft bgs	215 ft bgs

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Forklift	Mobile GAC Trailer
Rental Truck	Generator X 2
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes	
NA	NA	NA

**Brief Description of Work Performed:**

Completed drilling at MW54B, reached total depth of 215 feet bgs. Began to set temporary well at MW54B. Began development at MW105, pumped 550 gallons.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 7/13/2021  
**Weather:** 63°-80°F Mostly Sunny, Breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Harman Guraya	Na Ali'i
Bill Sheldon	Na Ali'i
Chris Hill	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket
Mark Cullum	Colog
Francesca Settanni	Colog

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
MW54B-Temp	NA	NA

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Forklift	Mobile GAC Trailer
Rental Truck	Generator X 2
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
FEW4-MW105-Temp	VOCs 8260C

**Brief Description of Work Performed:**

Completed temporary well installation at MW54B. Bailed approximately 250 gallons from MW54B-Temp. Colog completed geophysical logging at MW107, began hydrophysical logging at MW107. Completed development of MW105-Temp, pumped approximately 1,700 gallons into poly tanks for IDW treatment by mobile GAC. Collected development sample at MW105-Temp.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 7/14/2021  
**Weather:** 68°-73°F Partly Cloudy, Breezy, Afternoon Storm  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Jen Hussey	Na Ali'i
Bill Sheldon	Na Ali'i
Chris Hill	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket
Mark Cullum	Colog
Francesca Settanni	Colog

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Forklift	Mobile GAC Trailer
Rental Truck	Generator X 2
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
FEW4-IDW-INF1	VOCs 8260C
FEW4-IDW-INT1	VOCs 8260C
FEW4-IDW-EFF1	VOCs 8260C

**Brief Description of Work Performed:**

Colog completed hydrophysical log (HPL) of MW107, mobilized to MW105. All HPL water was treated though a GAC trailer on site. Samples were collected from the GAC trailer during treatment. Drillers mobilized all equipment and supplies to MW107. Began development of MW54B-Temp and pumped approximately 250 gallons.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting  
Work activities were stopped for 2.5 hours due to large storm cell with lightning within 10 miles.

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 7/15/2021  
**Weather:** 59°-76°F Sunny - Partly Cloudy, Breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Jen Hussey	Na Ali'i
Bill Sheldon	Na Ali'i
Chris Hill	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket
Mark Cullum	Colog
Francesca Settanni	Colog

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Forklift	Mobile GAC Trailer
Rental Truck	Generator X 2
Na Ali'i Truck	1.5 HP Grundfos Pump
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
FEW4-MW54B-Temp	VOCs 8260C

**Brief Description of Work Performed:**

Began removing temporary well from MW107. Completed development of MW54B, pumped a total of approximately 1,200 gallons and treated all development water through mobile GAC system. Collected one sample during development of MW54B. Colog completed GPL at MW105 and begins HPL. Development water from MW105 is treated through mobile GAC system (approximately 2000 gallons).

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 7/16/2021  
**Weather:** 64°-81°F Mostly Sunny, Breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Jen Hussey	Na Ali'i
Bill Sheldon	Na Ali'i
Chris Hill	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket
Mark Cullum	Colog
Francesca Settanni	Colog

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Forklift	Mobile GAC Trailer
Rental Truck	Generator X 2
Na Ali'i Truck	1.5 HP Grundfos Pump
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Continued removing temporary well from MW107. Began flushing out MW107. Colog completed HPL at MW105 and 1,100 gallons of HPL water was treated through the mobile GAC system. Colog deconed equipment and mobilized to MW54B. Completed GPL at MW54B. AECOM and Na Ali'i scatter soil cores from MW104.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 7/17/2021  
**Weather:** 68°-83°F Mostly Sunny, Calm/Breezy, Afternoon Storm  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Bill Sheldon	Na Ali'i
Chris Hill	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket
Mark Cullum	Colog
Francesca Settanni	Colog

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Forklift	Mobile GAC Trailer
Rental Truck	Generator X 2
Na Ali'i Truck	1.5 HP Grundfos Pump
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Drillers finished removing temp well at MW107 and flushed out the borehole. Colog completed HPL at MW54B. All HPL water was treated through the mobile GAC system (1,100 gallons).

