3R-1038

Mangum No. 1

"Final" Soil C-141
And
Initial Well Installation
Plan

Date 5/17/16

(90)

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 8, 2011

Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

Release Notification and Corrective Action

update ES

OPERATOR

☒ Initial Report ☐ Final Report

Name of Company ConocoPhillips Company	Contact Lisa Hunter
Address 5525 Hwy 64, Farmington, NM 87401	Telephone No. 505-326-9525
Facility Name Mangum No. 1	Facility Type Natural Gas Well

Surface Owner BLM	Mineral Owner Federal (SF-047020-B)	API No. 30-045-07835

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
L	27	29N	11W	2200	South	1175	West	San Juan

OIL CONS. DIV DIST. 3

MAY 4 2016

Latitude 36.69571° **Longitude** 107.98404°

NATURE OF RELEASE

Type of Release Historic Release of Produced Water and/or Condensate	Volume of Release Unknown	Volume Recovered 0
Source of Release Believed to be from former AGT	Date and Hour of Occurrence	Date and Hour of Discovery 04/06/15
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? NMOCD	
By Whom? Ashley Maxwell-COP	Date and Hour April 17, 2015 12:46PM	
Was a Watercourse Reached? ☒ Yes ☐ No	If YES, Volume Impacting the Watercourse. Unknown	

If a Watercourse was Impacted, Describe Fully.* A groundwater sample was collected through the soil boring augers and analyzed by EPA Method 8021B. Ethylbenzene was detected at a concentration of 160 parts per billion (ppb). Xylenes were detected at a concentration of 930 ppb.

Describe Cause of Problem and Remedial Action Taken.* On April 6, 2015, seven backhoe test holes were dug to depths of 7.5 to 8 ft deep on the site as part of a due diligence site assessment. Soil samples were collected from the test holes and field screened using a PID and field TPH test kit. Samples from two test holes that indicated TPH field screening concentrations above the 100 parts per million (ppm) site action level were thus submitted for laboratory analysis by EPA Method 8015D. One of these samples indicated a concentration of 3,180 ppm TPH. The location of this boring appears to coincide with the location of a former AGT belonging to a former site operator and a release from this tank is the apparent source of contamination. On April 17, 2015 a soil boring was drilled with hollow stem auger to determine the vertical extent of impacts in the area of the impacted test hole location and where the former AGT was located. Two soil samples from the auger boring were analyzed by EPA Method 8015. The 10-11.5 ft below ground surface (bgs) sample had a concentration of 425 ppm and the 15-16.5 ft bgs sample had a concentration of 1,530 ppm. Groundwater was encountered at a depth of 16.5 ft bgs. A groundwater sample was collected through the augers and analyzed by EPA Method 8021B. This sample had a concentration of 160 ppb ethylbenzene and 930 ppb xylenes. Test hole locations impacted with TPH concentrations above site action levels were backfilled with clean soils and impacted soils were hauled to a landfarm. Impacted soils from the auger boring were also included with soils that were removed to the landfarm.

Describe Area Affected and Cleanup Action Taken.* Soils were excavated Feb 8-11, 2016. Final excavation dimensions 100' x 38' x 17' deep. 1400 cy soil removed for offsite disposal. Groundwater encountered at ~17 ft bgs. Confirmation soil samples collected from excavation sidewalls. Lab analyses indicated all samples <100 mg/kg TPH. A groundwater sample was collected from the open excavation after purging with vac truck. Groundwater results indicated BTEX, Mn and sulfates above standards. Groundwater monitoring wells will be installed at the site to further assess impacts.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Signature:	OIL CONSERVATION DIVISION Approved by Environmental Specialist:
Printed Name: Lisa Hunter	
Title: Field Environmental Specialist	Approval Date: 5/17/16 Expiration Date:
E-mail Address: Lisa.Hunter@cop.com	Conditions of Approval: Attached ☐
Date: May 4, 2016 Phone: 505-258-1607	Additional Groundwater Remediation Required Assigned 3RP-1038

* Attach Additional Sheets If Necessary

#DCS 1602631162

Sent via email to Environ Dept in SF.

Smith, Cory, EMNRD

From: Smith, Cory, EMNRD
Sent: Tuesday, May 17, 2016 1:49 PM
To: Coffman, Keith
Cc: Griswold, Jim, EMNRD; VonGonten, Glenn, EMNRD; Fields, Vanessa, EMNRD; Powell, Brandon, EMNRD; 'Walker, Jeffrey'
Subject: Mangum No.1 (API# 30-045-07835) Assigned to 3RP-1038

Keith,

I have received and approved the "Updated C-141" for the Mangum No.1 (API# 30-045-07835) release, the site has been assigned as 3R-1038. Conoco may find the signed documents through the OCD website searching with that number(Instructions below). Since ground water has been confirmed impacted via laboratory samples, further remediation of ground water through Santa Fe/Aztec is required. As we have discussed via phone through GHG Jeffery Walker OCD recommends that COPC install an up gradient monitor well that is located on or near the release area to monitor background levels. Please contact Santa Fe Glenn, VonGonten (505-476-3488) for further instructions regarding ground water remediation.

To find the 3RP

1. Navigate to http://ocdimage.emnrd.state.nm.us/imaging/AEOrderCriteria.aspx
2. In the Order Type drop down Box select "3R – Remediation Permit – Aztec- (3RP)
3. In the Order Number/Amendment Type in your given number
4. Click search

The current document will be scanned and uploaded to that location as soon as possible. If you have any questions please call.

Cory Smith
Environmental Specialist
Oil Conservation Division
Energy, Minerals, & Natural Resources
1000 Rio Brazos, Aztec, NM 87410
(505)334-6178 ext 115
cory.smith@state.nm.us

Cory Smith
Environmental Specialist
Oil Conservation Division
Energy, Minerals, & Natural Resources
1000 Rio Brazos, Aztec, NM 87410
(505)334-6178 ext 115
cory.smith@state.nm.us

April 7, 2016

Reference No. 11102646

Mr. Keith Coffman
ConocoPhillips Company
600 N. Dairy Ashford
Houston, Texas 77079

Dear Mr. Coffman:

Re: Remediation Summary Letter Report
Mangum No. 1
S27, T29N, R11W
San Juan County, New Mexico

On behalf of ConocoPhillips Company (ConocoPhillips) GHD Services Inc. (GHD) is providing this Remediation Summary Report for the above-referenced site. The Mangum No. 1 site (hereafter referred to as the "Site") is located on federal land within Section 27, Township 29 North, and Range 11 West in San Juan County, New Mexico. Geographical coordinates for the Site are 36.6965° North, 107.9840° West (Figure 1). The Site consists of an active gas well and associated production equipment (Figure 2).

1. Introduction

Site remediation was performed in order to address soil impacts from a historical release of produced water and condensate. A remediation work plan was submitted to the New Mexico Oil Conservation Division (NMOCD) and to the Bureau of Land Management (BLM), Farmington Field Office for approval. The GHD work plan was approved by BLM via telephone on January 27, 2016 and by NMOCD via email notification on February 1, 2016.

An initial release assessment was conducted in April 2015 by Animas Environmental Services, LLC (AES). In the May 4, 2015 AES Mangum #1 Release Assessment Report, the Site was assigned Recommended Remediation Action Levels (RRALs) in accordance with the NMOCD Guidelines for Remediation of Leaks, Spills and Releases, dated August 13, 1993. RRALs were established based on the following ranking criteria:

- Depth to Groundwater: Groundwater was encountered at approximately 16.5 feet below ground surface (bgs) during initial Site assessment activities (20 points).
- Wellhead Protection Area: Water well SJ 02664 is located approximately 900 feet to the east (20 points).

GHD Services Inc.
6121 Indian School Road NE Suite 200 Albuquerque New Mexico 87110 USA
T 505 884 0672 **F** 505 884 4932 **W** www.ghd.com

- Distance to Surface Water Body: An irrigation canal (Hammond Ditch) is approximately 150 feet west and north of the Site. There is also an unnamed stream approximately 350 feet to the north that discharges directly to the San Juan River (20 points).

Based on these criteria, Site-specific RRALs are 10 parts per million (ppm) for benzene, 50 ppm for benzene, toluene, ethylbenzene, and xylenes (BTEX), and 100 ppm for total petroleum hydrocarbons (TPH).

Subsurface soil samples were collected at the Site via seven backhoe test pits. Release assessment laboratory sample results were above RRALs in one of the test pits located in the approximate area of a former site tank. The sample indicated TPH at a concentration of 2,700 ppm at a depth of 8 feet bgs. An auger boring was placed at this location to determine the vertical extent of hydrocarbon impacts to Site soils. Groundwater was encountered in this boring at a depth of 16.5 ft bgs. A groundwater sample was collected through the hollow stem augers and analyzed for BTEX constituents which indicated Xylenes above the RRAL at a concentration of 930 ppm.

2. Remediation Activities

Between February 8 and February 11, 2016, GHD supervised the excavation of hydrocarbon-impacted soils. The dimensions of the final excavation were approximately 100 ft x 38 ft. x 17 ft deep. A summary of activities is presented below.

2.1 Excavation and Soil Sampling

During excavation, a calibrated photo-ionization detector and PetroFlag Hydrocarbon Analyzer were used to field screen for the presence of volatile organic compounds (VOCs) and TPH, respectively. Once field screening results indicated that impacted soils had been removed to concentrations below the RRALs, laboratory confirmation soil samples were collected. Field screened soils that indicated TPH concentrations below 100 ppm were segregated to the extent possible and used as eventual backfill material.

Confirmation composite soil samples were collected from each wall and the bottom of the excavation (Figure 3). Soil samples were placed in laboratory-supplied containers, labeled, place on ice, and submitted to Pace Analytical Services, Inc. (Pace) in Lenexa, Kansas for analysis. Samples were analyzed for TPH gasoline/diesel-range organics (GRO/DRO) by Environmental Protection Agency (EPA) Method 8015, BTEX by EPA Method 8260, and chloride by EPA Method 300.0. All confirmation samples returned analytical results below the Site-specific RRALs. Soil laboratory analytical reports are included as Appendix A and summarized on Table 1.

