



DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

ENTERED



JAN 20 2017

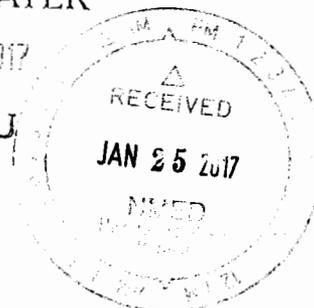
Colonel Eric H. Froehlich
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB NM 87117-5000

Ms. Michelle Hunter, Bureau Chief
Ground Water Quality Bureau (GWQB)
New Mexico Environment Department (NMED)
1190 St. Francis Drive, Harold Runnels Building
Room N-2250
Santa Fe NM 87502

GROUND WATER

JAN 23 2017

BUREAU



Dear Ms. Hunter

Attached please find attached the Initial Corrective Action Report for the KAFB-106239 Development Water Release associated with the Bulk Fuels Facility Spill, Solid Waste Management Unit ST-106/SS-111, Kirtland Air Force Base (KAFB), New Mexico. This report is submitted pursuant to 20.6.2.1203.A(6) NMAC, "Notification of Discharge-Removal". This report also satisfies the requirements in Part 1.27 of KAFB's 2010 Hazardous Waste Treatment Facility Operating Permit (HWTF Permit No. NM9570024423). The 150-gallon water release was originally reported to NMED via email on January 8, 2017, a few hours after the release occurred. The Air Force has implemented all planned corrective action activities identified in that notification. At this time, the final post-soil removal data are pending. Following receipt of these analytical data, a Final Corrective Action Report will be submitted.

If you have any questions or concerns, please contact Mr. Scott Clark at (505) 846-9017 or at scott.clark@us.af.mil.

Sincerely

ERIC H. FROEHLICH, Colonel, USAF
Commander

Attachment:

Initial Corrective Action Report, KAFB-106239 Development Water Release

cc:

- NMED-EHD (Keiling, McQuillan)
- NMED-HWB (Agnew)
- NMED-GWQB (Pullen)
- EPA Region 6 (King, Ellinger)
- SAF-IEE (Lynnes)
- COA-EHD (Faris, Leonard)
- AFCEC/CZ (Bodour, Clark, Devergie)
- USACE-ABQ District Office (Simpler, Phaneuf, Dreeland; Sanchez; Salazar)
- Public Info Repository, AR/IR, and File

KAFB4478



Initial Report
Extraction Well KAFB-106239 Development Water Release
Bulk Fuels Facility Project, Kirtland Air Force Base, Albuquerque, New Mexico

Description of the Release

On 8 January 2017, Kirtland Air Force Base (AFB) was performing well development activities on extraction well KAFB-106239 located on Ridgecrest Drive SE just east of San Pedro Drive (Figure 1). KAFB-106239 is being constructed to extract dissolved-phase organic contaminated groundwater for treatment at the Kirtland AFB Bulk Fuels Facility Groundwater Treatment System. During well development, groundwater was pumped from the well as part of the well screen cleaning process to enhance well performance. All water pumped from the well was pumped directly into 21,000-gallon capacity, onsite storage tanks. The storage tanks were placed on portable, heavy duty vinyl, secondary containment structures with 1-foot (ft) high sides to capture leaks and small releases from the tank.

During pumping of the deepest portion of the well screen interval on 8 January 2017, the storage tank overflowed water from the top port of the tank (Attachment 1, Photograph 1). The overflow began at 4:15 p.m. just as the pump was shut down to end the pumping cycle. The cover of the port was closed, but not locked down. Pressure in the pump line feeding the tank forced water to shoot outward from the port for approximately 15-20 seconds into the secondary containment structure and directly onto the ground (i.e.: release was not direct overflow from the secondary containment structure). The secondary containment structure captured some of the overflow; however, due to the pumping pressure, it was limited to a few gallons that ran down the side of the tank. Most of the water overshot the edge of the secondary containment and was released onto the ground (Attachment 1, Photograph 2). An estimated 150 gallons of water was released onto the soil adjacent to the tank. Water then flowed westward in the dirt right-of-way adjacent to the south side of Ridgecrest Drive SE, following the existing soil drainage contours for a measured distance of 170 ft to the west (toward San Pedro Drive SE). Figure 2 shows the approximate area of the impacted soil from the release. The width of the flow was contained in a 2- to 3-ft wide path for most of the flow length. At the spill point, water did cover a 9-ft wide area (Attachment 1, Photograph 3; Figure 2). None of the released water reached any City of Albuquerque storm drains on either Ridgecrest Drive SE or San Pedro Drive SE. In addition no private property was impacted.

Corrective Actions

Field personnel immediately responded by first ensuring the well pump was turned off. A small earthen berm was then constructed downslope of the flow near San Pedro Drive SE to prevent any water from leaving the dirt area south of Ridgecrest Drive SE or east of San Pedro Drive SE. Once the site spill was secured, Mr. Steve Pullen of the New Mexico Environment Department (NMED) Ground Water Quality Bureau was notified regarding the incident via email on 8 January 2017.

One soil sample (SP-001) was collected on 8 January 2017 at the distal extent of the surface flow where water was ponding on the surface (Figure 2). The sample was collected within 2 hours of the release and analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) by U.S. Environmental Protection Agency (EPA) Method 8021B, ethylene dibromide (EDB) by EPA Method 8011, and Resource Conservation and Recovery Act (RCRA) metals by EPA Methods 6010B/7471A at Hall Environmental

Laboratories in Albuquerque, New Mexico. Soil sample results and project screening levels are provided in Table 1. Laboratory analytical reports are provided in Attachment 2.

Characterization Sampling and Soil Removal on 9 January 2017

On the morning of 9 January 2017, the area of the surface release was first pin-flagged to clearly identify the impacted area in preparation for soil removal (Attachment 1, Photograph 4). Two additional samples (pre-excavation) were then collected: one from the spill area near the storage tank (SP-002; Figure 2) and one liquid sample collected from the development water in tank (SP; Table 2). Samples were delivered to Hall Environmental Laboratories and analyzed for BTEX, EDB, and RCRA metals as described above for the soil sample. The water sample was analyzed for BTEX by EPA Method 8260B, EDB by EPA Method 8011, and RCRA metals by EPA Methods 6010B/7470A.

In order to determine how much soil should be removed in the release area, a shovel was used to dig into the soil to determine a visual depth of water infiltration. It was determined that along most of the primary flow path (approximately 150 linear ft) and at the base of the storage tank, the depth of water infiltration was within 1 inch of the surface. At the far distal (western) extent of the surface flow, previous snow melt infiltration combined with the release resulted in saturated soil approximately two inches in depth. Based on the saturation depth, a 2-inch depth of soil removal was initiated in this area (approximately 20 linear ft).

A buried utility line mark was observed along the path of the proposed excavation. Although the buried utility was deeper than 2 inches, to mitigate any risk, four, 2-inch deep trenches were hand-dug along the length of the proposed removal area and perpendicular to the utility trace. The trenches confirmed that the utility was not present at these depths.

Soil removal was performed using a Bobcat excavator with a 5-ft wide bucket (Attachment 1, Photographs 5 and 6). A 1-inch deep cut was made into the soil the width of the bucket along the pathway of the spill. A second linear cut of approximately 3 ft was done to ensure capture of all the impacted area along the length of the spill.

At the release point at the storage tank, an area of approximately 9 × 9 ft was removed to 1-inch deep. At the downslope end of the flow, an area 20 ft long ranging from 3 to 8 ft wide was removed to a depth of 2 inches. The soil removal area is shown on Figure 3.

All excavated soil was placed in a lined, 20-yard roll-off bin. Approximately 2 yards of soil was removed during the excavation. The soil will be characterized for waste management purposes and properly disposed of upon receipt of analytical results.

Post-Excavation Confirmation Soil Sampling on 9 January 2017

Upon completion of the soil excavation activities, six soil samples were collected along the length of the excavated area on 9 January 2017 (Figure 4; and Attachment 1, Photographs 7 and 8). The purpose of the post-excavation sampling was to confirm all impacted soil was removed and that no soil contamination remained at the site or associated with the release. The samples were sent Eurofins Lancaster Laboratories Environmental, Lancaster, Pennsylvania for BTEX, EDB, and RCRA metals analysis. These analytical results are pending and will be submitted with a final report.

Sample Analytical Results

Table 1 provides the analytical results for two pre-excavation soil samples. Table 2 presents the analytical results for the well development water collected from the storage tank. Table 3 provides a summary of all the samples collected as part of this soil removal activity.

Development Water

The data results from the development water released from the tank document the sample to be non-hazardous. EDB was reported at 0.056 micrograms per liter ($\mu\text{g/L}$), which is slightly above the EPA Maximum Contaminant Level (MCL) of 0.05 $\mu\text{g/L}$. For the BTEX compounds analyzed, only toluene was detected at 3.9 $\mu\text{g/L}$, well below the New Mexico Water Quality Control Commission (NMWQCC) standard of 750 $\mu\text{g/L}$. The only metal detected in the development water was barium at 0.12 milligrams per liter, less than the EPA MCL. Water data were conservatively compared to EPA MCLs/NMWQCC Standards, but no surface, storm, or groundwater was impacted.

Pre-Removal Soil Samples

Laboratory results for the two soil samples (SP001 and SP002) collected prior to excavation activities indicate the soil did not contain EDB or BTEX compounds above the method detection limit as all results were non-detect for these compounds. Metals in soil showed detected concentrations of barium, chromium, and lead that were below NMED residential soil screening levels.

Post-Removal Soil Samples

These analytical data are pending and will be provided in a final report.