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting  
Lightning delay for 1.5 hours, all team members sheltered in trucks.

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 7/18/2021  
**Weather:** 66°-83°F Sunny, Breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Jen Hussey	Na Ali'i
Chris Hill	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Forklift	Mobile GAC Trailer
Rental Truck	Generator X 2
Na Ali'i Truck	1.5 HP Grundfos Pump
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Began monitoring well installation at MW107. Scattered soil cores at MW92B.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade



**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 7/19/2021  
**Weather:** 68°-83°F Sunny, Breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Jen Hussey	Na Ali'i
Peter Deery	Na Ali'i
Chris Hill	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
MW107 Nested Monitoring Well	NA	NA

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Forklift	Mobile GAC Trailer
Rental Truck	Generator X 2
Na Ali'i Truck	1.5 HP Grundfos Pump
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Completed nested monitoring well installation at MW107. Scattered core bags of MW106.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 7/20/2021  
**Weather:** 70°-82°F Partly Cloudy/Sunny, Breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Jen Hussey	Na Ali'i
Chris Hill	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
MW107 Steel Casing and Concrete Well Pad		

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Forklift	Mobile GAC Trailer
Rental Truck	Generator X 2
Na Ali'i Truck	1.5 HP Grundfos Pump
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Complete grouting at MW107 (fill to the top after sinking overnight). Complete steel casing and well pad installation at MW107.  
Mobilize all drilling equipment to MW54B.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 7/28/2021  
**Weather:** Mostly Sunny, 85-90°F, breeze  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Sean Adams	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Forklift	Mobile GAC Trailer
Rental Truck	Generator X 2
Na Ali'i Truck	1.5 HP Grundfos Pump
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Begin removing Temporary Well at MW54B.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 7/29/2021  
**Weather:** Mostly Sunny, 85-90° F, breeze  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Jen Hussey	Na Ali'i
Sean Adams	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
MW-54B Nested Monitoring Well	NA	NA

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Forklift	Mobile GAC Trailer
Rental Truck	Generator X 2
Na Ali'i Truck	1.5 HP Grundfos Pump
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Complete removing temporary well at MW54B. Install shallow and deep wells at MW54B and place bentonite seal.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 7/30/2021  
**Weather:** 66°-80°F Partly Cloudy, Breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Jen Hussey	Na Ali'i
Sean Adams	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
MW-54B Nested Monitoring Well	NA	NA

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Forklift	Mobile GAC Trailer
Rental Truck	Generator X 2
Na Ali'i Truck	1.5 HP Grundfos Pump
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Complete grouting at MW54B. Mobilize drill rig and other equipment to MW105.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

Pause outdoor fieldwork for 1 hour due to lightning within 10 miles.

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 7/31/2021  
**Weather:** 59°-72°F Cloudy, Breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Jen Hussey	Na Ali'i
Sean Adams	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Forklift	Mobile GAC Trailer
Rental Truck	Generator X 2
Na Ali'i Truck	1.5 HP Grundfos Pump
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Remove temporary well at MW105.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 8/1/2021  
**Weather:** 68°-77°F Partly Cloudy, Breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Sean Adams	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
MW105 Nested Monitoring Wells	NA	NA

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	10 ft. Stainless Steel Bailer
Box Truck	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Forklift	Mobile GAC Trailer
Rental Truck	Generator X 2
Na Ali'i Truck	1.5 HP Grundfos Pump
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Complete installation of nested monitoring wells at MW105.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 8/2/2021  
**Weather:** 67°-82°F Partly Cloudy, Hazy, Breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Curtis Carlson	Yellow Jacket
Sean Adams	Yellow Jacket
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Sonic Drill Rig	Mud System
5000 gal. Water Truck	20 ft. (1" dia.) PVC Bailer
Box Truck	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Forklift	Mobile GAC Trailer
Rental Truck	Generator X 2
Na Ali'i Truck	1.5 HP Grundfos Pump
Trailer	Development Rig
Geologist Tools	Surge Block