Approximately 1,400 cubic yards (cy) of impacted soils were hauled to Industrial Ecosystems, Inc. (IEI) in Aztec, New Mexico for disposal. Waste shipment manifests and the disposal facility Waste Acceptance Form (NMOCD Form C-138) have been included as Appendix B.

Permission to backfill was granted by the NMOCD via email on February 22, 2016. The excavations were backfilled with segregated field screened soils (i.e., below 100 ppm PID) and clean, imported BLM-approved fill from Aztec Machine. The excavation area was graded to natural ground surface on

February 24 and February 25, 2016. A photographic log illustrating excavation activities is included as Appendix C.

2.2 Groundwater Sampling

Groundwater was encountered at approximately 16 feet bgs in the eastern portion of the excavation. Approximately 1 foot of groundwater saturated soil was removed from beneath the water table. The groundwater accumulation at the bottom of the excavation was evacuated by IEI using a vacuum truck. Groundwater was allowed to recharge overnight and was evacuated for three consecutive business days. Approximately 275 barrels (bbls) of groundwater were removed and transported to IEI for disposal.

At the recommendation of the NMOCD, a groundwater sample was obtained from the groundwater accumulation at the bottom of the excavation. The groundwater sample was collected using a new, cleaned and rinsed 5-gallon bucket attached to the excavator arm. Groundwater was then decanted into laboratory-supplied containers, labeled, placed on ice, and submitted to Pace for analysis. The groundwater sample was analyzed for VOCs, dissolved metals including arsenic, barium, cadmium, calcium, chromium, iron, manganese, magnesium, sodium, and zinc, and for general chemistry analytes including chloride, potassium, nitrate, sulfate, fluoride, total alkalinity, bicarbonate, total hardness, pH, and specific conductivity.

The groundwater analytical results were above the New Mexico Water Quality Control Commission (NMWQCC) groundwater quality standards for benzene, xylenes, dissolved manganese, and sulfate with results of 0.0189 milligrams per liter (mg/L), 0.863 mg/L, 0.554 mg/L, and 819 mg/L, respectively. The NMWQCC standards for the above-listed analytes are 0.01 mg/L, 0.62 mg/L, 0.2 mg/L, and 600 mg/L, respectively.

A summary of the laboratory detections for analytes regulated by the NMWQCC is included on Table 2. The complete groundwater laboratory analytical report is included as Appendix D.

3. Summary and Recommendations

A summary of the events and findings from the remediation activities performed at the Site are as follows:

- Approximately 2,300 cy of soil were excavated from the impacted area.
- Approximately 1,404 cy of impacted soil were transported offsite for disposal.
- All confirmation soil samples from the excavation sidewalls returned analytical results below the applicable NMOCD RRALs.
- Approximately 275 bbls of groundwater were removed from the excavation and transported offsite for disposal.
- The groundwater sample collected from the bottom of the open excavation indicated analytical results exceeding the applicable NMWQCC groundwater quality standards for benzene, xylenes, dissolved manganese, and sulfate.

Based on analytical results from the groundwater sample collected from the open excavation, GHD recommends the following:

- Install groundwater monitoring wells at the Site to assess the extent of groundwater impacts.
- Conduct an initial groundwater monitoring event.

If you have any questions or comments with regard to this report, please do not hesitate to contact GHD's Albuquerque office at (505) 884-0672.

Sincerely,

GHD

Cale Kanack
Project Scientist

Jeff Walker
Senior Project Manager

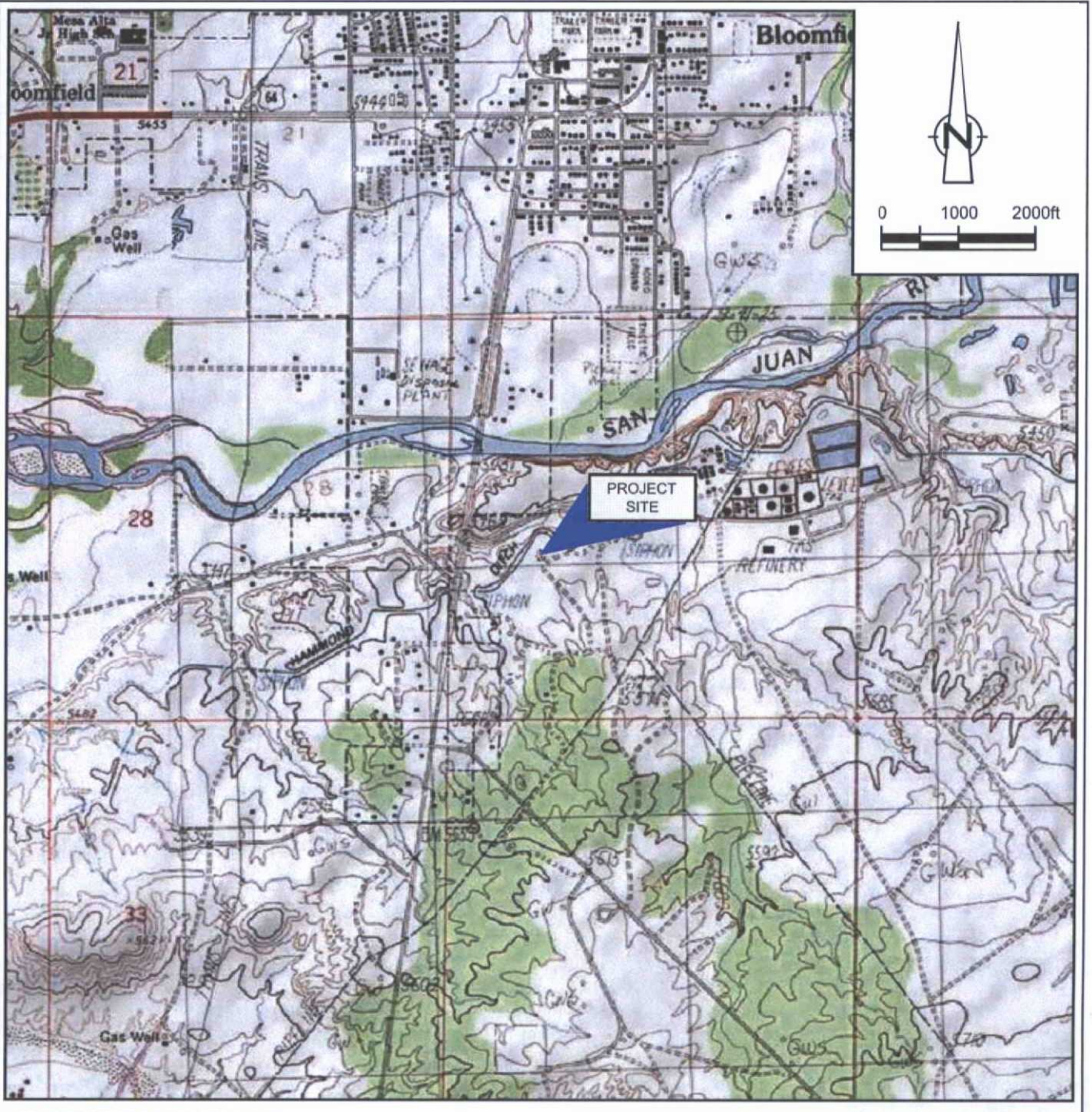
Encl. (10)

- Figure 1 – Site Location Map
- Figure 2 – Site Details Map
- Figure 3 – Soil Sample Map
- Figure 4 – Proposed Monitoring Well Location Map

- Table 1 – Soil Analytical Results Summary
- Table 2 – Groundwater Analytical Results Summary

- Appendix A – Soil Analytical
- Appendix B – Waste Manifests
- Appendix C – Photo Log
- Appendix D – Groundwater Analytical

Figures



SOURCE: USGS 7.5 MINUTE QUAD
"BLOOMFIELD AND HORN CANYON, NEW MEXICO WEST"