FIGURES

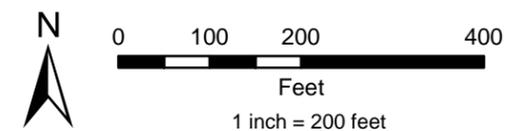
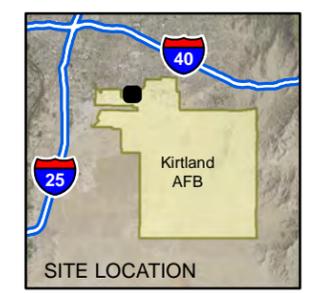
- | | |
|----------|--|
| Figure 1 | Location of Extraction Well KAFB-106239 |
| Figure 2 | Extent of Water Release and Location of Pre-Removal Soil Samples |
| Figure 3 | Impacted Soil Removal Action |
| Figure 4 | Location of Post-Removal Action Soil Samples |



Notes:
Aerial Imagery from ESRI Online Map Service 2016

Legend

- Extraction Well
- Storage Tank



Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

EXTRACTION WELL KAFB-106239
WATER STORAGE TANK RELEASE REPORT
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNIT ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

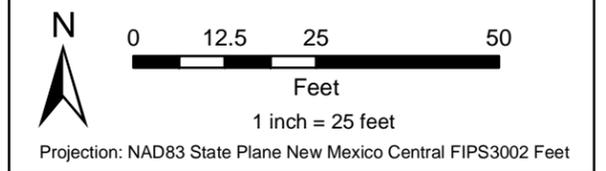
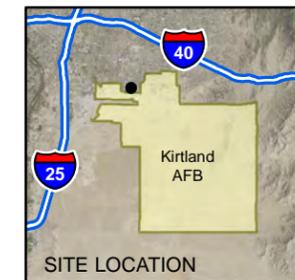
FIGURE 1

LOCATION OF EXTRACTION WELL
KAFB-106239



Legend

- Pre-Removal Soil Sample Location
January 8, 2017
- Development Water Sample
- ▲ Reference Point
- ▨ Impacted Soil Area



EXTRACTION WELL KAFB-106239
 WATER STORAGE TANK RELEASE REPORT
 BULK FUELS FACILITY
 SOLID WASTE MANAGEMENT UNIT ST-106/SS-111
 KIRTLAND AIR FORCE BASE, NEW MEXICO

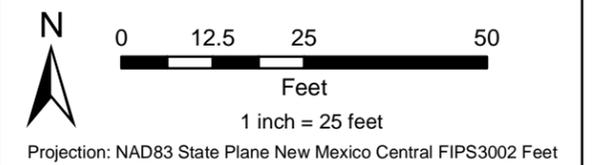
FIGURE 2

**EXTENT OF WATER RELEASE
 AND LOCATION OF PRE-REMOVAL
 SOIL SAMPLES**



Legend

- Area of 1" Soil Removal
January 9, 2017
- Area of 2" Soil Removal
January 9, 2017



EXTRACTION WELL KAFB-106239
 WATER STORAGE TANK RELEASE REPORT
 BULK FUELS FACILITY
 SOLID WASTE MANAGEMENT UNIT ST-106/SS-111
 KIRTLAND AIR FORCE BASE, NEW MEXICO

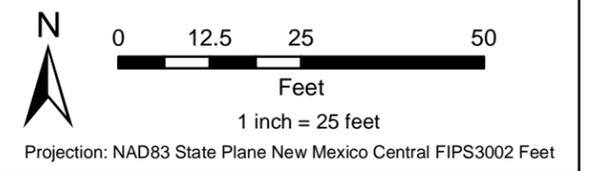
FIGURE 3

IMPACTED SOIL REMOVAL ACTION



Legend

- Post-Removal Soil Sample Location
January 9, 2017
- ▲ Reference Point
- Soil Removal Area



EXTRACTION WELL KAFB-106239
WATER STORAGE TANK RELEASE REPORT
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNIT ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 4

**LOCATION OF POST-REMOVAL
ACTION SOIL SAMPLES**

TABLES

| | |
|---------|--|
| Table 1 | Soil Analytical Results, 8-9 January 2017 |
| Table 2 | Development Water Analytical Results, 9 January 2017 |
| Table 3 | Sampling Locations, 8-9 January 2017 |

**Table 1
Soil Analytical Results
January 8-9, 2017**

| | | Location ID: | | | KAFB-106239 | KAFB-106239 | | |
|---------------------|------------|------------------------|-----------|-----------------------------------|---|--|-----------------------|------------|
| | | Field Sample ID: | | | 106239 SP-001 | 106239 SP-002 | | |
| | | Sample Date: | | | 1/8/2017 | 1/9/2017 | | |
| | | Sample Type: | | | REG | REG | | |
| | | Sample Depth (ft bgs): | | | Surface | Surface | | |
| | | Notes | | | Soil Pre-Removal Action - Distal End | Soil Pre-Removal Action - Near Storage Tank | | |
| Parameter | EPA Method | Analyte | CAS RN | NMED Residential SSL ^a | Result (mg/kg) | PQL | Result (mg/kg) | PQL |
| EDB | SW8011 | 1,2-dibromoethane | 106-93-4 | 0.672 | ND | 0.0001 | ND | 0.000096 |
| | | | | | Result (mg/kg) | PQL | Result (mg/kg) | PQL |
| BTEX | SW8021B | Benzene | 71-43-2 | 17.8 | ND | 0.024 | ND | 0.024 |
| | | Ethylbenzene | 100-41-4 | 75.1 | ND | 0.048 | ND | 0.048 |
| | | Toluene | 108-88-3 | 5,230 | ND | 0.048 | ND | 0.048 |
| | | Xylenes, total | 1330-20-7 | 871 | ND | 0.096 | ND | 0.096 |
| | | | | | Result (mg/kg) | PQL | Result (mg/kg) | PQL |
| Total Metals | SW6010B | Arsenic | 7440-38-2 | 4.25 | ND | 2.5 | ND | 2.5 |
| | | Barium | 7440-39-3 | 15,600 | 71 | 0.10 | 95 | 0.098 |
| | | Cadmium | 7440-43-9 | 70.5 | ND | 0.10 | ND | 0.098 |
| | | Chromium | 7440-47-3 | 96.6 | 3.2 | 0.30 | 5.1 | 0.29 |
| | | Lead | 7439-92-1 | 400 | 5.3 | 0.25 | 9.8 | 0.25 |
| | | Selenium | 7782-49-2 | 391 | ND | 2.5 | ND | 2.5 |
| | | Silver | 7440-22-4 | 391 | ND | 0.25 | ND | 0.25 |
| | SW7471A | Mercury | 7439-97-6 | 23.8 | ND | 0.031 | ND | 0.033 |

NOTES:

^a Residential land use SSLs from the NMED Risk Assessment Guidance for Site Investigations and Remediation, Appendix A, Table A-1, NMED SSLs. July 2015.

^b EPA RSLs for residential use scenario for hazard index = 1.0 for noncarcinogens and a 10⁻⁵ cancer risk level for carcinogens. May 2016.

mg/kg = Milligram(s) per kilogram.

CASRN = Chemical Abstracts Service Registry Number.

EPA = U.S. Environmental Protection Agency.

ND = Not detected above the method detection limit.

NMED = New Mexico Environment Department.

PQL = practical quantification limit.

RSL = Regional Screening Level.

SSL = Soil Screening Level.

SW = EPA SW-846 Test Methods for Evaluating Solid Waste, Third Edition, 1986 and Updates.

**Table 2
Development Water Analytical Results
January 9, 2017**

| | | Well Location ID: | | KAFB-106239 | | | |
|---------------------|-------------------|-------------------------------|---------------|---|-----------------------------------|-----------------------|------------|
| | | Field Sample ID: | | 106239 SP | | | |
| | | Sample Date: | | 1/9/2017 | | | |
| | | Sample Type: | | REG | | | |
| | | Sample Depth (ft bgs): | | Not Applicable | | | |
| | | Notes | | Development Water (Storage Tank) | | | |
| Parameter | EPA Method | Analyte | CAS RN | NMAC NMWQCC^a (µg/L) | EPA MCL^b | Result (µg/L) | PQL |
| EDB | SW8011 | 1,2-dibromoethane | 106-93-4 | 0.1 | 0.05 | 0.056 | 0.010 |
| | | | | | | Result (µg/L) | PQL |
| BTEX | SW8260B | Benzene | 71-43-2 | 10 | 5.0 | ND | 1.0 |
| | | Ethylbenzene | 100-41-4 | 750 | 700 | ND | 1.0 |
| | | Toluene | 108-88-3 | 750 | 1000 | 3.9 | 1.0 |
| | | Xylenes, total | 1330-20-7 | 620 | 10,000 | ND | 1.5 |
| | | | | NMAC NMWQCC^a (mg/L) | EPA MCL^b (mg/L) | Results (mg/L) | PQL |
| Total Metals | SW6010B | Arsenic | 7440-38-2 | 0.1 | 0.01 | ND | 0.020 |
| | | Barium | 7440-39-3 | 1.0 | 2 | 0.12 | 0.020 |
| | | Cadmium | 7440-43-9 | 0.01 | 0.005 | ND | 0.0020 |
| | | Chromium | 7440-47-3 | 0.05 | 0.1 | ND | 0.0060 |
| | | Lead | 7439-92-1 | 0.05 | 0.015 | ND | 0.0050 |
| | | Selenium | 7782-49-2 | 0.05 | 0.05 | ND | 0.050 |
| | | Silver | 7440-22-4 | 0.05 | NS | ND | 0.0050 |
| | SW7470A | Mercury | 7439-97-6 | 0.002 | 0.002 | ND | 0.00020 |

NOTES:

^a New Mexico Administrative Code Title 20.6.2.3103, Standards for Ground Water of 10,000 mg/L Total Dissolved Solids Concentration or Less (NMAC 2004).

For metals, the NMWQCC applies to dissolved metals and total mercury.

^b USEPA National Primary Drinking Water Regulations, Maximum Contaminant Levels (MCLs) and Secondary MCLs, Title 40CFR Part 141, 143 (May 2009)

µg/L = microgram per liter.

mg/L = milligrams per liter.

CASRN = Chemical Abstracts Service Registry Number.

CFR = Code of Federal Regulations.

EDB = ethylene dibromide (1,2-dibromoethane).

EPA = U.S. Environmental Protection Agency.

MCL = maximum contaminant level.

ND = not detected above the method detection limit.

NMAC = New Mexico Administrative Code.

NMWQCC = New Mexico Water Quality Control Commission.

NS = not specified.

PQL = practical quantification limit.