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Complete well completions at MW105, MW107, and MW54B. Surge and bail at all three nested monitoring wells at MW107.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade



**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 8/3/2021  
**Weather:** 61°-72°F Mostly Cloudy, Breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Curtis Carlson	Yellow Jacket
Jen Hussey	Na Ali'i
Joe Mastromarchi	Na Ali'i
Brandon Mosley	Yellow Jacket
Chris Helton	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Development Rig	Generator X 2
Surge Block	Forklift
20 ft. (1" dia.) PVC Bailer	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Mega Monsoon Pump	Mobile GAC Trailer
Rental Truck	
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Complete development of MW54B (deep well). Begin development of MW54B (shallow well).

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 8/4/2021  
**Weather:** 61°-80°F Mostly Sunny, Breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Curtis Carlson	Yellow Jacket
Jen Hussey	Na Ali'i
Joe Mastromarchi	Na Ali'i
Brandon Mosley	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Development Rig	Generator X 2
Surge Block	Forklift
20 ft. (1" dia.) PVC Bailer	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Mega Monsoon Pump	Mobile GAC Trailer
Rental Truck	
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Complete development of MW54B (shallow well). Begin development of MW105 nested monitoring wells.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

USACE, RAB, and Wyoming State Site Visit (site visit notes will be provided separately).

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 8/5/2021  
**Weather:** 65°-87°F Mostly Sunny, Breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Curtis Carlson	Yellow Jacket
Jen Hussey	Na Ali'i
Brandon Mosley	Yellow Jacket

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Development Rig	Generator X 2
Surge Block	Forklift
20 ft. (1" dia.) PVC Bailer	Hanna 98494
Yellow Jacket Crew Truck	LaMotte 2020 we
Mega Monsoon Pump	Mobile GAC Trailer
Rental Truck	
Na Ali'i Truck	
Trailer	
Geologist Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Continued development activities at MW105.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

The USACE-Omaha Atlas 4 team and several members of the RAB as well as URS and Na Ali'i project staff attended a Technical Project Planning (TPP) meeting in the morning to discuss the project and provide background on the project for new RAB members. The meeting was held at Laramie County Community College. See meeting minutes for attendee list.

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 8/6/2021  
**Weather:** 62°-85°F Sunny, Breezy, Afternoon Storms  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Jen Hussey	Na Ali'i

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Grundfos RediFlo 2	Generator X 2
Rental Truck	Hanna 98494
Na Ali'i Truck	LaMotte 2020 we
Trailer	Mobile GAC Trailer
Geologist Tools	Invertek Controller

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Designate monitoring well identifications: MW105-93, MW105-143, MW105-188. Treat approximately 475 gallons of development water from MW105 through mobile GAC system. Complete development at MW107-DEEP.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting  
Pause in fieldwork for 1 hr. 45 min. due to lightning within 10 miles.

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 8/7/2021  
**Weather:** 61°-77°F Mostly Cloudy, Windy, Very Smokey  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Jen Hussey	Na Ali'i

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Grundfos RediFlo 2	Generator X 2
Rental Truck	Hanna 98494
Na Ali'i Truck	LaMotte 2020 we
Trailer	Mobile GAC Trailer
Geologist Tools	Invertek Controller

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Complete development at MW107-MIDDLE. Treat all development water from MW107 through mobile GAC system.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 8/8/2021  
**Weather:** 70°-88°F Sunny, Breezy/Windy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Holly Young	Na Ali'i

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Grundfos RediFlo 2	Generator X 2
Rental Truck	Hanna 98494
Na Ali'i Truck	LaMotte 2020 we
Trailer	Mobile GAC Trailer
Geologist Tools	Invertek Controller