LAT/LONG: 36.6955° NORTH, 107.9840° WEST
COORDINATE: NAD83 DATUM, U.S. FOOT
STATE PLANE ONE - NEW MEXICO WEST

Figure 1

SITE LOCATION MAP
MANGUM #1
SAN JUAN COUNTY, NEW MEXICO
ConocoPhillips Company

GHD

11102646-00(000)GN-DL002 FEB 25/2016

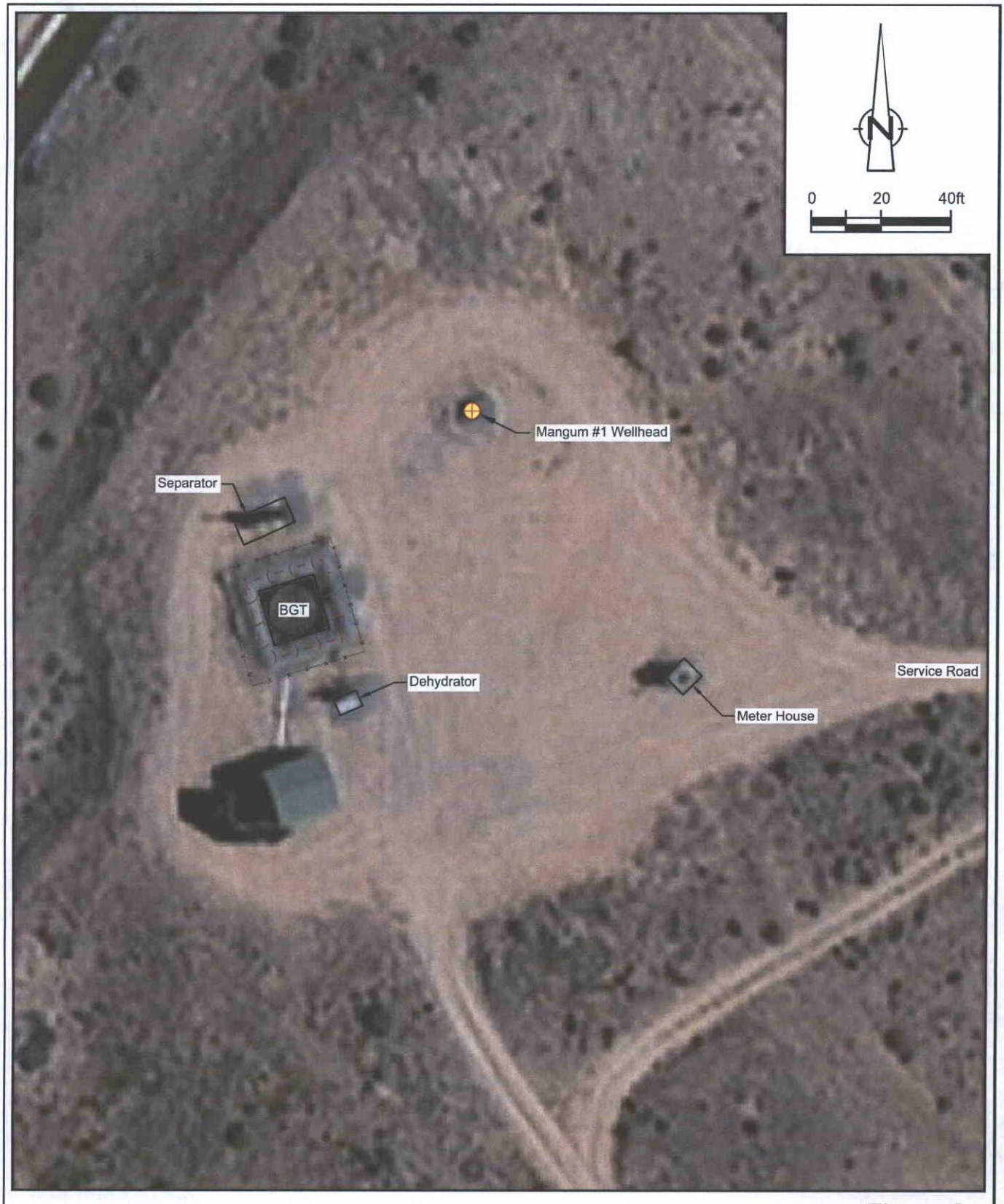


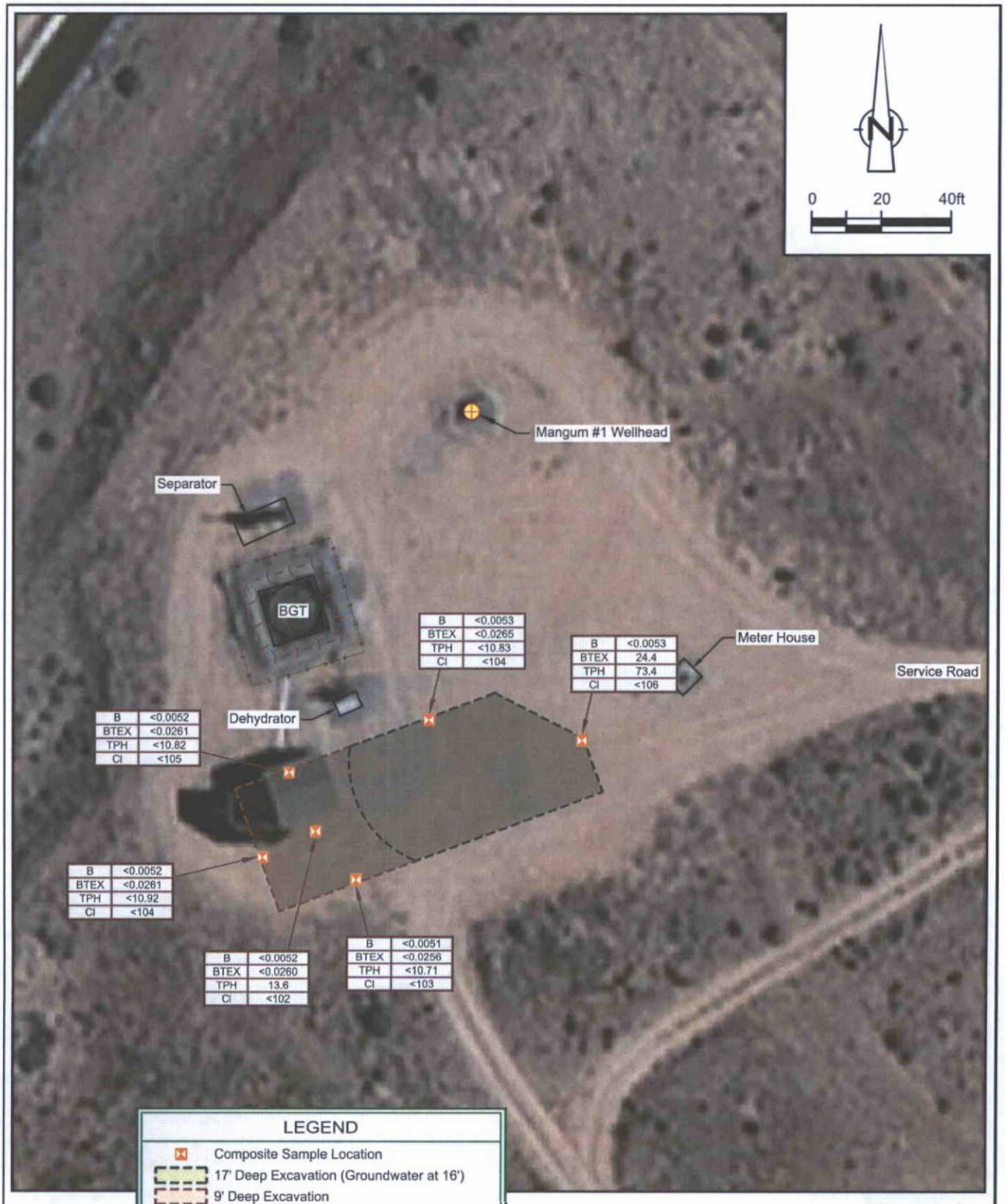
Figure 2

SITE DETAILS MAP
MANGUM #1
SAN JUAN COUNTY, NEW MEXICO
ConocoPhillips Company

GHD

LEGEND
—) — Berm Line
—x—x— Fence Line

11102646-00(000)GN-DL002 FEB 25/2016



LEGEND

- Composite Sample Location
- 17' Deep Excavation (Groundwater at 16')
- 9' Deep Excavation
- Berm Line
- Fence Line
- B — Benzene Concentration (mg/kg)
- BTEX — Benzene, Toluene, Ethylbenzene and Xylenes Concentration (mg/kg)
- TPH — Total Petroleum Hydrocarbons Concentration (mg/kg)
- Cl — Chlorides Concentration (mg/kg)

Figure 3

SOIL SAMPLE MAP
MANGUM #1
SAN JUAN COUNTY, NEW MEXICO
ConocoPhillips Company

GHD

11102646-00(000)GN-DL002 FEB 25/2016

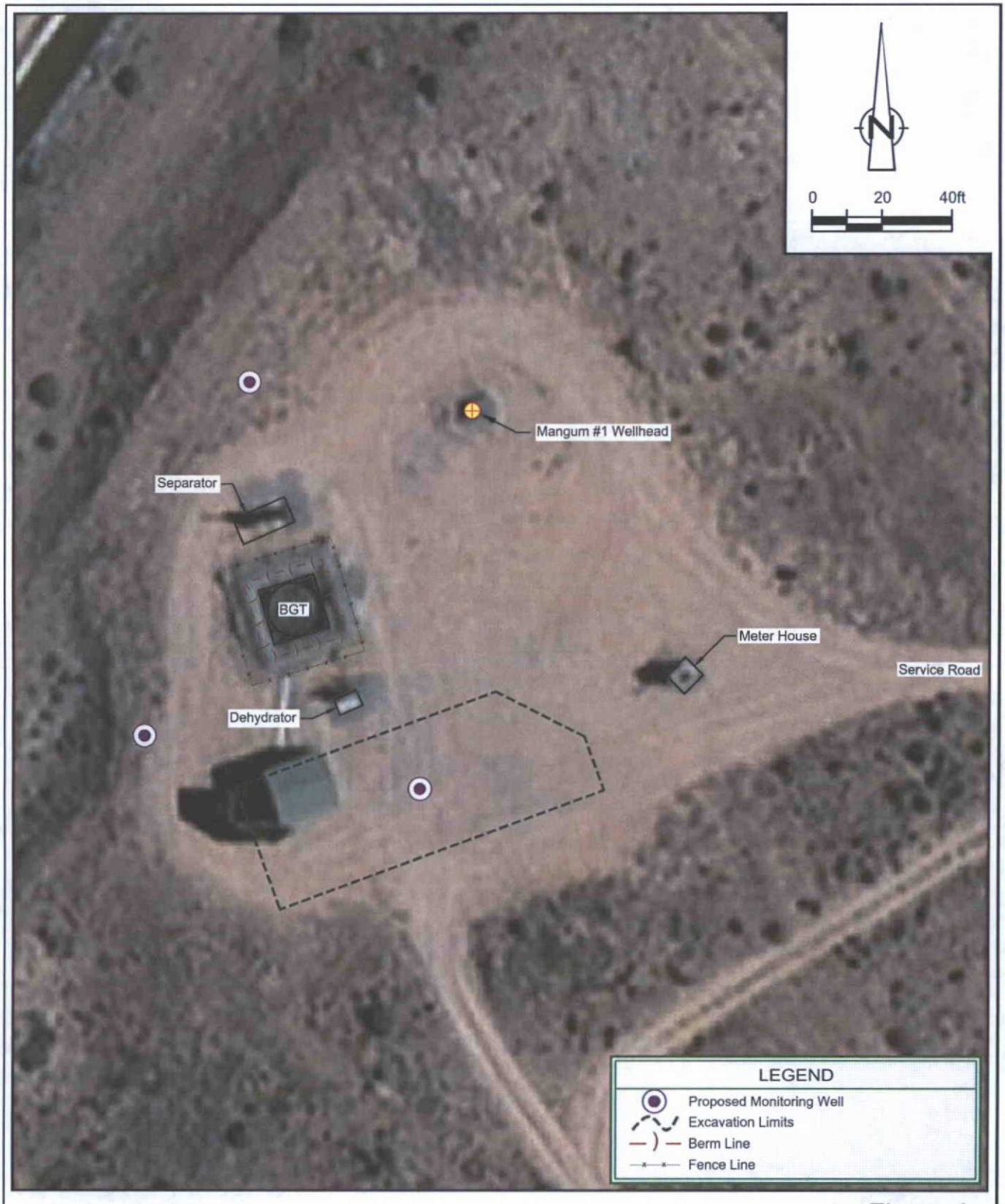


Figure 4

PROPOSED MONITORING WELL LOCATION
MANGUM #1
SAN JUAN COUNTY, NEW MEXICO
ConocoPhillips Company