Table 3
Sampling Locations
January 8-9, 2017

| Sample ID | Date Collected | Collection Timing | Reference Location ^a | Type | Laboratory | Notes |
|---------------|----------------|-------------------|---------------------------------|-------|-----------------------|---------------------------------------|
| 106239 SP-001 | 1/8/2017 | Pre-soil removal | 52'/2' | Soil | Hall ^b | Initial post -spill sample |
| 106239 SP-002 | 1/9/2017 | Pre-soil removal | 210'/8.5' | Soil | Hall | At spill point at storage tank |
| 106239 SP-003 | 1/9/2017 | Post-soil removal | 50'/2' | Soil | Eurofins ^c | Western most point of release flow |
| 106239 SP-004 | 1/9/2017 | Post-soil removal | 57.5'/3.5' | Soil | Eurofins | Observed water ponded area on 1-8-17 |
| 106239 SP-005 | 1/9/2017 | Post-soil removal | 132'/2' | Soil | Eurofins | Along flow path |
| 106239 SP-006 | 1/9/2017 | Post-soil removal | 178'/3' | Soil | Eurofins | Along flow path |
| 106239 SP-007 | 1/9/2017 | Post-soil removal | 210'/5.5' | Soil | Eurofins | Flow path from tank to Ridgecrest Dr. |
| 106239 SP-008 | 1/9/2017 | Post-soil removal | 215.5'/5.5' | Soil | Eurofins | Flow path from tank to Ridgecrest Dr. |
| 106239SP | 1/9/2017 | Pre-soil removal | na | Water | Hall | Water sample from the storage tank |

NOTES:

^aReference location: Distance east from edge of concrete gutter strip on San Pedro/Distance south from edge of Ridgecrest Drive (see Figures 2 and 4)

^bHall Environmental Analysis Laboratory Inc., Albuquerque, NM

^cEurofins Lancaster Laboratories Environmental, LLC., Lancaster, Pennsylvania

ATTACHMENT 1
PHOTOGRAPHS

LIST OF PHOTOGRAPHS

| | |
|--------------|---|
| Photograph 1 | Storage Tank Port that Overflowed, V |
| Photograph 2 | Impacted Soil Immediately after Release, 8 January 2017 |
| Photograph 3 | Impacted Soil Area near the Storage Tank, 9 January 2017 |
| Photograph 4 | Flagged Impacted Soil Area, 9 January 2017 |
| Photograph 5 | Soil Removal Activities – 1-Inch Layer, 9 January 2017 |
| Photograph 6 | Soil Excavation in Progress; 9 January 2017 |
| Photograph 7 | Post-Soil Removal Site Conditions, 9 January 2017 |
| Photograph 8 | Impacted Soil Area after Removal Activities; 9 January 2017 |



Photograph 1 – Storage Tank Port That Overflowed



Photograph 2 – Impacted Soil Immediately After Release, January 8, 2017



Photograph 3 – Impacted Soil Area Near the Storage Tank, January 9, 2017



Photograph 4 – Flagged Impacted Soil Area, January 9, 2017



Photograph 5 – Soil Removal Activities – One-Inch Layer, January 9, 2017



Photograph 6 – Soil Excavation in Progress; January 9, 2017



Photograph 7 – Post-Soil Removal Site Conditions, January 9, 2017



Photograph 8 – Impacted Soil Area after Removal Activities; January 9, 2017

ATTACHMENT 2
LABORATORY ANALYTICAL REPORTS



Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

January 12, 2017

Devon Jercinovic

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland BFF 106239

OrderNo.: 1701251

Dear Devon Jercinovic:

Hall Environmental Analysis Laboratory received 1 sample(s) on 1/9/2017 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

A handwritten signature in black ink, appearing to read 'Andy Freeman', is written in a cursive style.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1701251

Date Reported: 1/12/2017

CLIENT: EA Engineering Science & Technology

Client Sample ID: 106239SP-001

Project: Kirtland BFF 106239

Collection Date: 1/8/2017 6:20:00 PM

Lab ID: 1701251-001

Matrix: SOIL

Received Date: 1/9/2017 9:25:00 AM

| Analyses | Result | PQL | Qual | Units | DF | Date Analyzed | Batch |
|--|--------|--------|------|-------|----|-----------------------|---------------------|
| EPA METHOD 7471: MERCURY | | | | | | | Analyst: pmf |
| Mercury | ND | 0.031 | | mg/Kg | 1 | 1/10/2017 5:46:17 PM | 29617 |
| EPA METHOD 6010B: SOIL METALS | | | | | | | Analyst: pmf |
| Arsenic | ND | 2.5 | | mg/Kg | 1 | 1/10/2017 2:50:48 PM | 29595 |
| Barium | 71 | 0.10 | | mg/Kg | 1 | 1/10/2017 2:50:48 PM | 29595 |
| Cadmium | ND | 0.10 | | mg/Kg | 1 | 1/10/2017 2:50:48 PM | 29595 |
| Chromium | 3.2 | 0.30 | | mg/Kg | 1 | 1/10/2017 2:50:48 PM | 29595 |
| Lead | 5.3 | 0.25 | | mg/Kg | 1 | 1/10/2017 2:50:48 PM | 29595 |
| Selenium | ND | 2.5 | | mg/Kg | 1 | 1/10/2017 2:50:48 PM | 29595 |
| Silver | ND | 0.25 | | mg/Kg | 1 | 1/10/2017 2:50:48 PM | 29595 |
| EPA METHOD 8011/504.1 MODIFIED: EDB | | | | | | | Analyst: JME |
| 1,2-Dibromoethane | ND | 0.10 | | µg/Kg | 1 | 1/9/2017 1:13:21 PM | 29590 |
| EPA METHOD 8021B: VOLATILES | | | | | | | Analyst: DJF |
| Methyl tert-butyl ether (MTBE) | ND | 0.096 | | mg/Kg | 1 | 1/10/2017 12:53:23 PM | 29591 |
| Benzene | ND | 0.024 | | mg/Kg | 1 | 1/10/2017 12:53:23 PM | 29591 |
| Toluene | ND | 0.048 | | mg/Kg | 1 | 1/10/2017 12:53:23 PM | 29591 |
| Ethylbenzene | ND | 0.048 | | mg/Kg | 1 | 1/10/2017 12:53:23 PM | 29591 |
| Xylenes, Total | ND | 0.096 | | mg/Kg | 1 | 1/10/2017 12:53:23 PM | 29591 |
| Surr: 4-Bromofluorobenzene | 93.7 | 80-120 | | %Rec | 1 | 1/10/2017 12:53:23 PM | 29591 |

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

| Qualifiers: | | | |
|-------------|---|----|---|
| * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
| D | Sample Diluted Due to Matrix | E | Value above quantitation range |
| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| R | RPD outside accepted recovery limits | RL | Reporting Detection Limit |
| S | % Recovery outside of range due to dilution or matrix | W | Sample container temperature is out of limit as specified |

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1701251

12-Jan-17

Client: EA Engineering Science & Technology

Project: Kirtland BFF 106239

| | | | | | | | | | | |
|-------------------|-----------------|----------------|-----------------|-------------|--|----------|--------------|------|----------|------|
| Sample ID | MB-29590 | SampType: | MBLK | TestCode: | EPA Method 8011/504.1 Modified: EDB | | | | | |
| Client ID: | PBS | Batch ID: | 29590 | RunNo: | 39904 | | | | | |
| Prep Date: | 1/9/2017 | Analysis Date: | 1/9/2017 | SeqNo: | 1250677 | Units: | µg/Kg | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| 1,2-Dibromoethane | ND | 0.10 | | | | | | | | |

| | | | | | | | | | | |
|-------------------|------------------|----------------|-----------------|-------------|--|----------|--------------|------|----------|------|
| Sample ID | LCS-29590 | SampType: | LCS | TestCode: | EPA Method 8011/504.1 Modified: EDB | | | | | |
| Client ID: | LCSS | Batch ID: | 29590 | RunNo: | 39904 | | | | | |
| Prep Date: | 1/9/2017 | Analysis Date: | 1/9/2017 | SeqNo: | 1250678 | Units: | µg/Kg | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| 1,2-Dibromoethane | 1.2 | 0.10 | 1.000 | 0 | 119 | 70 | 130 | | | |

| | | | | | | | | | | |
|-------------------|-----------------------|----------------|-----------------|-------------|--|----------|--------------|------|----------|------|
| Sample ID | 1701251-001AMS | SampType: | MS | TestCode: | EPA Method 8011/504.1 Modified: EDB | | | | | |
| Client ID: | 106239SP-001 | Batch ID: | 29590 | RunNo: | 39904 | | | | | |
| Prep Date: | 1/9/2017 | Analysis Date: | 1/9/2017 | SeqNo: | 1250683 | Units: | µg/Kg | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| 1,2-Dibromoethane | 0.74 | 0.10 | 1.042 | 0 | 71.1 | 46.2 | 169 | | | |

| | | | | | | | | | | |
|-------------------|------------------------|----------------|-----------------|-------------|--|----------|--------------|------|----------|------|
| Sample ID | 1701251-001AMSD | SampType: | MSD | TestCode: | EPA Method 8011/504.1 Modified: EDB | | | | | |
| Client ID: | 106239SP-001 | Batch ID: | 29590 | RunNo: | 39904 | | | | | |
| Prep Date: | 1/9/2017 | Analysis Date: | 1/9/2017 | SeqNo: | 1250684 | Units: | µg/Kg | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| 1,2-Dibromoethane | 0.87 | 0.098 | 0.9831 | 0 | 88.3 | 46.2 | 169 | 15.9 | 20 | |

Qualifiers:

- | | |
|---|---|
| * Value exceeds Maximum Contaminant Level. | B Analyte detected in the associated Method Blank |
| D Sample Diluted Due to Matrix | E Value above quantitation range |
| H Holding times for preparation or analysis exceeded | J Analyte detected below quantitation limits |
| ND Not Detected at the Reporting Limit | P Sample pH Not In Range |
| R RPD outside accepted recovery limits | RL Reporting Detection Limit |
| S % Recovery outside of range due to dilution or matrix | W Sample container temperature is out of limit as specified |