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Complete development at MW107-SHALLOW and MW54B-SHALLOW. Treat all development water from MW107 and MW54B through mobile GAC system. Designate monitoring well identifications: MW107-249, MW107-310, MW107-355, MW54B-164, and MW54B-199.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

**PROJECT NAME:** Atlas D Missile Site 4 - DGI  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 8/9/2021  
**Weather:** 70°-84°F Sunny, Hazy, Breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Jon Kinkade	AECOM
Dustin Sharpe	Steil Surveying
Alan Renneisen	Steil Surveying

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Grundfos RediFlo 2	Generator X 2
Rental Truck	Hanna 98494
Na Ali'i Truck	LaMotte 2020 we
Trailer	Mobile GAC Trailer
Geologist Tools	Invertek Controller
Steil Surveying Truck and Tools	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

Steil Surveying completes survey of MW105, MW54B, the PTI shed, INJ01, MW107, and the Duck Creed Stock Well. Complete development at MW105-Deep. Install dedicated tubing in all monitoring wells.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade

<b>PROJECT NAME:</b>	<u>Atlas D Missile Site 4 - DGI</u>	<b>Date:</b>	<u>8/10/2021</u>
<b>Location:</b>	<u>Cheyenne, Wyoming</u>	<b>Weather:</b>	<u>78°-89°F Sunny, Breezy</u>
<b>USACE PM:</b>	<u>Laura Deck</u>	<b>URS PM:</b>	<u>Robert Mallisee</u>
<b>URS Project No.:</b>	<u>60613342</u>	<b>Contract/DO:</b>	<u>W912DY-16-D-0026/W9128F19F0192</u>

**PERSONNEL:**

<u>Name</u>	<u>Company</u>
<u>Jon Kinkade</u>	<u>AECOM</u>
<u>Joseph Mastromarchi</u>	<u>Na Ali'i</u>
<u>Bill Sheldon</u>	<u>Na Ali'i</u>

**FIELD INSTALLATIONS:**

<u>ID Nos.</u>	<u>Drilled From:</u>	<u>Drilled To:</u>
<u>NA</u>	<u>NA</u>	<u>NA</u>
<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>

**EQUIPMENT:**

<u>Description</u>	<u>Description</u>
<u>Grundfos RediFlo 2</u>	<u>Generator X 2</u>
<u>Rental Truck</u>	<u>Hanna 98494</u>
<u>Na Ali'i Truck</u>	<u>LaMotte 2020 we</u>
<u>Trailer</u>	<u>Mobile GAC Trailer</u>
<u>Geologist Tools</u>	<u>Invertek Controller</u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>

**ENVIRONMENTAL SAMPLES COLLECTED:**

<u>Sample ID Nos.</u>	<u>Analytes</u>
<u>FEW4-MW54B-CORE</u>	<u>8260C/Ignitability &amp; Corrosivity</u>
<u>FEW4-MW54B-CUTTINGS</u>	<u>8260C/Ignitability &amp; Corrosivity</u>
<u>FEW4-MW107-CORE</u>	<u>8260C/Ignitability &amp; Corrosivity</u>
<u>FEW4-MW107-CUTTINGS</u>	<u>8260C/Ignitability &amp; Corrosivity</u>
<u>FEW4-MW105-CORE</u>	<u>8260C/Ignitability &amp; Corrosivity</u>
<u>FEW4-MW105-CUTTINGS</u>	<u>8260C/Ignitability &amp; Corrosivity</u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>

**Brief Description of Work Performed:**

Treat remaining development water at MW54B and MW105. Collect IDW samples of cuttings and cores from each newly installed nested monitoring well location.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

NA

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Jon Kinkade



**PROJECT NAME:** Atlas D Missile Site 4 - DGI Task  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 8/20/2021  
**Weather:** Mostly Sunny, 75°F, breeze  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Joseph Mastromarchi	Na Ali'i Consulting, LLC