GHD

11102646-00(000)GN-DL002 MAR 31/2016

Tables

Table 1

Soil Analytical Results Summary
Mangum No. 1
ConocoPhillips Company

Sample ID	Date	Sample Type	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	Total BTEX (mg/kg)	TPH-GRO (mg/kg)	TPH-DRO (mg/kg)	Total TPH (mg/kg)	Chloride (mg/kg)
NMOCD RRALs (Ranking Score = 60)			10	NE	NE	NE	50	100			250
S-11102646-021016-JW-WEST	2/10/2016	Composite	< 0.0052	< 0.0052	< 0.0052	< 0.0105	< 0.0261	< 0.52	< 10.4	< 10.92	< 104
S-11102646-021016-JW-SOUTH	2/10/2016	Composite	< 0.0051	< 0.0051	< 0.0051	< 0.0103	< 0.0256	< 0.51	< 10.2	< 10.71	< 103
S-11102646-021016-JW-BOTTOM	2/10/2016	Composite	< 0.0052	< 0.0052	< 0.0052	< 0.0104	< 0.0260	< 0.52	13.6	13.6	< 102
SS-11102646-021116-JW-N. WALL WEST	2/11/2016	Composite	< 0.0052	< 0.0052	< 0.0052	< 0.0105	< 0.0261	< 0.52	< 10.3	< 10.82	< 105
SS-11102646-021116-JW-N. WALL EAST	2/11/2016	Composite	< 0.0053	< 0.0053	< 0.0053	< 0.0106	< 0.0265	< 0.53	< 10.3	< 10.83	< 104
SS-11102646-021116-JW-EAST WALL	2/11/2016	Composite	< 0.0053	< 0.0053	< 0.0053	24.4	24.4	10.2	63.2	73.4	< 106

Notes:

mg/kg = milligrams per kilogram
BTEX = benzene, toluene, ethylbenzene, and xylene
TPH = total petroleum hydrocarbons
GRO/DRO/MRO = gasoline/diesel/motor oil-range organics
NMOCD = New Mexico Oil Conservation Division
RRALs = Recommended Remediation Action Levels
NE = not established
< x = below laboratory detection limit of x

Table 2

Groundwater Analytical Results Detection Summary
Mangum No. 1
ConocoPhillips Company

Sample ID	Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	Naphthalene (mg/L)	1-Methyl naphthalene (mg/L)	2-Methyl naphthalene (mg/L)	Dissolved Barium (mg/L)	Dissolved Manganese (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Sulfate (mg/L)	pH
NMWQCC groundwater standard		***0.01***	***0.75***	***0.75***	***0.62***	***0.3***			***1***	***0.2***	***250***	***1.6***	***600***	***7 - 9***
GW-11102646-022416-CK-1	2/24/2016	**0.0189**	< 0.005	0.101	**0.863**	< 0.05	0.0393	0.0393	0.104	**0.554**	29.2	0.5	**819**	7.8

Notes:

mg/L = milligrams per liter
NMWQCC = New Mexico Water Quality Control Commission
< x = analyte concentration below laboratory detection limit of x
Bold = exceeds NMWQCC groundwater standard

Appendices

Appendix A
Waste Manifests

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-138
Revised August 1, 2011

*Surface Waste Management Facility Operator and Generator shall maintain and make this documentation available for Division inspection.

REQUEST FOR APPROVAL TO ACCEPT SOLID WASTE

1. **Generator Name and Address:**
ConocoPhillips Company – 600 N. Dairy Ashford, 2WL 11050, Houston, TX 77079 BILL : GHD

2. **Originating Site: Section 27, Township 29N, Range 11W, San Juan County, NM (36.69571 N, 107.98404 W)**
Magnum #1

3. **Location of Material (Street Address, City, State or ULSTR): Same as Site**
S-27, T-29N, R-11W (San Juan County)

4. **Source and Description of Waste:**
Remediation activities to remove hydrocarbon impacted soil from a historic release of produced water and condensate

2/12/16-234cy
2/11/16-438cy
2/10/16-342cy

*IEI is authorized to test for chloride content on behalf of Conoco/GHD

Estimated Volume 2000 cy yd³ / bbls Known Volume (to be entered by the operator at the end of the haul) 342 (yd³) / bbls

5. **GENERATOR CERTIFICATION STATEMENT OF WASTE STATUS**

I, B.K. Cliff, representative or authorized agent for ConocoPhillips Company hereby certify that according to the Resource Conservation and Recovery Act (RCRA) and the US Environmental Protection A uly 1988 regulatory determination, the above described waste is: (Check the appropriate classification)

☒ RCRA Exempt: Oil field wastes generated from oil and gas exploration and production operations and are no ith non-exempt waste. *Operator Use Only: Waste Acceptance Frequency: ☐ Monthly ☐ Weekly ☐ Per Load*

☐ RCRA Non-Exempt: Oil field waste which is non-hazardous that does not exceed the minimum standards fo zardous by characteristics established in RCRA regulations, 40 CFR 261.21-261.24, or listed hazardous waste as defined in 4 rt 261, subpart D, as amended. The following documentation is attached to demonstrate the above-described waste is no us. (Check the appropriate items)

☐ MSDS Information ☐ RCRA Hazardous Waste Analysis ☐ Process Knowledge ☐ Other (Provide descri ox 4)

GENERATOR 19.15.36.15 WASTE TESTING CERTIFICATION STATEMENT FOR LANDFA

I, K. Dolph, representative for IEI do hereby t representative samples of the oil field waste have been subjected to the paint filter test and tested for chloride conten the samples have been found to conform to the specific requirements applicable to landfarms pursuant to Section 15 of 19.15.36 The results of the representative samples are attached to demonstrate the above-described waste conform to the requirements of 5 of 19.15.36 NMAC.

5. **Transporter:**
M&M

OCD Permitted Surface Waste Management Facility

PH=6
CL=1132

Name and Facility Permit #: IEI/JFJ Landfarm NM 01-0010B

Address of Facility: 49 Road 3150 Aztec, NM 87410

Method of Treatment and/or Disposal:

☐ Evaporation ☐ Injection ☐ Treating Plant ☒ Landfarm ☐ Landfill ☐ Other

Waste Acceptance Status:

☒ **APPROVED** ☐ **DENIED** (Must Be Maintained As Permanent Record)

PRINT NAME: K. Dolph TITLE: Admin. Staff DATE: 2/9/16

SIGNATURE: K. Dolph TELEPHONE NO.: 505-632-1782
Surface Waste Management Facility Authorized Agent

01/27/16

Appendix B
Soil Analytical Reports

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

February 12, 2016

Jeffrey Walker
GHD Services, Inc
6121 Indian School Rd NE
Ste 200
Albuquerque, NM 87110

RE: Project: 11102646 Magnum No 1
Pace Project No.: 60212766

Dear Jeffrey Walker:
Enclosed are the analytical results for sample(s) received by the laboratory on February 11, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather M. Wilson

Heather Wilson for
Alice Flanagan
alice.flanagan@pacelabs.com
Project Manager

Enclosures

cc: Angela Bown, GHD Services, Inc,
Cassie Brown, GHD Services, Inc,
Cale Kanack, GHD

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: 11102646 Magnum No 1
Pace Project No.: 60212766

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 15-016-0
Illinois Certification #: 003097
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407
Utah Certification #: KS00021
Kansas Field Laboratory Accreditation: # E-92587

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

SAMPLE SUMMARY

Project: 11102646 Magnum No 1
Pace Project No.: 60212766

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60212766001	S-11102646-021016-JW-WEST	Solid	02/10/16 14:05	02/11/16 08:25
60212766002	S-11102646-021016-JW-SOUTH	Solid	02/10/16 14:10	02/11/16 08:25
60212766003	S-11102646-021016-JW-BOTTOM	Solid	02/10/16 14:15	02/11/16 08:25
60212766004	TRIP BLANK	Solid	02/10/16 14:05	02/11/16 08:25

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

SAMPLE ANALYTE COUNT

Project: 11102646 Magnum No 1
Pace Project No.: 60212766

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60212766001	S-11102646-021016-JW-WEST	EPA 8015B	ACW	3
		EPA 5035A/8260	JKL	8
		ASTM D2974	DWC	1
		EPA 300.0	RAB	1
60212766002	S-11102646-021016-JW-SOUTH	EPA 8015B	ACW	3
		EPA 5035A/8260	JKL	8
		ASTM D2974	DWC	1
		EPA 300.0	RAB	1
60212766003	S-11102646-021016-JW-BOTTOM	EPA 8015B	ACW	3
		EPA 5035A/8260	JKL	8
		ASTM D2974	DWC	1
		EPA 300.0	RAB	1
60212766004	TRIP BLANK	EPA 5035A/8260	JKL	8

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PROJECT NARRATIVE

Project: 11102646 Magnum No 1
Pace Project No.: 60212766

Method: **EPA 8015B**
Description: 8015B Diesel Range Organics
Client: GHD Services_COP NM
Date: February 12, 2016

General Information:
3 samples were analyzed for EPA 8015B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3546 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

QC Batch: OEXT/53071

S0: Surrogate recovery outside laboratory control limits.
- LCS (Lab ID: 1708461)
  - p-Terphenyl (S)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: OEXT/53071