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1701251

12-Jan-17

Client: EA Engineering Science & Technology

Project: Kirtland BFF 106239

| Sample ID MB-29591 | SampType: MBLK | | TestCode: EPA Method 8021B: Volatiles | | | | | | | |
|--------------------------------|---------------------------------|-------|--|-------------|---------------------|----------|-----------|------|----------|------|
| Client ID: PBS | Batch ID: 29591 | | RunNo: 39932 | | | | | | | |
| Prep Date: 1/9/2017 | Analysis Date: 1/10/2017 | | SeqNo: 1251686 | | Units: mg/Kg | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Methyl tert-butyl ether (MTBE) | ND | 0.10 | | | | | | | | |
| Benzene | ND | 0.025 | | | | | | | | |
| Toluene | ND | 0.050 | | | | | | | | |
| Ethylbenzene | ND | 0.050 | | | | | | | | |
| Xylenes, Total | ND | 0.10 | | | | | | | | |
| Surr: 4-Bromofluorobenzene | 0.95 | | 1.000 | | 95.0 | 80 | 120 | | | |

| Sample ID LCS-29591 | SampType: LCS | | TestCode: EPA Method 8021B: Volatiles | | | | | | | |
|--------------------------------|---------------------------------|-------|--|-------------|---------------------|----------|-----------|------|----------|------|
| Client ID: LCSS | Batch ID: 29591 | | RunNo: 39932 | | | | | | | |
| Prep Date: 1/9/2017 | Analysis Date: 1/10/2017 | | SeqNo: 1251687 | | Units: mg/Kg | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Methyl tert-butyl ether (MTBE) | 0.98 | 0.10 | 1.000 | 0 | 97.7 | 65.7 | 116 | | | |
| Benzene | 1.1 | 0.025 | 1.000 | 0 | 110 | 75.2 | 115 | | | |
| Toluene | 0.98 | 0.050 | 1.000 | 0 | 98.4 | 80.7 | 112 | | | |
| Ethylbenzene | 0.94 | 0.050 | 1.000 | 0 | 94.3 | 78.9 | 117 | | | |
| Xylenes, Total | 2.8 | 0.10 | 3.000 | 0 | 93.7 | 79.2 | 115 | | | |
| Surr: 4-Bromofluorobenzene | 0.96 | | 1.000 | | 95.8 | 80 | 120 | | | |

| Sample ID 1701251-001AMS | SampType: MS | | TestCode: EPA Method 8021B: Volatiles | | | | | | | |
|---------------------------------|---------------------------------|-------|--|-------------|---------------------|----------|-----------|------|----------|------|
| Client ID: 106239SP-001 | Batch ID: 29591 | | RunNo: 39932 | | | | | | | |
| Prep Date: 1/9/2017 | Analysis Date: 1/10/2017 | | SeqNo: 1251688 | | Units: mg/Kg | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Methyl tert-butyl ether (MTBE) | 0.92 | 0.098 | 0.9823 | 0 | 93.8 | 42.5 | 143 | | | |
| Benzene | 1.0 | 0.025 | 0.9823 | 0 | 106 | 61.5 | 138 | | | |
| Toluene | 1.0 | 0.049 | 0.9823 | 0 | 105 | 71.4 | 127 | | | |
| Ethylbenzene | 1.0 | 0.049 | 0.9823 | 0 | 103 | 70.9 | 132 | | | |
| Xylenes, Total | 3.0 | 0.098 | 2.947 | 0 | 103 | 76.2 | 123 | | | |
| Surr: 4-Bromofluorobenzene | 1.0 | | 0.9823 | | 104 | 80 | 120 | | | |

| Sample ID 1701251-001AMSD | SampType: MSD | | TestCode: EPA Method 8021B: Volatiles | | | | | | | |
|----------------------------------|---------------------------------|-------|--|-------------|---------------------|----------|-----------|------|----------|------|
| Client ID: 106239SP-001 | Batch ID: 29591 | | RunNo: 39932 | | | | | | | |
| Prep Date: 1/9/2017 | Analysis Date: 1/10/2017 | | SeqNo: 1251689 | | Units: mg/Kg | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Methyl tert-butyl ether (MTBE) | 0.65 | 0.096 | 0.9634 | 0 | 67.8 | 42.5 | 143 | 34.1 | 20 | R |
| Benzene | 0.89 | 0.024 | 0.9634 | 0 | 92.4 | 61.5 | 138 | 15.4 | 20 | |
| Toluene | 0.96 | 0.048 | 0.9634 | 0 | 99.8 | 71.4 | 127 | 6.61 | 20 | |
| Ethylbenzene | 0.99 | 0.048 | 0.9634 | 0 | 102 | 70.9 | 132 | 2.92 | 20 | |

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1701251

12-Jan-17

Client: EA Engineering Science & Technology

Project: Kirtland BFF 106239

| Sample ID | 1701251-001AMSD | SampType: | MSD | TestCode: | EPA Method 8021B: Volatiles | | | | | |
|----------------------------|-----------------|----------------|-----------|-------------|-----------------------------|----------|-----------|------|----------|------|
| Client ID: | 106239SP-001 | Batch ID: | 29591 | RunNo: | 39932 | | | | | |
| Prep Date: | 1/9/2017 | Analysis Date: | 1/10/2017 | SeqNo: | 1251689 | Units: | mg/Kg | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Xylenes, Total | 2.9 | 0.096 | 2.890 | 0 | 99.4 | 76.2 | 123 | 5.71 | 20 | |
| Surr: 4-Bromofluorobenzene | 0.99 | | 0.9634 | | 102 | 80 | 120 | 0 | 0 | |

Qualifiers:

- | | |
|---|---|
| * Value exceeds Maximum Contaminant Level. | B Analyte detected in the associated Method Blank |
| D Sample Diluted Due to Matrix | E Value above quantitation range |
| H Holding times for preparation or analysis exceeded | J Analyte detected below quantitation limits |
| ND Not Detected at the Reporting Limit | P Sample pH Not In Range |
| R RPD outside accepted recovery limits | RL Reporting Detection Limit |
| S % Recovery outside of range due to dilution or matrix | W Sample container temperature is out of limit as specified |

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1701251

12-Jan-17

Client: EA Engineering Science & Technology

Project: Kirtland BFF 106239

| | | | | | | | | | | |
|------------|------------------|----------------|------------------|-------------|---------------------------------|----------|--------------|------|----------|------|
| Sample ID | MB-29617 | SampType: | MBLK | TestCode: | EPA Method 7471: Mercury | | | | | |
| Client ID: | PBS | Batch ID: | 29617 | RunNo: | 39944 | | | | | |
| Prep Date: | 1/10/2017 | Analysis Date: | 1/10/2017 | SeqNo: | 1251601 | Units: | mg/Kg | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Mercury | ND | 0.033 | | | | | | | | |

| | | | | | | | | | | |
|------------|------------------|----------------|------------------|-------------|---------------------------------|----------|--------------|------|----------|------|
| Sample ID | LCS-29617 | SampType: | LCS | TestCode: | EPA Method 7471: Mercury | | | | | |
| Client ID: | LCSS | Batch ID: | 29617 | RunNo: | 39944 | | | | | |
| Prep Date: | 1/10/2017 | Analysis Date: | 1/10/2017 | SeqNo: | 1251602 | Units: | mg/Kg | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Mercury | 0.17 | 0.033 | 0.1667 | 0 | 100 | 80 | 120 | | | |

Qualifiers:

- | | |
|---|---|
| * Value exceeds Maximum Contaminant Level. | B Analyte detected in the associated Method Blank |
| D Sample Diluted Due to Matrix | E Value above quantitation range |
| H Holding times for preparation or analysis exceeded | J Analyte detected below quantitation limits |
| ND Not Detected at the Reporting Limit | P Sample pH Not In Range |
| R RPD outside accepted recovery limits | RL Reporting Detection Limit |
| S % Recovery outside of range due to dilution or matrix | W Sample container temperature is out of limit as specified |

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1701251

12-Jan-17

Client: EA Engineering Science & Technology

Project: Kirtland BFF 106239

| Sample ID | LCS-29595 | | SampType: | LCS | | TestCode: | EPA Method 6010B: Soil Metals | | | | |
|------------|------------------|------|----------------|------------------|------|-----------|--------------------------------------|------|---------------------|------|--|
| Client ID: | LCSS | | Batch ID: | 29595 | | RunNo: | 39935 | | | | |
| Prep Date: | 1/9/2017 | | Analysis Date: | 1/10/2017 | | SeqNo: | 1251459 | | Units: mg/Kg | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual | |
| Arsenic | 24 | 2.5 | 25.00 | 0 | 95.9 | 80 | 120 | | | | |
| Barium | 25 | 0.10 | 25.00 | 0 | 98.9 | 80 | 120 | | | | |
| Cadmium | 25 | 0.10 | 25.00 | 0 | 98.3 | 80 | 120 | | | | |
| Chromium | 25 | 0.30 | 25.00 | 0 | 98.2 | 80 | 120 | | | | |
| Lead | 24 | 0.25 | 25.00 | 0 | 95.5 | 80 | 120 | | | | |
| Selenium | 24 | 2.5 | 25.00 | 0 | 96.1 | 80 | 120 | | | | |
| Silver | 5.1 | 0.25 | 5.000 | 0 | 102 | 80 | 120 | | | | |

| Sample ID | 1701251-001AMS | | SampType: | MS | | TestCode: | EPA Method 6010B: Soil Metals | | | | |
|------------|-----------------------|------|----------------|------------------|------|-----------|--------------------------------------|------|---------------------|------|--|
| Client ID: | 106239SP-001 | | Batch ID: | 29595 | | RunNo: | 39935 | | | | |
| Prep Date: | 1/9/2017 | | Analysis Date: | 1/10/2017 | | SeqNo: | 1251461 | | Units: mg/Kg | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual | |
| Arsenic | 21 | 2.5 | 25.12 | 1.235 | 77.8 | 75 | 125 | | | | |
| Barium | 85 | 0.10 | 25.12 | 70.73 | 57.2 | 75 | 125 | | | S | |
| Cadmium | 21 | 0.10 | 25.12 | 0 | 82.6 | 75 | 125 | | | | |
| Chromium | 24 | 0.30 | 25.12 | 3.220 | 82.8 | 75 | 125 | | | | |
| Lead | 25 | 0.25 | 25.12 | 5.290 | 78.4 | 75 | 125 | | | | |
| Selenium | 20 | 2.5 | 25.12 | 0 | 79.2 | 75 | 125 | | | | |
| Silver | 4.3 | 0.25 | 5.024 | 0 | 84.8 | 75 | 125 | | | | |

| Sample ID | 1701251-001AMSD | | SampType: | MSD | | TestCode: | EPA Method 6010B: Soil Metals | | | | |
|------------|------------------------|------|----------------|------------------|-------|-----------|--------------------------------------|------|---------------------|------|--|
| Client ID: | 106239SP-001 | | Batch ID: | 29595 | | RunNo: | 39935 | | | | |
| Prep Date: | 1/9/2017 | | Analysis Date: | 1/10/2017 | | SeqNo: | 1251462 | | Units: mg/Kg | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual | |
| Arsenic | 20 | 2.6 | 25.51 | 1.235 | 74.8 | 75 | 125 | 2.15 | 20 | S | |
| Barium | 70 | 0.10 | 25.51 | 70.73 | -1.43 | 75 | 125 | 19.0 | 20 | S | |
| Cadmium | 20 | 0.10 | 25.51 | 0 | 79.8 | 75 | 125 | 2.01 | 20 | | |
| Chromium | 22 | 0.31 | 25.51 | 3.220 | 75.2 | 75 | 125 | 6.93 | 20 | | |
| Lead | 24 | 0.26 | 25.51 | 5.290 | 72.1 | 75 | 125 | 5.33 | 20 | S | |
| Selenium | 19 | 2.6 | 25.51 | 0 | 72.6 | 75 | 125 | 7.04 | 20 | S | |
| Silver | 4.2 | 0.26 | 5.102 | 0 | 82.4 | 75 | 125 | 1.32 | 20 | | |

| Sample ID | 1701251-001APS | | SampType: | PS | | TestCode: | EPA Method 6010B: Soil Metals | | | | |
|------------|-----------------------|-----|----------------|------------------|------|-----------|--------------------------------------|------|---------------------|------|--|
| Client ID: | 106239SP-001 | | Batch ID: | 29595 | | RunNo: | 39935 | | | | |
| Prep Date: | | | Analysis Date: | 1/10/2017 | | SeqNo: | 1251463 | | Units: mg/Kg | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual | |
| Arsenic | 20 | 2.5 | 25.39 | 1.235 | 75.4 | 80 | 120 | | | S | |