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
Trailer-mounted GAC system	

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

DGI work consisted of treating the final 200 gallons of IDW purge (development) water from MW105, and also 1400 gallons of IDW water from the drill mud settling tank located near MW105, which contained drill mud and water from the drilling of MW54B and MW105.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

None

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Joseph Mastromarchi

PROJECT NAME:

Atlas D Missile Site 4 - DGI Task

Location:

Cheyenne, Wyoming

USACE PM:

Laura Deck

URS Project No.:

60613342

Date:

8/21/2021

Weather:

Mostly Sunny, 75° F, breeze

URS PM:

Robert Mallisee

Contract/DO:

W912DY-16-D-0026/W9128F19F0192

PERSONNEL:		FIELD INSTALLATIONS:		
Name	Company	ID Nos.	Drilled From:	Drilled To:
Joseph Mastromarchi	Na Ali'i Consulting, LLC	NA	NA	NA

EQUIPMENT:		ENVIRONMENTAL SAMPLES COLLECTED:	
Description	Description	Sample ID Nos.	Analytes
Trailer-mounted GAC system		NA	NA

Brief Description of Work Performed:

DGI work consisted of beginning construction of a mud drying bed for IDW drill mud contained in the settling tank located near MW105, which contained drill mud and water from the drilling of MW54B and MW105.

Health and Safety Levels/Activities:

Level D, Daily Safety Tailgate Meeting

Problems Encountered and Corrective Action taken:

None

Changes from Workplan:

NA

Remarks/Visitors:

NA

Signature:

Joseph Mastromarchi

**PROJECT NAME:** Atlas D Missile Site 4 - DGI Task  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 8/22/2021  
**Weather:** Mostly Sunny, 75° F, breeze  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Joseph Mastromarchi	Na Ali'i Consulting, LLC

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
NA	NA

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

DGI work consisted of completing construction of a mud drying bed for IDW drill mud contained in the settling tank located near MW105, which contained drill mud and water from the drilling of MW54B and MW105. Drill mud transferred from the settling tank to the drying bed.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

None

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Joseph Mastromarchi

**PROJECT NAME:** Atlas D Missile Site 4 - DGI Task  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 8/24/2021  
**Weather:** Mostly Sunny, 90°F, breeze  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Joseph Mastromarchi	Na Ali'i Consulting, LLC

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
NA	NA

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
NA	NA

**Brief Description of Work Performed:**

DGI work consisted of completing construction of a mud drying bed for IDW drill mud contained in the settling tank located near MW107. Drill mud transferred from the settling tank to the drying bed.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

None

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Kristine Weber

**PROJECT NAME:** Atlas D Missile Site 4 - DGI Task  
**Location:** Cheyenne, Wyoming  
**USACE PM:** Laura Deck  
**URS Project No.:** 60613342

**Date:** 9/19/2021  
**Weather:** Mostly Sunny, 75° F, breezy  
**URS PM:** Robert Mallisee  
**Contract/DO:** W912DY-16-D-0026/W9128F19F0192

**PERSONNEL:**

Name	Company
Joseph Mastromarchi	Na Ali'i Consulting, LLC
William Sheldon	Na Ali'i Consulting, LLC

**FIELD INSTALLATIONS:**

ID Nos.	Drilled From:	Drilled To:
NA	NA	NA

**EQUIPMENT:**

Description	Description
NA	NA

**ENVIRONMENTAL SAMPLES COLLECTED:**

Sample ID Nos.	Analytes
FEW4-IDW-BED2	VOCs, ignitability, corrosivity
FEW4-IDW-BED3	VOCs, ignitability, corrosivity

**Brief Description of Work Performed:**

Collected drill mud drying bed IDW samples from beds associated with drilling of MW105 (BED3) and MW107 (BED2).  
Samples were 5-point composite samples from the dried mud beds.

**Health and Safety Levels/Activities:**

Level D, Daily Safety Tailgate Meeting

**Problems Encountered and Corrective Action taken:**

None

**Changes from Workplan:**

NA

**Remarks/Visitors:**

NA

**Signature:** Joseph Mastromarchi