1e: Analyte recovery in the laboratory control sample (LCS) was outside QC limits high. No further corrective action was taken, since the matrix spike and matrix spike duplicate was within the LCS limits.
- LCS (Lab ID: 1708461)
  - TPH-DRO

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 11102646 Magnum No 1
Pace Project No.: 60212766

Method: **EPA 5035A/8260**
Description: 8260 MSV GRO and Oxygenates
Client: GHD Services_COP NM
Date: February 12, 2016

General Information:
4 samples were analyzed for EPA 5035A/8260. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: 11102646 Magnum No 1
Pace Project No.: 60212766

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: GHD Services_COP NM
Date: February 12, 2016

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 300.0 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: 11102646 Magnum No 1
Pace Project No.: 60212766

Sample: S-11102646-021016-JW-WEST **Lab ID: 60212766001** Collected: 02/10/16 14:05 Received: 02/11/16 08:25 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015B Diesel Range Organics	Analytical Method: EPA 8015B Preparation Method: EPA 3546							
TPH-DRO	ND	mg/kg	10.4	1	02/11/16 00:00	02/12/16 09:49		L3
Surrogates								
n-Tetracosane (S)	92	%	18-139	1	02/11/16 00:00	02/12/16 09:49	646-31-1	
p-Terphenyl (S)	98	%	51-120	1	02/11/16 00:00	02/12/16 09:49	92-94-4	
8260 MSV GRO and Oxygenates	Analytical Method: EPA 5035A/8260							
Benzene	ND	ug/kg	5.2	1		02/11/16 15:02	71-43-2	
Ethylbenzene	ND	ug/kg	5.2	1		02/11/16 15:02	100-41-4	
Toluene	ND	ug/kg	5.2	1		02/11/16 15:02	108-88-3	
TPH-GRO	ND	mg/kg	0.52	1		02/11/16 15:02		
Xylene (Total)	ND	ug/kg	10.5	1		02/11/16 15:02	1330-20-7	
Surrogates								
Toluene-d8 (S)	101	%	80-120	1		02/11/16 15:02	2037-26-5	
4-Bromofluorobenzene (S)	96	%	81-117	1		02/11/16 15:02	460-00-4	
1,2-Dichloroethane-d4 (S)	99	%	83-120	1		02/11/16 15:02	17060-07-0	
Percent Moisture	Analytical Method: ASTM D2974							
Percent Moisture	**4.3**	%	0.50	1		02/11/16 00:00		D6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Preparation Method: EPA 300.0							
Chloride	ND	mg/kg	104	10	02/11/16 11:45	02/11/16 13:44	16887-00-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11102646 Magnum No 1
Pace Project No.: 60212766

Sample: S-11102646-021016-JW-SOUTH **Lab ID: 60212766002** Collected: 02/10/16 14:10 Received: 02/11/16 08:25 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015B Diesel Range Organics	Analytical Method: EPA 8015B Preparation Method: EPA 3546							
TPH-DRO	ND	mg/kg	10.2	1	02/11/16 00:00	02/12/16 09:56		L3
Surrogates								
n-Tetracosane (S)	99	%	18-139	1	02/11/16 00:00	02/12/16 09:56	646-31-1	
p-Terphenyl (S)	104	%	51-120	1	02/11/16 00:00	02/12/16 09:56	92-94-4	
8260 MSV GRO and Oxygenates	Analytical Method: EPA 5035A/8260							
Benzene	ND	ug/kg	5.1	1		02/11/16 15:48	71-43-2	
Ethylbenzene	ND	ug/kg	5.1	1		02/11/16 15:48	100-41-4	
Toluene	ND	ug/kg	5.1	1		02/11/16 15:48	108-88-3	
TPH-GRO	ND	mg/kg	0.51	1		02/11/16 15:48		
Xylene (Total)	ND	ug/kg	10.3	1		02/11/16 15:48	1330-20-7	
Surrogates								
Toluene-d8 (S)	99	%	80-120	1		02/11/16 15:48	2037-26-5	
4-Bromofluorobenzene (S)	96	%	81-117	1		02/11/16 15:48	460-00-4	
1,2-Dichloroethane-d4 (S)	98	%	83-120	1		02/11/16 15:48	17060-07-0	
Percent Moisture	Analytical Method: ASTM D2974							
Percent Moisture	**3.8**	%	0.50	1		02/11/16 00:00		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Preparation Method: EPA 300.0							
Chloride	ND	mg/kg	103	10	02/11/16 11:45	02/11/16 15:10	16887-00-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11102646 Magnum No 1
Pace Project No.: 60212766

Sample: S-11102646-021016-JW-BOTTOM **Lab ID: 60212766003** Collected: 02/10/16 14:15 Received: 02/11/16 08:25 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015B Diesel Range Organics	Analytical Method: EPA 8015B Preparation Method: EPA 3546							
TPH-DRO	**13.6**	mg/kg	10.2	1	02/11/16 00:00	02/12/16 10:04		L1
Surrogates								
n-Tetracosane (S)	99	%	18-139	1	02/11/16 00:00	02/12/16 10:04	646-31-1	
p-Terphenyl (S)	101	%	51-120	1	02/11/16 00:00	02/12/16 10:04	92-94-4	
8260 MSV GRO and Oxygenates	Analytical Method: EPA 5035A/8260							
Benzene	ND	ug/kg	5.2	1		02/11/16 16:04	71-43-2	
Ethylbenzene	ND	ug/kg	5.2	1		02/11/16 16:04	100-41-4	
Toluene	ND	ug/kg	5.2	1		02/11/16 16:04	108-88-3	
TPH-GRO	ND	mg/kg	0.52	1		02/11/16 16:04		
Xylene (Total)	ND	ug/kg	10.4	1		02/11/16 16:04	1330-20-7	
Surrogates								
Toluene-d8 (S)	99	%	80-120	1		02/11/16 16:04	2037-26-5	
4-Bromofluorobenzene (S)	98	%	81-117	1		02/11/16 16:04	460-00-4	
1,2-Dichloroethane-d4 (S)	99	%	83-120	1		02/11/16 16:04	17060-07-0	
Percent Moisture	Analytical Method: ASTM D2974							
Percent Moisture	**2.6**	%	0.50	1		02/11/16 00:00		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Preparation Method: EPA 300.0							
Chloride	ND	mg/kg	102	10	02/11/16 11:45	02/11/16 15:27	16887-00-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11102646 Magnum No 1
Pace Project No.: 60212766

Sample: TRIP BLANK **Lab ID: 60212766004** Collected: 02/10/16 14:05 Received: 02/11/16 08:25 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV GRO and Oxygenates	Analytical Method: EPA 5035A/8260							
Benzene	ND	ug/kg	5.0	1		02/11/16 16:19	71-43-2	
Ethylbenzene	ND	ug/kg	5.0	1		02/11/16 16:19	100-41-4	
Toluene	ND	ug/kg	5.0	1		02/11/16 16:19	108-88-3	
TPH-GRO	ND	mg/kg	0.50	1		02/11/16 16:19		
Xylene (Total)	ND	ug/kg	10.0	1		02/11/16 16:19	1330-20-7	
Surrogates								
Toluene-d8 (S)	99	%	80-120	1		02/11/16 16:19	2037-26-5	
4-Bromofluorobenzene (S)	96	%	81-117	1		02/11/16 16:19	460-00-4	
1,2-Dichloroethane-d4 (S)	96	%	83-120	1		02/11/16 16:19	17060-07-0	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11102646 Magnum No 1
Pace Project No.: 60212766

QC Batch: MSV/74118 Analysis Method: EPA 5035A/8260
QC Batch Method: EPA 5035A/8260 Analysis Description: 8260 MSV GRO and Oxygenates
Associated Lab Samples: 60212766001, 60212766002, 60212766003, 60212766004

METHOD BLANK: 1708456 Matrix: Solid
Associated Lab Samples: 60212766001, 60212766002, 60212766003, 60212766004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/kg	ND	5.0	02/11/16 14:16	
Ethylbenzene	ug/kg	ND	5.0	02/11/16 14:16	
Toluene	ug/kg	ND	5.0	02/11/16 14:16	
TPH-GRO	mg/kg	ND	0.50	02/11/16 14:16	
Xylene (Total)	ug/kg	ND	10.0	02/11/16 14:16	
1,2-Dichloroethane-d4 (S)	%	96	83-120	02/11/16 14:16	
4-Bromofluorobenzene (S)	%	95	81-117	02/11/16 14:16	
Toluene-d8 (S)	%	101	80-120	02/11/16 14:16	

LABORATORY CONTROL SAMPLE: 1708457

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/kg	100	89.1	89	75-116	
Ethylbenzene	ug/kg	100	88.6	89	72-116	
Toluene	ug/kg	100	88.9	89	72-116	
TPH-GRO	mg/kg	4	4.4	110	76-128	
Xylene (Total)	ug/kg	300	260	87	69-116	
1,2-Dichloroethane-d4 (S)	%			97	83-120	
4-Bromofluorobenzene (S)	%			101	81-117	
Toluene-d8 (S)	%			101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1708458 1708459

Parameter	Units	60212766001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/kg	ND	106	106	94.3	102	89	96	28-136	8	36	
Ethylbenzene	ug/kg	ND	106	106	93.8	99.6	89	94	10-152	6	48	
Toluene	ug/kg	ND	106	106	94.8	103	89	98	19-141	9	40	
Xylene (Total)	ug/kg	ND	318	317	276	298	87	94	10-149	8	50	
1,2-Dichloroethane-d4 (S)	%						99	98	83-120			
4-Bromofluorobenzene (S)	%						99	99	81-117			
Toluene-d8 (S)	%						100	101	80-120		38	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11102646 Magnum No 1
Pace Project No.: 60212766

QC Batch: OEXT/53071 Analysis Method: EPA 8015B
QC Batch Method: EPA 3546 Analysis Description: EPA 8015B
Associated Lab Samples: 60212766001, 60212766002, 60212766003