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1701251

12-Jan-17

Client: EA Engineering Science & Technology

Project: Kirtland BFF 106239

| Sample ID | 1701251-001APS | SampType: | PS | TestCode: | EPA Method 6010B: Soil Metals | | | | | |
|------------|-----------------------|----------------|------------------|-------------|--------------------------------------|----------|--------------|------|----------|------|
| Client ID: | 106239SP-001 | Batch ID: | 29595 | RunNo: | 39935 | | | | | |
| Prep Date: | | Analysis Date: | 1/10/2017 | SeqNo: | 1251463 | Units: | mg/Kg | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Barium | 87 | 0.10 | 25.39 | 70.73 | 64.3 | 80 | 120 | | | S |
| Lead | 23 | 0.25 | 25.39 | 5.290 | 68.8 | 80 | 120 | | | S |
| Selenium | 18 | 2.5 | 25.39 | 0 | 69.4 | 80 | 120 | | | S |

| Sample ID | MB-29595 | SampType: | MBLK | TestCode: | EPA Method 6010B: Soil Metals | | | | | |
|------------|-----------------|----------------|------------------|-------------|--------------------------------------|----------|--------------|------|----------|------|
| Client ID: | PBS | Batch ID: | 29595 | RunNo: | 39935 | | | | | |
| Prep Date: | 1/9/2017 | Analysis Date: | 1/10/2017 | SeqNo: | 1251479 | Units: | mg/Kg | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Arsenic | ND | 2.5 | | | | | | | | |
| Barium | ND | 0.10 | | | | | | | | |
| Cadmium | ND | 0.10 | | | | | | | | |
| Chromium | ND | 0.30 | | | | | | | | |
| Lead | ND | 0.25 | | | | | | | | |
| Selenium | ND | 2.5 | | | | | | | | |
| Silver | ND | 0.25 | | | | | | | | |

Qualifiers:

- | | |
|---|---|
| * Value exceeds Maximum Contaminant Level. | B Analyte detected in the associated Method Blank |
| D Sample Diluted Due to Matrix | E Value above quantitation range |
| H Holding times for preparation or analysis exceeded | J Analyte detected below quantitation limits |
| ND Not Detected at the Reporting Limit | P Sample pH Not In Range |
| R RPD outside accepted recovery limits | RL Reporting Detection Limit |
| S % Recovery outside of range due to dilution or matrix | W Sample container temperature is out of limit as specified |



Hall Environmental Analysis Laboratory
 4901 Hawkins NE
 Albuquerque, NM 87109
 TEL: 505-345-3975 FAX: 505-345-4107
 Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb

Work Order Number: 1701251

RcptNo: 1

Received by/date: ajs 1/9/17

Logged By: Andy Jansson 1/9/2017 9:25:00 AM only 1/17

Completed By: Andy Jansson 1/9/17

Reviewed By: LA 01/09/17

Chain of Custody

- 1. Custody seals intact on sample bottles? Yes No Not Present
- 2. Is Chain of Custody complete? Yes No Not Present
- 3. How was the sample delivered? Client

Log In

- 4. Was an attempt made to cool the samples? Yes No NA
- 5. Were all samples received at a temperature of >0° C to 6.0°C Yes No NA
- 6. Sample(s) in proper container(s)? Yes No
- 7. Sufficient sample volume for indicated test(s)? Yes No
- 8. Are samples (except VOA and ONG) properly preserved? Yes No
- 9. Was preservative added to bottles? Yes No NA
- 10. VOA vials have zero headspace? Yes No No VOA Vials
- 11. Were any sample containers received broken? Yes No
- 12. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes No
- 13. Are matrices correctly identified on Chain of Custody? Yes No
- 14. Is it clear what analyses were requested? Yes No
- 15. Were all holding times able to be met? (If no, notify customer for authorization.) Yes No

of preserved bottles checked for pH: _____
 (<2 or >12 unless noted)
 Adjusted? _____
 Checked by: _____

Special Handling (if applicable)

- 16. Was client notified of all discrepancies with this order? Yes No NA

Person Notified: _____ Date: _____
 By Whom: _____ Via: eMail Phone Fax In Person
 Regarding: _____
 Client Instructions: _____

17. Additional remarks:

18. Cooler Information

| Cooler No | Temp °C | Condition | Seal Intact | Seal No | Seal Date | Signed By |
|-----------|---------|-----------|-------------|---------|-----------|-----------|
| 1 | 1.0 | Good | Not Present | | | |

Chain-of-Custody Record

Client: EA Engineering
320 Gold SW #1300
 Mailing Address: ABQ, NM 87102

Phone #: 505-715-4275
 email or Fax#: emorse@EAEST.COM
 Standard Level 4 (Full Validation)

Accreditation:
 NELAP Other
 EDD (Type)

Turn-Around Time:

Standard Rush 24-hr
 Project Name:
Kirtland Bff 106239

Project #:
62599DM01.1028

Project Manager:
Devon Seamonov

Sampler: Earl Morse
 On Ice: Yes No
 Sample Temperature: 1.00C

Container Type and #
EA 320 ml Jar
 Preservative Type
SEA
 HEAL No.
1701251
-001



www.hallenvironmental.com
 4901 Hawkins NE - Albuquerque, NM 87109
 Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

| | | |
|-------------------------------------|--|--|
| <input checked="" type="checkbox"/> | BTEX + MTBE + TMB's (8021) | |
| <input checked="" type="checkbox"/> | BTEX + MTBE + TPH (Gas only) | |
| <input type="checkbox"/> | TPH Method 8015B (Gas/Diesel) | |
| <input type="checkbox"/> | TPH (Method 418.1) | |
| <input checked="" type="checkbox"/> | EDB (Method 504.1) | |
| <input type="checkbox"/> | 8310 (PNA or PAH) | |
| <input checked="" type="checkbox"/> | RCRA 8 Metals | |
| <input type="checkbox"/> | Anions (F, Cl, NO ₃ , NO ₂ , PO ₄ , SO ₄) | |
| <input type="checkbox"/> | 8081 Pesticides / 8082 PCB's | |
| <input type="checkbox"/> | 8260B (VOA) | |
| <input type="checkbox"/> | 8270 (Semi-VOA) | |
| <input type="checkbox"/> | Air Bubbles (Y or N) | |

Remarks:

| | | | | | |
|--------|-------|--------------------|--------|-------|--------------------|
| Date: | Time: | Relinquished by: | Date: | Time: | Received by: |
| 1-9-17 | 0755 | <u>Earl Morse</u> | 1-9-17 | 0755 | <u>[Signature]</u> |
| Date: | Time: | Relinquished by: | Date: | Time: | Received by: |
| 1-9-17 | 0925 | <u>[Signature]</u> | 1-9-17 | 0925 | <u>[Signature]</u> |

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.



Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

January 12, 2017

Devon Jercinovic

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland BFF

OrderNo.: 1701252

Dear Devon Jercinovic:

Hall Environmental Analysis Laboratory received 1 sample(s) on 1/9/2017 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

A handwritten signature in black ink, appearing to read 'Andy Freeman', is written in a cursive style.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1701252

Date Reported: 1/12/2017

CLIENT: EA Engineering Science & Technology

Client Sample ID: 106239SP-002

Project: Kirtland BFF

Collection Date: 1/9/2017 7:50:00 AM

Lab ID: 1701252-001

Matrix: SOIL

Received Date: 1/9/2017 9:25:00 AM

| Analyses | Result | PQL | Qual | Units | DF | Date Analyzed | Batch |
|--|--------|--------|------|-------|----|----------------------|---------------------|
| EPA METHOD 7471: MERCURY | | | | | | | Analyst: pmf |
| Mercury | ND | 0.033 | | mg/Kg | 1 | 1/10/2017 5:48:03 PM | 29617 |
| EPA METHOD 6010B: SOIL METALS | | | | | | | Analyst: pmf |
| Arsenic | ND | 2.5 | | mg/Kg | 1 | 1/10/2017 3:11:02 PM | 29595 |
| Barium | 95 | 0.098 | | mg/Kg | 1 | 1/10/2017 3:11:02 PM | 29595 |
| Cadmium | ND | 0.098 | | mg/Kg | 1 | 1/10/2017 3:11:02 PM | 29595 |
| Chromium | 5.1 | 0.29 | | mg/Kg | 1 | 1/10/2017 3:11:02 PM | 29595 |
| Lead | 9.8 | 0.25 | | mg/Kg | 1 | 1/10/2017 3:11:02 PM | 29595 |
| Selenium | ND | 2.5 | | mg/Kg | 1 | 1/10/2017 3:11:02 PM | 29595 |
| Silver | ND | 0.25 | | mg/Kg | 1 | 1/10/2017 3:11:02 PM | 29595 |
| EPA METHOD 8011/504.1 MODIFIED: EDB | | | | | | | Analyst: JME |
| 1,2-Dibromoethane | ND | 0.096 | | µg/Kg | 1 | 1/9/2017 1:28:24 PM | 29590 |
| EPA METHOD 8021B: VOLATILES | | | | | | | Analyst: DJF |
| Methyl tert-butyl ether (MTBE) | ND | 0.096 | | mg/Kg | 1 | 1/10/2017 1:17:06 PM | 29591 |
| Benzene | ND | 0.024 | | mg/Kg | 1 | 1/10/2017 1:17:06 PM | 29591 |
| Toluene | ND | 0.048 | | mg/Kg | 1 | 1/10/2017 1:17:06 PM | 29591 |
| Ethylbenzene | ND | 0.048 | | mg/Kg | 1 | 1/10/2017 1:17:06 PM | 29591 |
| Xylenes, Total | ND | 0.096 | | mg/Kg | 1 | 1/10/2017 1:17:06 PM | 29591 |
| Surr: 4-Bromofluorobenzene | 93.2 | 80-120 | | %Rec | 1 | 1/10/2017 1:17:06 PM | 29591 |

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

| | | | | |
|--------------------|----|---|----|---|
| Qualifiers: | * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
| | D | Sample Diluted Due to Matrix | E | Value above quantitation range |
| | H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| | ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| | R | RPD outside accepted recovery limits | RL | Reporting Detection Limit |
| | S | % Recovery outside of range due to dilution or matrix | W | Sample container temperature is out of limit as specified |

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1701252

12-Jan-17

Client: EA Engineering Science & Technology

Project: Kirtland BFF

| | | | | | | | | | | |
|-------------------|-----------------|----------------|-----------------|-------------|--|----------|--------------|------|----------|------|
| Sample ID | MB-29590 | SampType: | MBLK | TestCode: | EPA Method 8011/504.1 Modified: EDB | | | | | |
| Client ID: | PBS | Batch ID: | 29590 | RunNo: | 39904 | | | | | |
| Prep Date: | 1/9/2017 | Analysis Date: | 1/9/2017 | SeqNo: | 1250677 | Units: | µg/Kg | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| 1,2-Dibromoethane | ND | 0.10 | | | | | | | | |

| | | | | | | | | | | |
|-------------------|------------------|----------------|-----------------|-------------|--|----------|--------------|------|----------|------|
| Sample ID | LCS-29590 | SampType: | LCS | TestCode: | EPA Method 8011/504.1 Modified: EDB | | | | | |
| Client ID: | LCSS | Batch ID: | 29590 | RunNo: | 39904 | | | | | |
| Prep Date: | 1/9/2017 | Analysis Date: | 1/9/2017 | SeqNo: | 1250678 | Units: | µg/Kg | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| 1,2-Dibromoethane | 1.2 | 0.10 | 1.000 | 0 | 119 | 70 | 130 | | | |

Qualifiers:

- | | |
|---|---|
| * Value exceeds Maximum Contaminant Level. | B Analyte detected in the associated Method Blank |
| D Sample Diluted Due to Matrix | E Value above quantitation range |
| H Holding times for preparation or analysis exceeded | J Analyte detected below quantitation limits |
| ND Not Detected at the Reporting Limit | P Sample pH Not In Range |
| R RPD outside accepted recovery limits | RL Reporting Detection Limit |
| S % Recovery outside of range due to dilution or matrix | W Sample container temperature is out of limit as specified |

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1701252

12-Jan-17

Client: EA Engineering Science & Technology

Project: Kirtland BFF

| Sample ID MB-29591 | SampType: MBLK | | TestCode: EPA Method 8021B: Volatiles | | | | | | | |
|--------------------------------|---------------------------------|-------|--|-------------|---------------------|----------|-----------|------|----------|------|
| Client ID: PBS | Batch ID: 29591 | | RunNo: 39932 | | | | | | | |
| Prep Date: 1/9/2017 | Analysis Date: 1/10/2017 | | SeqNo: 1251686 | | Units: mg/Kg | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Methyl tert-butyl ether (MTBE) | ND | 0.10 | | | | | | | | |
| Benzene | ND | 0.025 | | | | | | | | |
| Toluene | ND | 0.050 | | | | | | | | |
| Ethylbenzene | ND | 0.050 | | | | | | | | |
| Xylenes, Total | ND | 0.10 | | | | | | | | |
| Surr: 4-Bromofluorobenzene | 0.95 | | 1.000 | | 95.0 | 80 | 120 | | | |

| Sample ID LCS-29591 | SampType: LCS | | TestCode: EPA Method 8021B: Volatiles | | | | | | | |
|--------------------------------|---------------------------------|-------|--|-------------|---------------------|----------|-----------|------|----------|------|
| Client ID: LCSS | Batch ID: 29591 | | RunNo: 39932 | | | | | | | |
| Prep Date: 1/9/2017 | Analysis Date: 1/10/2017 | | SeqNo: 1251687 | | Units: mg/Kg | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Methyl tert-butyl ether (MTBE) | 0.98 | 0.10 | 1.000 | 0 | 97.7 | 65.7 | 116 | | | |
| Benzene | 1.1 | 0.025 | 1.000 | 0 | 110 | 75.2 | 115 | | | |
| Toluene | 0.98 | 0.050 | 1.000 | 0 | 98.4 | 80.7 | 112 | | | |
| Ethylbenzene | 0.94 | 0.050 | 1.000 | 0 | 94.3 | 78.9 | 117 | | | |
| Xylenes, Total | 2.8 | 0.10 | 3.000 | 0 | 93.7 | 79.2 | 115 | | | |
| Surr: 4-Bromofluorobenzene | 0.96 | | 1.000 | | 95.8 | 80 | 120 | | | |

Qualifiers:

- | | |
|---|---|
| * Value exceeds Maximum Contaminant Level. | B Analyte detected in the associated Method Blank |
| D Sample Diluted Due to Matrix | E Value above quantitation range |
| H Holding times for preparation or analysis exceeded | J Analyte detected below quantitation limits |
| ND Not Detected at the Reporting Limit | P Sample pH Not In Range |
| R RPD outside accepted recovery limits | RL Reporting Detection Limit |
| S % Recovery outside of range due to dilution or matrix | W Sample container temperature is out of limit as specified |

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1701252

12-Jan-17

Client: EA Engineering Science & Technology

Project: Kirtland BFF

| | | | | | | | | | | |
|------------|------------------|----------------|------------------|-------------|---------------------------------|----------|--------------|------|----------|------|
| Sample ID | MB-29617 | SampType: | MBLK | TestCode: | EPA Method 7471: Mercury | | | | | |
| Client ID: | PBS | Batch ID: | 29617 | RunNo: | 39944 | | | | | |
| Prep Date: | 1/10/2017 | Analysis Date: | 1/10/2017 | SeqNo: | 1251601 | Units: | mg/Kg | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Mercury | ND | 0.033 | | | | | | | | |

| | | | | | | | | | | |
|------------|------------------|----------------|------------------|-------------|---------------------------------|----------|--------------|------|----------|------|
| Sample ID | LCS-29617 | SampType: | LCS | TestCode: | EPA Method 7471: Mercury | | | | | |
| Client ID: | LCSS | Batch ID: | 29617 | RunNo: | 39944 | | | | | |
| Prep Date: | 1/10/2017 | Analysis Date: | 1/10/2017 | SeqNo: | 1251602 | Units: | mg/Kg | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Mercury | 0.17 | 0.033 | 0.1667 | 0 | 100 | 80 | 120 | | | |

Qualifiers:

- | | |
|---|---|
| * Value exceeds Maximum Contaminant Level. | B Analyte detected in the associated Method Blank |
| D Sample Diluted Due to Matrix | E Value above quantitation range |
| H Holding times for preparation or analysis exceeded | J Analyte detected below quantitation limits |
| ND Not Detected at the Reporting Limit | P Sample pH Not In Range |
| R RPD outside accepted recovery limits | RL Reporting Detection Limit |
| S % Recovery outside of range due to dilution or matrix | W Sample container temperature is out of limit as specified |

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1701252

12-Jan-17

Client: EA Engineering Science & Technology

Project: Kirtland BFF

| Sample ID | LCS-29595 | SampType: | LCS | TestCode: | EPA Method 6010B: Soil Metals | | | | | |
|------------|------------------|----------------|------------------|-------------|--------------------------------------|----------|--------------|------|----------|------|
| Client ID: | LCSS | Batch ID: | 29595 | RunNo: | 39935 | | | | | |
| Prep Date: | 1/9/2017 | Analysis Date: | 1/10/2017 | SeqNo: | 1251459 | Units: | mg/Kg | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Arsenic | 24 | 2.5 | 25.00 | 0 | 95.9 | 80 | 120 | | | |
| Barium | 25 | 0.10 | 25.00 | 0 | 98.9 | 80 | 120 | | | |
| Cadmium | 25 | 0.10 | 25.00 | 0 | 98.3 | 80 | 120 | | | |
| Chromium | 25 | 0.30 | 25.00 | 0 | 98.2 | 80 | 120 | | | |
| Lead | 24 | 0.25 | 25.00 | 0 | 95.5 | 80 | 120 | | | |
| Selenium | 24 | 2.5 | 25.00 | 0 | 96.1 | 80 | 120 | | | |
| Silver | 5.1 | 0.25 | 5.000 | 0 | 102 | 80 | 120 | | | |

| Sample ID | MB-29595 | SampType: | MBLK | TestCode: | EPA Method 6010B: Soil Metals | | | | | |
|------------|-----------------|----------------|------------------|-------------|--------------------------------------|----------|--------------|------|----------|------|
| Client ID: | PBS | Batch ID: | 29595 | RunNo: | 39935 | | | | | |
| Prep Date: | 1/9/2017 | Analysis Date: | 1/10/2017 | SeqNo: | 1251479 | Units: | mg/Kg | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Arsenic | ND | 2.5 | | | | | | | | |
| Barium | ND | 0.10 | | | | | | | | |
| Cadmium | ND | 0.10 | | | | | | | | |
| Chromium | ND | 0.30 | | | | | | | | |
| Lead | ND | 0.25 | | | | | | | | |
| Selenium | ND | 2.5 | | | | | | | | |
| Silver | ND | 0.25 | | | | | | | | |

Qualifiers:

- | | |
|---|---|
| * Value exceeds Maximum Contaminant Level. | B Analyte detected in the associated Method Blank |
| D Sample Diluted Due to Matrix | E Value above quantitation range |
| H Holding times for preparation or analysis exceeded | J Analyte detected below quantitation limits |
| ND Not Detected at the Reporting Limit | P Sample pH Not In Range |
| R RPD outside accepted recovery limits | RL Reporting Detection Limit |
| S % Recovery outside of range due to dilution or matrix | W Sample container temperature is out of limit as specified |



Hall Environmental Analysis Laboratory
 4901 Hawkins NE
 Albuquerque, NM 87109
 TEL: 505-345-3975 FAX: 505-345-4107
 Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb

Work Order Number: 1701252

RcptNo: 1

Received by/date: ajs 1/9/17

Logged By: **Andy Jansson** 1/9/2017 9:25:00 AM *ajs*

Completed By: Andy Jansson 1/9/17

Reviewed By: JA 01/09/17

Chain of Custody

- 1. Custody seals intact on sample bottles? Yes No Not Present
- 2. Is Chain of Custody complete? Yes No Not Present
- 3. How was the sample delivered? Client

Log In

- 4. Was an attempt made to cool the samples? Yes No NA
- 5. Were all samples received at a temperature of >0° C to 6.0°C Yes No NA
- 6. Sample(s) in proper container(s)? Yes No
- 7. Sufficient sample volume for indicated test(s)? Yes No
- 8. Are samples (except VOA and ONG) properly preserved? Yes No
- 9. Was preservative added to bottles? Yes No NA
- 10. VOA vials have zero headspace? Yes No No VOA Vials
- 11. Were any sample containers received broken? Yes No
- 12. Does paperwork match bottle labels? Yes No
(Note discrepancies on chain of custody)
- 13. Are matrices correctly identified on Chain of Custody? Yes No
- 14. Is it clear what analyses were requested? Yes No
- 15. Were all holding times able to be met? Yes No
(If no, notify customer for authorization.)

of preserved bottles checked for pH: _____
 (<2 or >12 unless noted)
 Adjusted? _____
 Checked by: _____

Special Handling (if applicable)

- 16. Was client notified of all discrepancies with this order? Yes No NA

Person Notified: _____ Date: _____
 By Whom: _____ Via: eMail Phone Fax In Person
 Regarding: _____
 Client Instructions: _____

17. Additional remarks:

18. Cooler Information

| Cooler No | Temp °C | Condition | Seal Intact | Seal No | Seal Date | Signed By |
|-----------|---------|-----------|-------------|---------|-----------|-----------|
| 1 | 1.0 | Good | Not Present | | | |

Chain-of-Custody Record

Client: EA Engineering

Mailing Address: 320 GOLD AVENUE
 Albuquerque, NM 87109

Phone #: 505-345-3975

email or Fax#: 505-345-4107

QA/QC Package: Standard Level 4 (Full Validation)

Accreditation: NELAP Other

EDD (Type) Other

Sampler: Pusher Pump

On Ice: Yes No

Sample Temperature: 1.0°C

Container Type and #

Preservative Type

HEAL No.