METHOD BLANK: 1708460 Matrix: Solid
Associated Lab Samples: 60212766001, 60212766002, 60212766003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
TPH-DRO	mg/kg	ND	10	02/12/16 09:18	
n-Tetracosane (S)	%	108	18-139	02/12/16 09:18	
p-Terphenyl (S)	%	116	51-120	02/12/16 09:18	

LABORATORY CONTROL SAMPLE: 1708461

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
TPH-DRO	mg/kg	83.2	99.4	119	76-115	1e
n-Tetracosane (S)	%			116	18-139	
p-Terphenyl (S)	%			128	51-120	S0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1708462 1708463

Parameter	Units	60212766001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
TPH-DRO	mg/kg	ND	85.5	86.8	92.7	96.2	102	105	12-159	4	37	
n-Tetracosane (S)	%						103	102	18-139			
p-Terphenyl (S)	%						111	109	51-120			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11102646 Magnum No 1
Pace Project No.: 60212766

QC Batch: PMST/11491 Analysis Method: ASTM D2974
QC Batch Method: ASTM D2974 Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 60212766001, 60212766002, 60212766003

METHOD BLANK: 1708645 Matrix: Solid
Associated Lab Samples: 60212766001, 60212766002, 60212766003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Percent Moisture	%	ND	0.50	02/11/16 00:00	

SAMPLE DUPLICATE: 1708646

Parameter	Units	60212766001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	4.3	13.5	104	20	D6

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11102646 Magnum No 1
Pace Project No.: 60212766

QC Batch: WETA/38058 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60212766001, 60212766002, 60212766003

METHOD BLANK: 1708340 Matrix: Solid
Associated Lab Samples: 60212766001, 60212766002, 60212766003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/kg	ND	100	02/11/16 13:09	

LABORATORY CONTROL SAMPLE: 1708341

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/kg	500	479	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1708342 1708343

Parameter	Units	60212766001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/kg	ND	522	518	515	516	95	96	80-120	0	15	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 11102646 Magnum No 1
Pace Project No.: 60212766

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

1e	Analyte recovery in the laboratory control sample (LCS) was outside QC limits high. No further corrective action was taken, since the matrix spike and matrix spike duplicate was within the LCS limits.
D6	The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
L1	Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results for this analyte in associated samples may be biased high.
L3	Analyte recovery in the laboratory control sample (LCS) exceeded QC limits. Analyte presence below reporting limits in associated samples. Results unaffected by high bias.
S0	Surrogate recovery outside laboratory control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 11102646 Magnum No 1
Pace Project No.: 60212766

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60212766001	S-11102646-021016-JW-WEST	EPA 3546	OEXT/53071	EPA 8015B	GCSV/20510
60212766002	S-11102646-021016-JW-SOUTH	EPA 3546	OEXT/53071	EPA 8015B	GCSV/20510
60212766003	S-11102646-021016-JW-BOTTOM	EPA 3546	OEXT/53071	EPA 8015B	GCSV/20510
60212766001	S-11102646-021016-JW-WEST	EPA 5035A/8260	MSV/74118		
60212766002	S-11102646-021016-JW-SOUTH	EPA 5035A/8260	MSV/74118		
60212766003	S-11102646-021016-JW-BOTTOM	EPA 5035A/8260	MSV/74118		
60212766004	TRIP BLANK	EPA 5035A/8260	MSV/74118		
60212766001	S-11102646-021016-JW-WEST	ASTM D2974	PMST/11491		
60212766002	S-11102646-021016-JW-SOUTH	ASTM D2974	PMST/11491		
60212766003	S-11102646-021016-JW-BOTTOM	ASTM D2974	PMST/11491		
60212766001	S-11102646-021016-JW-WEST	EPA 300.0	WETA/38058	EPA 300.0	WETA/38059
60212766002	S-11102646-021016-JW-SOUTH	EPA 300.0	WETA/38058	EPA 300.0	WETA/38059
60212766003	S-11102646-021016-JW-BOTTOM	EPA 300.0	WETA/38058	EPA 300.0	WETA/38059

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Sample Condition Upon Receipt
ESI Tech Spec Client

WO# : 60212766

60212766

AAT

Optional
Proj Due Date:
Proj Name:

Client Name: GHD COR NM

Courier: FedEx ☑ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Other ☐ Client ☐

Tracking #: 6508 8164 3874 Pace Shipping Label Used? Yes ☐ No ☐

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☑ None ☐ Other ☐

Thermometer Used: T-239 (CF +0.8) / T-262 (CF +0.7) **Type of Ice:** Wet Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 2.1

Temperature should be above freezing to 6°C

Date and initials of person examining contents: 2/11/16

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☐N/A	11.
Filtered volume received for dissolved tests?	☐Yes ☑No ☐N/A	12.
Sample labels match COC:	☑Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: SL		13.
All containers needing preservation have been checked.	☐Yes ☐No ☑N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☐Yes ☐No ☑N/A	14.
Exceptions: VOA, Coliform, O&G, WI-DRO (water)	☐Yes ☑No	Initial when completed / Lot # of added preservative
Trip Blank present:	☑Yes ☐No ☐N/A	
Pace Trip Blank lot # (if purchased): 10121S-3		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☑No ☐N/A	17. List State: NM
Additional labels attached to 5035A vials in the field?	☐Yes ☐No ☑N/A	18.

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: CMW for AAF Date: 2/11/16

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.	
Start: 958	Start:
End: 1007	End:
Temp:	Temp:

Pace Analytical

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 Of 1

Section A	Section B	Section C	
Required Client Information:	Required Project Information:	Invoice Information:	
Company: GHD Services_COP NM	Report To: Jeffrey Walker	Attention:	
Address: 6121 Indian School Rd NE	Copy To: Cale Kanack	Company Name:	
Albuquerque, NM 87110	Angela Bown	Address:	Regulatory Agency
Email: jeff.walker@ghd.com	Purchase Order #:	Pace Quote:	
Phone: 505-377-3920 Fax:	Project Name: 11102646 Mangnum No 1	Pace Project Manager: alice.flanagan@pacelabs.com,	State / Location
Requested Due Date:	Project #:	Pace Profile #: 8644, 32	NM

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	Chloride	8015 DRO	8260 GRO	8260 BTEX	Residual Chlorine (Y/N)	6021 2766
1	~~S-111026446-021016-JW-NORTH~~	SL	C	~~2/10/16~~	—	~~2/10/16~~	1400		2	X									X	X	X	X		
2	S-111026446-021016-JW-WEST	SL	C	↓	—	↓	1405		2	X									X	X	X	X		2(VOFU) 001
3	S-111026446-021016-JW-SOUTH	SL	C	↓	—	↓	1410		2	X									X	X	X	X		002
4	S-111026446-021016-JW-BOTTOM	SL	C	↓	—	↓	1415		2	X									X	X	X	X		↓ 003
5	TRIP BLANK	WT	—	—	—	—	—	—	2				X									X		2(VOAV) 004
6																								
7																								
8																								
9																								
10																								
11																								
12																								

MATRIX CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Other OT; Tissue TS

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Cale Kanack / GHD	2-10-16	1530	[signature] / PAS	2/11/16	0825	2.1	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: CALE KANACK

SIGNATURE of SAMPLER: [signature] DATE Signed: 2-10-16

TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

February 16, 2016

Jeffrey Walker
GHD Services, Inc
6121 Indian School Rd NE
Ste 200
Albuquerque, NM 87110

RE: Project: 11102646 Mangnum No 1
Pace Project No.: 60212867

Dear Jeffrey Walker:
Enclosed are the analytical results for sample(s) received by the laboratory on February 12, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Alice Flanagan

Alice Flanagan
alice.flanagan@pacelabs.com
Project Manager

Enclosures

cc: Angela Bown, GHD Services, Inc,
Cassie Brown, GHD Services, Inc,
Cale Kanack, GHD

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CERTIFICATIONS

Project: 11102646 Mangnum No 1
Pace Project No.: 60212867

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 15-016-0
Illinois Certification #: 003097
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407
Utah Certification #: KS00021
Kansas Field Laboratory Accreditation: # E-92587

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

SAMPLE SUMMARY

Project: 11102646 Mangnum No 1
Pace Project No.: 60212867

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60212867001	SS11102646-021116JW-N. WALL WE	Solid	02/11/16 09:55	02/12/16 09:20
60212867002	SS11102646-021116JW-N. WALL EA	Solid	02/11/16 10:00	02/12/16 09:20
60212867003	SS11102646-021116JW-N. EAST WA	Solid	02/11/16 12:55	02/12/16 09:20
60212867004	TRIP BLANK	Solid	02/11/16 12:55	02/12/16 09:20

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SAMPLE ANALYTE COUNT

Project: 11102646 Mangnum No 1
Pace Project No.: 60212867

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60212867001	SS11102646-021116JW-N. WALL WE	EPA 8015B	ACW	3
		EPA 5035A/8260	JKL	8
		ASTM D2974	DWC	1
		EPA 300.0	RAB	1
60212867002	SS11102646-021116JW-N. WALL EA	EPA 8015B	ACW	3
		EPA 5035A/8260	JKL	8
		ASTM D2974	DWC	1
		EPA 300.0	RAB	1
60212867003	SS11102646-021116JW-N. EAST WA	EPA 8015B	ACW	3
		EPA 5035A/8260	JKL	8
		ASTM D2974	DWC	1
		EPA 300.0	RAB	1

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PROJECT NARRATIVE

Project: 11102646 Mangnum No 1
Pace Project No.: 60212867

Method: **EPA 8015B**
Description: 8015B Diesel Range Organics
Client: GHD Services_COP NM
Date: February 16, 2016

General Information:
3 samples were analyzed for EPA 8015B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3546 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: 11102646 Mangnum No 1
Pace Project No.: 60212867

Method: **EPA 5035A/8260**
Description: 8260 MSV GRO and Oxygenates
Client: GHD Services_COP NM
Date: February 16, 2016

General Information:
3 samples were analyzed for EPA 5035A/8260. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: 11102646 Mangnum No 1
Pace Project No.: 60212867