1701052

1-9-17 0730

Soil

106234 SF-002

WSP

-001

Received by: [Signature]

Date: 1-9-17

Time: 0925

Received by: [Signature]

Date: 1/17/17

Time: 0925

Remarks: Email analytical to Emerge @ equest.com + jibony @ equest.com



HALL ENVIRONMENTAL ANALYSIS LABORATORY
 www.hallenvironmental.com
 4901 Hawkins NE - Albuquerque, NM 87109
 Tel. 505-345-3975 Fax 505-345-4107

| Analysis Request | |
|--|---|
| BTEX + MTBE + TMB's (8021) | X |
| BTEX + MTBE + TPH (Gas only) | |
| TPH Method 8015B (Gas/Diesel) | |
| TPH (Method 418.1) | |
| EDB (Method 504.1) | X |
| 8310 (PNA or PAH) | |
| RCRA 8 Metals | X |
| Anions (F, Cl, NO ₃ , NO ₂ , PO ₄ , SO ₄) | |
| 8081 Pesticides / 8082 PCB's | |
| 8260B (VOA) | |
| 8270 (Semi-VOA) | |
| Air Bubbles (Y or N) | |

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.



Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

January 12, 2017

Devon Jercinovic

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland BFF 106239

OrderNo.: 1701256

Dear Devon Jercinovic:

Hall Environmental Analysis Laboratory received 1 sample(s) on 1/9/2017 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

A handwritten signature in black ink, appearing to read 'Andy Freeman', is written in a cursive style.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1701256

Date Reported: 1/12/2017

CLIENT: EA Engineering Science & Technology

Client Sample ID: KAFB-106239SP

Project: Kirtland BFF 106239

Collection Date: 1/9/2017 7:35:00 AM

Lab ID: 1701256-001

Matrix: AQUEOUS

Received Date: 1/9/2017 9:25:00 AM

| Analyses | Result | PQL | Qual | Units | DF | Date Analyzed | Batch |
|--|--------|---------|------|-------|----|-----------------------|---------------------|
| EPA METHOD 7470: MERCURY | | | | | | | Analyst: MED |
| Mercury | ND | 0.00020 | | mg/L | 1 | 1/10/2017 12:20:49 PM | 29607 |
| EPA 6010B: TOTAL RECOVERABLE METALS | | | | | | | Analyst: pmf |
| Arsenic | ND | 0.020 | | mg/L | 1 | 1/10/2017 6:25:50 PM | 29596 |
| Barium | 0.12 | 0.020 | | mg/L | 1 | 1/10/2017 6:25:50 PM | 29596 |
| Cadmium | ND | 0.0020 | | mg/L | 1 | 1/10/2017 6:25:50 PM | 29596 |
| Chromium | ND | 0.0060 | | mg/L | 1 | 1/10/2017 6:25:50 PM | 29596 |
| Lead | ND | 0.0050 | | mg/L | 1 | 1/10/2017 6:25:50 PM | 29596 |
| Selenium | ND | 0.050 | | mg/L | 1 | 1/10/2017 6:25:50 PM | 29596 |
| Silver | ND | 0.0050 | | mg/L | 1 | 1/10/2017 6:25:50 PM | 29596 |
| EPA METHOD 8011/504.1: EDB | | | | | | | Analyst: JME |
| 1,2-Dibromoethane | 0.056 | 0.010 | | µg/L | 1 | 1/10/2017 10:40:55 AM | 29609 |
| EPA METHOD 8260: VOLATILES SHORT LIST | | | | | | | Analyst: BCN |
| Benzene | ND | 1.0 | | µg/L | 1 | 1/10/2017 12:13:00 PM | R39923 |
| Toluene | 3.9 | 1.0 | | µg/L | 1 | 1/10/2017 12:13:00 PM | R39923 |
| Ethylbenzene | ND | 1.0 | | µg/L | 1 | 1/10/2017 12:13:00 PM | R39923 |
| Xylenes, Total | ND | 1.5 | | µg/L | 1 | 1/10/2017 12:13:00 PM | R39923 |
| Surr: 1,2-Dichloroethane-d4 | 103 | 70-130 | | %Rec | 1 | 1/10/2017 12:13:00 PM | R39923 |
| Surr: 4-Bromofluorobenzene | 102 | 70-130 | | %Rec | 1 | 1/10/2017 12:13:00 PM | R39923 |
| Surr: Dibromofluoromethane | 102 | 70-130 | | %Rec | 1 | 1/10/2017 12:13:00 PM | R39923 |
| Surr: Toluene-d8 | 98.4 | 70-130 | | %Rec | 1 | 1/10/2017 12:13:00 PM | R39923 |

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

| | | | |
|--------------------|---|---|-------------|
| Qualifiers: | * Value exceeds Maximum Contaminant Level. | B Analyte detected in the associated Method Blank | Page 1 of 5 |
| | D Sample Diluted Due to Matrix | E Value above quantitation range | |
| | H Holding times for preparation or analysis exceeded | J Analyte detected below quantitation limits | |
| | ND Not Detected at the Reporting Limit | P Sample pH Not In Range | |
| | R RPD outside accepted recovery limits | RL Reporting Detection Limit | |
| | S % Recovery outside of range due to dilution or matrix | W Sample container temperature is out of limit as specified | |

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1701256

12-Jan-17

Client: EA Engineering Science & Technology

Project: Kirtland BFF 106239

| Sample ID MB-29609 | SampType: MBLK | TestCode: EPA Method 8011/504.1: EDB | | | | | | | | |
|-----------------------------|---------------------------------|---|--------------------|-------------|------|----------|-----------|------|----------|------|
| Client ID: PBW | Batch ID: 29609 | RunNo: 39918 | | | | | | | | |
| Prep Date: 1/10/2017 | Analysis Date: 1/10/2017 | SeqNo: 1251243 | Units: µg/L | | | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| 1,2-Dibromoethane | ND | 0.010 | | | | | | | | |

| Sample ID LCS-29609 | SampType: LCS | TestCode: EPA Method 8011/504.1: EDB | | | | | | | | |
|-----------------------------|---------------------------------|---|--------------------|-------------|------|----------|-----------|------|----------|------|
| Client ID: LCSW | Batch ID: 29609 | RunNo: 39918 | | | | | | | | |
| Prep Date: 1/10/2017 | Analysis Date: 1/10/2017 | SeqNo: 1251245 | Units: µg/L | | | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| 1,2-Dibromoethane | 0.094 | 0.010 | 0.1000 | 0 | 93.8 | 70 | 130 | | | |

Qualifiers:

- | | |
|---|---|
| * Value exceeds Maximum Contaminant Level. | B Analyte detected in the associated Method Blank |
| D Sample Diluted Due to Matrix | E Value above quantitation range |
| H Holding times for preparation or analysis exceeded | J Analyte detected below quantitation limits |
| ND Not Detected at the Reporting Limit | P Sample pH Not In Range |
| R RPD outside accepted recovery limits | RL Reporting Detection Limit |
| S % Recovery outside of range due to dilution or matrix | W Sample container temperature is out of limit as specified |

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1701256

12-Jan-17

Client: EA Engineering Science & Technology

Project: Kirtland BFF 106239

| Sample ID 100ng lcs | SampType: LCS | | TestCode: EPA Method 8260: Volatiles Short List | | | | | | | |
|-----------------------------|---------------------------------|-----|--|-------------|--------------------|----------|-----------|------|----------|------|
| Client ID: LCSW | Batch ID: R39923 | | RunNo: 39923 | | | | | | | |
| Prep Date: | Analysis Date: 1/10/2017 | | SeqNo: 1251276 | | Units: µg/L | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Benzene | 20 | 1.0 | 20.00 | 0 | 97.9 | 70 | 130 | | | |
| Toluene | 19 | 1.0 | 20.00 | 0 | 96.8 | 70 | 130 | | | |
| Surr: 1,2-Dichloroethane-d4 | 10 | | 10.00 | | 103 | 70 | 130 | | | |
| Surr: 4-Bromofluorobenzene | 9.9 | | 10.00 | | 99.3 | 70 | 130 | | | |
| Surr: Dibromofluoromethane | 10 | | 10.00 | | 101 | 70 | 130 | | | |
| Surr: Toluene-d8 | 9.8 | | 10.00 | | 98.5 | 70 | 130 | | | |

| Sample ID vsb deli | SampType: MBLK | | TestCode: EPA Method 8260: Volatiles Short List | | | | | | | |
|-----------------------------|---------------------------------|-----|--|-------------|--------------------|----------|-----------|------|----------|------|
| Client ID: PBW | Batch ID: R39923 | | RunNo: 39923 | | | | | | | |
| Prep Date: | Analysis Date: 1/10/2017 | | SeqNo: 1251277 | | Units: µg/L | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Benzene | ND | 1.0 | | | | | | | | |
| Toluene | ND | 1.0 | | | | | | | | |
| Ethylbenzene | ND | 1.0 | | | | | | | | |
| Xylenes, Total | ND | 1.5 | | | | | | | | |
| Surr: 1,2-Dichloroethane-d4 | 10 | | 10.00 | | 104 | 70 | 130 | | | |
| Surr: 4-Bromofluorobenzene | 9.8 | | 10.00 | | 98.3 | 70 | 130 | | | |
| Surr: Dibromofluoromethane | 10 | | 10.00 | | 101 | 70 | 130 | | | |
| Surr: Toluene-d8 | 9.9 | | 10.00 | | 98.6 | 70 | 130 | | | |

Qualifiers:

- | | |
|---|---|
| * Value exceeds Maximum Contaminant Level. | B Analyte detected in the associated Method Blank |
| D Sample Diluted Due to Matrix | E Value above quantitation range |
| H Holding times for preparation or analysis exceeded | J Analyte detected below quantitation limits |
| ND Not Detected at the Reporting Limit | P Sample pH Not In Range |
| R RPD outside accepted recovery limits | RL Reporting Detection Limit |
| S % Recovery outside of range due to dilution or matrix | W Sample container temperature is out of limit as specified |

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1701256

12-Jan-17

Client: EA Engineering Science & Technology

Project: Kirtland BFF 106239

| | | | | | | | | | | |
|------------|-----------------|----------------|------------------|-------------|---------------------------------|----------|-------------|------|----------|------|
| Sample ID | MB-29607 | SampType: | MBLK | TestCode: | EPA Method 7470: Mercury | | | | | |
| Client ID: | PBW | Batch ID: | 29607 | RunNo: | 39928 | | | | | |
| Prep Date: | 1/9/2017 | Analysis Date: | 1/10/2017 | SeqNo: | 1251289 | Units: | mg/L | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Mercury | ND | 0.00020 | | | | | | | | |

| | | | | | | | | | | |
|------------|------------------|----------------|------------------|-------------|---------------------------------|----------|-------------|------|----------|------|
| Sample ID | LCS-29607 | SampType: | LCS | TestCode: | EPA Method 7470: Mercury | | | | | |
| Client ID: | LCSW | Batch ID: | 29607 | RunNo: | 39928 | | | | | |
| Prep Date: | 1/9/2017 | Analysis Date: | 1/10/2017 | SeqNo: | 1251290 | Units: | mg/L | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Mercury | 0.0052 | 0.00020 | 0.005000 | 0 | 105 | 80 | 120 | | | |

| | | | | | | | | | | |
|------------|-----------------------|----------------|------------------|-------------|---------------------------------|----------|-------------|------|----------|------|
| Sample ID | 1701256-001CMS | SampType: | MS | TestCode: | EPA Method 7470: Mercury | | | | | |
| Client ID: | KAFB-106239SP | Batch ID: | 29607 | RunNo: | 39928 | | | | | |
| Prep Date: | 1/9/2017 | Analysis Date: | 1/10/2017 | SeqNo: | 1251294 | Units: | mg/L | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Mercury | 0.0052 | 0.00020 | 0.005000 | .00006117 | 102 | 75 | 125 | | | |

| | | | | | | | | | | |
|------------|------------------------|----------------|------------------|-------------|---------------------------------|----------|-------------|------|----------|------|
| Sample ID | 1701256-001CMSD | SampType: | MSD | TestCode: | EPA Method 7470: Mercury | | | | | |
| Client ID: | KAFB-106239SP | Batch ID: | 29607 | RunNo: | 39928 | | | | | |
| Prep Date: | 1/9/2017 | Analysis Date: | 1/10/2017 | SeqNo: | 1251295 | Units: | mg/L | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Mercury | 0.0052 | 0.00020 | 0.005000 | .00006117 | 104 | 75 | 125 | 1.73 | 20 | |

Qualifiers:

- | | |
|---|---|
| * Value exceeds Maximum Contaminant Level. | B Analyte detected in the associated Method Blank |
| D Sample Diluted Due to Matrix | E Value above quantitation range |
| H Holding times for preparation or analysis exceeded | J Analyte detected below quantitation limits |
| ND Not Detected at the Reporting Limit | P Sample pH Not In Range |
| R RPD outside accepted recovery limits | RL Reporting Detection Limit |
| S % Recovery outside of range due to dilution or matrix | W Sample container temperature is out of limit as specified |

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1701256

12-Jan-17

Client: EA Engineering Science & Technology

Project: Kirtland BFF 106239

| | | | | | | | | | | |
|------------|------------------|----------------|------------------|-----------|--|--------|-------------|--|--|--|
| Sample ID | MB-29596 | SampType: | MBLK | TestCode: | EPA 6010B: Total Recoverable Metals | | | | | |
| Client ID: | PBW | Batch ID: | 29596 | RunNo: | 39943 | | | | | |
| Prep Date: | 1/10/2017 | Analysis Date: | 1/10/2017 | SeqNo: | 1251576 | Units: | mg/L | | | |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|----------|--------|--------|-----------|-------------|------|----------|-----------|------|----------|------|
| Arsenic | ND | 0.020 | | | | | | | | |
| Barium | ND | 0.020 | | | | | | | | |
| Cadmium | ND | 0.0020 | | | | | | | | |
| Chromium | ND | 0.0060 | | | | | | | | |
| Lead | ND | 0.0050 | | | | | | | | |
| Selenium | ND | 0.050 | | | | | | | | |
| Silver | ND | 0.0050 | | | | | | | | |

| | | | | | | | | | | |
|------------|------------------|----------------|------------------|-----------|--|--------|-------------|--|--|--|
| Sample ID | LCS-29596 | SampType: | LCS | TestCode: | EPA 6010B: Total Recoverable Metals | | | | | |
| Client ID: | LCSW | Batch ID: | 29596 | RunNo: | 39943 | | | | | |
| Prep Date: | 1/10/2017 | Analysis Date: | 1/10/2017 | SeqNo: | 1251577 | Units: | mg/L | | | |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|----------|--------|--------|-----------|-------------|------|----------|-----------|------|----------|------|
| Arsenic | 0.45 | 0.020 | 0.5000 | 0 | 90.5 | 80 | 120 | | | |
| Barium | 0.46 | 0.020 | 0.5000 | 0 | 91.0 | 80 | 120 | | | |
| Cadmium | 0.45 | 0.0020 | 0.5000 | 0 | 90.0 | 80 | 120 | | | |
| Chromium | 0.45 | 0.0060 | 0.5000 | 0 | 90.7 | 80 | 120 | | | |
| Lead | 0.44 | 0.0050 | 0.5000 | 0 | 87.6 | 80 | 120 | | | |
| Selenium | 0.44 | 0.050 | 0.5000 | 0 | 87.9 | 80 | 120 | | | |
| Silver | 0.092 | 0.0050 | 0.1000 | 0 | 91.7 | 80 | 120 | | | |

Qualifiers:

- | | |
|---|---|
| * Value exceeds Maximum Contaminant Level. | B Analyte detected in the associated Method Blank |
| D Sample Diluted Due to Matrix | E Value above quantitation range |
| H Holding times for preparation or analysis exceeded | J Analyte detected below quantitation limits |
| ND Not Detected at the Reporting Limit | P Sample pH Not In Range |
| R RPD outside accepted recovery limits | RL Reporting Detection Limit |
| S % Recovery outside of range due to dilution or matrix | W Sample container temperature is out of limit as specified |



Hall Environmental Analysis Laboratory
 4901 Hawkins NE
 Albuquerque, NM 87109
 TEL: 505-345-3975 FAX: 505-345-4107
 Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb

Work Order Number: 1701256

RcptNo: 1

Received by/date: AS 01/09/17

Logged By: Anne Thorne 1/9/2017 9:25:00 AM *Anne Thorne*

Completed By: Anne Thorne 1/9/2017 10:08:08 AM *Anne Thorne*

Reviewed By: RA 01/09/17

Chain of Custody

- 1. Custody seals intact on sample bottles? Yes No Not Present
- 2. Is Chain of Custody complete? Yes No Not Present
- 3. How was the sample delivered? Client

Log In

- 4. Was an attempt made to cool the samples? Yes No NA
- 5. Were all samples received at a temperature of >0° C to 6.0°C Yes No NA
- 6. Sample(s) in proper container(s)? Yes No
- 7. Sufficient sample volume for indicated test(s)? Yes No
- 8. Are samples (except VOA and ONG) properly preserved? Yes No
- 9. Was preservative added to bottles? Yes No NA
- 10. VOA vials have zero headspace? Yes No No VOA Vials
- 11. Were any sample containers received broken? Yes No
- 12. Does paperwork match bottle labels? Yes No
- 13. Are matrices correctly identified on Chain of Custody? Yes No
- 14. Is it clear what analyses were requested? Yes No
- 15. Were all holding times able to be met? Yes No

of preserved bottles checked for pH: 1

(<2 or >12 unless noted)

Adjusted? No

Checked by: Re

Special Handling (if applicable)

- 16. Was client notified of all discrepancies with this order? Yes No NA

Person Notified: _____ Date: _____

By Whom: _____ Via: eMail Phone Fax In Person

Regarding: _____

Client Instructions: _____

17. Additional remarks:

18. Cooler Information

| Cooler No | Temp °C | Condition | Seal Intact | Seal No | Seal Date | Signed By |
|-----------|---------|-----------|-------------|---------|-----------|-----------|
| 1 | 1.0 | Good | Not Present | | | |

Chain-of-Custody Record

Client: EA Engineering

Mailing Address: 320 GOLD SW 1300

ABQ NM 87102

Phone #: _____

email or Fax#: _____

QA/QC Package: Standard Level 4 (Full Validation)

Accreditation: NELAP Other _____

EDD (Type) _____

Turn-Around Time: 24 hr Standard Rush

Project Name: Kirtland BFF

Project #: 100239

Project Manager: Dawn Tercinovic

Sampler: Joshua Brown

On Ice: Yes No

Sample Temperature: 1.0°C

Container Type and #

Preservative Type

HEAL No. 17012514

-001

Date

Time

Relinquished by: _____

Time

Date

Relinquished by: _____

Time

Date

Received by: [Signature]

Date

Time



HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

| Analysis Request | |
|--|-------------------------------------|
| <input checked="" type="checkbox"/> BTEX + MTBE + TPH (Gas only) | |
| <input checked="" type="checkbox"/> BTEX + MTBE + TPH (8021) | |
| BTEX + MTBE + TPH (Gas only) | |
| TPH 8015B (GRO / DRO / MRO) | |
| TPH (Method 418.1) | |
| EDB (Method 504.1) | <input checked="" type="checkbox"/> |
| PAH's (8310 or 8270 SIMS) | |
| RCRA 8 Metals + Hg | <input checked="" type="checkbox"/> |
| Anions (F, Cl, NO ₃ , NO ₂ , PO ₄ , SO ₄) | |
| 8081 Pesticides / 8082 PCB's | |
| 8260B (VOA) | |
| 8270 (Semi-VOA) | |
| Air Bubbles (Y or N) | |

Remarks: Send analytical to jbrown@enest.com + Enorse@enest.com

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.