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: GHD Services_COP NM
Date: February 16, 2016

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 300.0 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, Inc.
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ANALYTICAL RESULTS

Project: 11102646 Mangnum No 1
Pace Project No.: 60212867

Sample: SS11102646-021116JW-N. WALL WE **Lab ID: 60212867001** Collected: 02/11/16 09:55 Received: 02/12/16 09:20 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015B Diesel Range Organics	Analytical Method: EPA 8015B Preparation Method: EPA 3546							
TPH-DRO	ND	mg/kg	10.3	1	02/12/16 00:00	02/16/16 12:54		
Surrogates								
n-Tetracosane (S)	82	%	18-139	1	02/12/16 00:00	02/16/16 12:54	646-31-1	
p-Terphenyl (S)	81	%	51-120	1	02/12/16 00:00	02/16/16 12:54	92-94-4	
8260 MSV GRO and Oxygenates	Analytical Method: EPA 5035A/8260							
Benzene	ND	ug/kg	5.2	1		02/12/16 15:14	71-43-2	
Ethylbenzene	ND	ug/kg	5.2	1		02/12/16 15:14	100-41-4	
Toluene	ND	ug/kg	5.2	1		02/12/16 15:14	108-88-3	
TPH-GRO	ND	mg/kg	0.52	1		02/12/16 15:14		
Xylene (Total)	ND	ug/kg	10.5	1		02/12/16 15:14	1330-20-7	
Surrogates								
Toluene-d8 (S)	101	%	80-120	1		02/12/16 15:14	2037-26-5	
4-Bromofluorobenzene (S)	93	%	81-117	1		02/12/16 15:14	460-00-4	
1,2-Dichloroethane-d4 (S)	98	%	83-120	1		02/12/16 15:14	17060-07-0	
Percent Moisture	Analytical Method: ASTM D2974							
Percent Moisture	**4.7**	%	0.50	1		02/12/16 00:00		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Preparation Method: EPA 300.0							
Chloride	ND	mg/kg	105	10	02/12/16 10:40	02/12/16 13:03	16887-00-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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(913)599-5665

ANALYTICAL RESULTS

Project: 11102646 Mangnum No 1
Pace Project No.: 60212867

Sample: SS11102646-021116JW-N. WALL EA **Lab ID: 60212867002** Collected: 02/11/16 10:00 Received: 02/12/16 09:20 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015B Diesel Range Organics	Analytical Method: EPA 8015B Preparation Method: EPA 3546							
TPH-DRO	ND	mg/kg	10.3	1	02/12/16 00:00	02/16/16 13:02		
Surrogates								
n-Tetracosane (S)	86	%	18-139	1	02/12/16 00:00	02/16/16 13:02	646-31-1	
p-Terphenyl (S)	82	%	51-120	1	02/12/16 00:00	02/16/16 13:02	92-94-4	
8260 MSV GRO and Oxygenates	Analytical Method: EPA 5035A/8260							
Benzene	ND	ug/kg	5.3	1		02/12/16 16:00	71-43-2	
Ethylbenzene	ND	ug/kg	5.3	1		02/12/16 16:00	100-41-4	
Toluene	ND	ug/kg	5.3	1		02/12/16 16:00	108-88-3	
TPH-GRO	ND	mg/kg	0.53	1		02/12/16 16:00		
Xylene (Total)	ND	ug/kg	10.6	1		02/12/16 16:00	1330-20-7	
Surrogates								
Toluene-d8 (S)	101	%	80-120	1		02/12/16 16:00	2037-26-5	
4-Bromofluorobenzene (S)	95	%	81-117	1		02/12/16 16:00	460-00-4	
1,2-Dichloroethane-d4 (S)	98	%	83-120	1		02/12/16 16:00	17060-07-0	
Percent Moisture	Analytical Method: ASTM D2974							
Percent Moisture	**3.9**	%	0.50	1		02/12/16 00:00		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Preparation Method: EPA 300.0							
Chloride	ND	mg/kg	104	10	02/12/16 10:40	02/12/16 13:54	16887-00-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11102646 Mangnum No 1
Pace Project No.: 60212867

Sample: SS11102646-021116JW-N. EAST WA **Lab ID: 60212867003** Collected: 02/11/16 12:55 Received: 02/12/16 09:20 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015B Diesel Range Organics	Analytical Method: EPA 8015B Preparation Method: EPA 3546							
TPH-DRO	**63.2**	mg/kg	10.4	1	02/12/16 00:00	02/16/16 13:10		
Surrogates								
n-Tetracosane (S)	93	%	18-139	1	02/12/16 00:00	02/16/16 13:10	646-31-1	
p-Terphenyl (S)	89	%	51-120	1	02/12/16 00:00	02/16/16 13:10	92-94-4	
8260 MSV GRO and Oxygenates	Analytical Method: EPA 5035A/8260							
Benzene	ND	ug/kg	5.3	1		02/12/16 16:15	71-43-2	
Ethylbenzene	ND	ug/kg	5.3	1		02/12/16 16:15	100-41-4	
Toluene	ND	ug/kg	5.3	1		02/12/16 16:15	108-88-3	
TPH-GRO	**10.2**	mg/kg	0.53	1		02/12/16 16:15		
Xylene (Total)	**24.4**	ug/kg	10.6	1		02/12/16 16:15	1330-20-7	
Surrogates								
Toluene-d8 (S)	102	%	80-120	1		02/12/16 16:15	2037-26-5	
4-Bromofluorobenzene (S)	116	%	81-117	1		02/12/16 16:15	460-00-4	
1,2-Dichloroethane-d4 (S)	100	%	83-120	1		02/12/16 16:15	17060-07-0	
Percent Moisture	Analytical Method: ASTM D2974							
Percent Moisture	**5.8**	%	0.50	1		02/12/16 00:00		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Preparation Method: EPA 300.0							
Chloride	ND	mg/kg	106	10	02/12/16 10:40	02/12/16 14:11	16887-00-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: 11102646 Mangnum No 1
Pace Project No.: 60212867

QC Batch: MSV/74143 Analysis Method: EPA 5035A/8260
QC Batch Method: EPA 5035A/8260 Analysis Description: 8260 MSV GRO and Oxygenates
Associated Lab Samples: 60212867001, 60212867002, 60212867003

METHOD BLANK: 1709190 Matrix: Solid
Associated Lab Samples: 60212867001, 60212867002, 60212867003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/kg	ND	5.0	02/12/16 12:09	
Ethylbenzene	ug/kg	ND	5.0	02/12/16 12:09	
Toluene	ug/kg	ND	5.0	02/12/16 12:09	
TPH-GRO	mg/kg	ND	0.50	02/12/16 12:09	
Xylene (Total)	ug/kg	ND	10.0	02/12/16 12:09	
1,2-Dichloroethane-d4 (S)	%	98	83-120	02/12/16 12:09	
4-Bromofluorobenzene (S)	%	95	81-117	02/12/16 12:09	
Toluene-d8 (S)	%	101	80-120	02/12/16 12:09	

LABORATORY CONTROL SAMPLE: 1709191

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/kg	100	100	100	75-116	
Ethylbenzene	ug/kg	100	97.7	98	72-116	
Toluene	ug/kg	100	96.3	96	72-116	
TPH-GRO	mg/kg	4	3.8	96	76-128	
Xylene (Total)	ug/kg	300	293	98	69-116	
1,2-Dichloroethane-d4 (S)	%			106	83-120	
4-Bromofluorobenzene (S)	%			100	81-117	
Toluene-d8 (S)	%			100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1709192 1709193

Parameter	Units	60212867001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/kg	ND	107	105	100	94.7	94	91	28-136	6	36	
Ethylbenzene	ug/kg	ND	107	105	102	97.1	96	93	10-152	5	48	
Toluene	ug/kg	ND	107	105	103	98.8	97	95	19-141	5	40	
Xylene (Total)	ug/kg	ND	321	314	302	286	94	91	10-149	6	50	
1,2-Dichloroethane-d4 (S)	%						95	96	83-120			
4-Bromofluorobenzene (S)	%						99	100	81-117			
Toluene-d8 (S)	%						101	101	80-120		38	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: 11102646 Mangnum No 1
Pace Project No.: 60212867

QC Batch: OEXT/53083 Analysis Method: EPA 8015B
QC Batch Method: EPA 3546 Analysis Description: EPA 8015B
Associated Lab Samples: 60212867001, 60212867002, 60212867003

METHOD BLANK: 1709087 Matrix: Solid
Associated Lab Samples: 60212867001, 60212867002, 60212867003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
TPH-DRO	mg/kg	ND	10	02/16/16 12:23	
n-Tetracosane (S)	%	82	18-139	02/16/16 12:23	
p-Terphenyl (S)	%	94	51-120	02/16/16 12:23	

LABORATORY CONTROL SAMPLE: 1709088

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
TPH-DRO	mg/kg	82.9	84.6	102	76-115	
n-Tetracosane (S)	%			91	18-139	
p-Terphenyl (S)	%			96	51-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1709089 1709090

Parameter	Units	60212867001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
TPH-DRO	mg/kg	ND	85.7	84.7	86.5	84.6	100	99	12-159	2	37	
n-Tetracosane (S)	%						90	92	18-139			
p-Terphenyl (S)	%						91	91	51-120			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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(913)599-5665

QUALITY CONTROL DATA

Project: 11102646 Mangnum No 1
Pace Project No.: 60212867

QC Batch: PMST/11493 Analysis Method: ASTM D2974
QC Batch Method: ASTM D2974 Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 60212867001, 60212867002, 60212867003

METHOD BLANK: 1709093 Matrix: Solid
Associated Lab Samples: 60212867001, 60212867002, 60212867003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Percent Moisture	%	ND	0.50	02/12/16 00:00	

SAMPLE DUPLICATE: 1709094

Parameter	Units	60212828001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	20.5	21.7	6	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11102646 Mangnum No 1
Pace Project No.: 60212867

QC Batch: WETA/38078 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60212867001, 60212867002, 60212867003

METHOD BLANK: 1709081 Matrix: Solid
Associated Lab Samples: 60212867001, 60212867002, 60212867003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/kg	ND	100	02/12/16 12:28	

LABORATORY CONTROL SAMPLE: 1709082

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/kg	500	491	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1709083 1709084

Parameter	Units	60212867001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/kg	ND	515	523	504	509	95	95	80-120	1	15	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Lenexa, KS 66219
(913)599-5665

QUALIFIERS

Project: 11102646 Mangnum No 1
Pace Project No.: 60212867

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 11102646 Mangnum No 1
Pace Project No.: 60212867

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60212867001	SS11102646-021116JW-N. WALL WE	EPA 3546	OEXT/53083	EPA 8015B	GCSV/20516
60212867002	SS11102646-021116JW-N. WALL EA	EPA 3546	OEXT/53083	EPA 8015B	GCSV/20516
60212867003	SS11102646-021116JW-N. EAST WA	EPA 3546	OEXT/53083	EPA 8015B	GCSV/20516
60212867001	SS11102646-021116JW-N. WALL WE	EPA 5035A/8260	MSV/74143		
60212867002	SS11102646-021116JW-N. WALL EA	EPA 5035A/8260	MSV/74143		
60212867003	SS11102646-021116JW-N. EAST WA	EPA 5035A/8260	MSV/74143		
60212867001	SS11102646-021116JW-N. WALL WE	ASTM D2974	PMST/11493		
60212867002	SS11102646-021116JW-N. WALL EA	ASTM D2974	PMST/11493		
60212867003	SS11102646-021116JW-N. EAST WA	ASTM D2974	PMST/11493		
60212867001	SS11102646-021116JW-N. WALL WE	EPA 300.0	WETA/38078	EPA 300.0	WETA/38079
60212867002	SS11102646-021116JW-N. WALL EA	EPA 300.0	WETA/38078	EPA 300.0	WETA/38079
60212867003	SS11102646-021116JW-N. EAST WA	EPA 300.0	WETA/38078	EPA 300.0	WETA/38079

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Sample Condition Upon Receipt
ESI Tech Spec Client

WO# : 60212867

60212867

AFT

Optional
Proj Due Date:
Proj Name:

Client Name: GHD

Courier: FedEx ☑ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Other ☐ Client ☐

Tracking #: 6508 8164 3841 Pace Shipping Label Used? Yes ☐ No ☑

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☑ None ☐ Other ☐

Thermometer Used: CF +0.8 T-239 / CF +0.7 T-262 **Type of Ice:** (Wet) Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 1.1

Date and initials of person examining contents: BB 2/12/16

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes	☐No	☐N/A	1.
Chain of Custody filled out:	☑Yes	☐No	☐N/A	2.
Chain of Custody relinquished:	☑Yes	☐No	☐N/A	3.
Sampler name & signature on COC:	☑Yes	☐No	☐N/A	4.
Samples arrived within holding time:	☑Yes	☐No	☐N/A	5.
Short Hold Time analyses (<72hr):	☐Yes	☑No	☐N/A	6.
Rush Turn Around Time requested:	☑Yes	☐No	☐N/A	7. 2/12/16
Sufficient volume:	☑Yes	☐No	☐N/A	8.
Correct containers used:	☑Yes	☐No	☐N/A	
Pace containers used:	☑Yes	☐No	☐N/A	9.
Containers intact:	☑Yes	☐No	☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes	☐No	☑N/A	11.
Filtered volume received for dissolved tests?	☐Yes	☐No	☑N/A	12.
Sample labels match COC: Includes date/time/ID/analyses Y Matrix: SL	☐Yes	☐No	☐N/A	13.
All containers needing preservation have been checked.	☐Yes	☐No	☑N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☐Yes	☐No	☑N/A	14.
Exceptions: VOA, Coliform, O&G, WI-DRO (water)	☐Yes	☑No		Initial when completed / Lot # of added preservative
Trip Blank present: Pace Trip Blank lot # (if purchased): 101215-3	☐Yes	☐No	☐N/A	15.
Headspace in VOA vials (>6mm):	☐Yes	☐No	☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes	☑No	☐N/A	17. List State:
Additional labels attached to 5035A vials in the field?	☐Yes	☐No	☑N/A	18.

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.	
Start: 0950	Start:
End: 0955	End:
Temp:	Temp:

Project Manager Review: AAF Date: 2/12/16

F-KS-C-004-Rev.4, 30June 2015

Pace Analytical

24 hr TAT

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 Of 1

Section A	Section B	Section C	
Required Client Information:	Required Project Information:	Invoice Information:	
Company: GHD Services_COP NM	Report To: Jeffrey Walker	Attention:	
Address: 6121 Indian School Rd NE	Copy To: Cale Kanack	Company Name:	
Albuquerque, NM 87110	Angela Bown	Address:	Regulatory Agency
Email: jeff.walker@ghd.com	Purchase Order #:	Pace Quote:	
Phone: 505-377-3920 Fax:	Project Name: 11102646 Mangnum No 1	Pace Project Manager: alice.flanagan@pacelabs.com,	State / Location
Requested Due Date: 2/12/16	Project #:	Pace Profile #: 8644, 32	NM

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test: Y/N	Chloride	8015 DRO	8260 GRO	8260 BTEX (GRO)	Residual Chlorine (Y/N)	60212867
1	SS-11102646-021116-SW-N. Wall West	SS	C	2-11-16	0955	→	→		2	X									X	X	X	X		2WGFV 001
2	SS-11102646-021116-SW-N. Wall East	SS	C	2-11-16	1000	→	→		2	X									X	X	X	X		002
3	SS-11102646-021116-SW-East Wall	SS	C	2-11-16	1255	→			2	X									X	X	X	X		003
4																								2VGAV TB 004
5																								
6																								
7																								
8																								
9																								
10																								
11																								
12																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
Please try to have results COB Friday 2/12/16	J Walker/GHD	2/11/16					

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Jeff Walker

SIGNATURE of SAMPLER: J Walker DATE Signed: 2/11/16

TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

Appendix C
Photo Log

Photo 1 – Mangum No. 1 Site as excavation began.

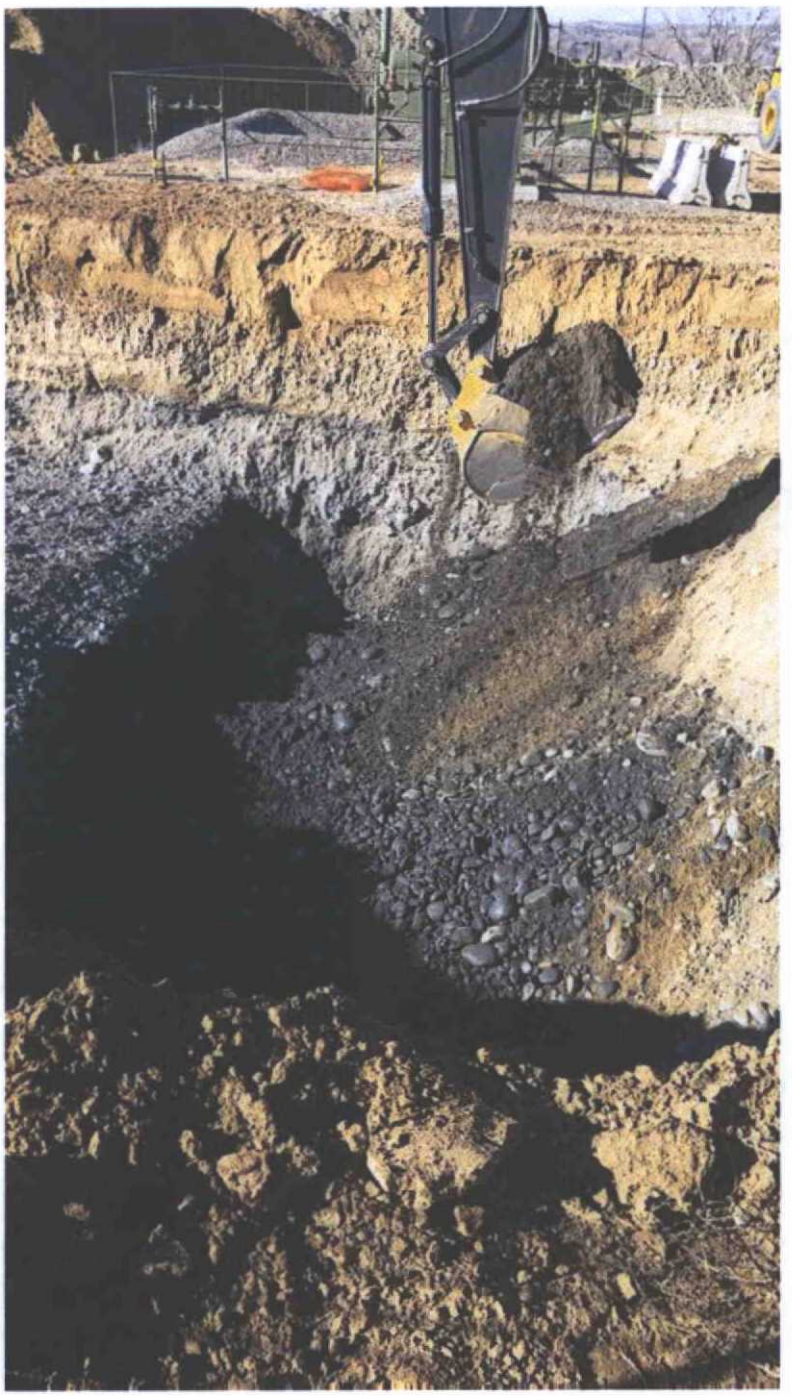

Photo 2 – Impacted soil being excavated.

Photo 3 – Excavation with groundwater accumulation in eastern portion.

Photo 4 – View to west after backfilling complete.

Appendix D
Groundwater Analytical Report

Pace Analytical Services, Inc.
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Lenexa, KS 66219
(913)599-5665

February 29, 2016

Jeffrey Walker
GHD Services, Inc
6121 Indian School Rd NE
Ste 200
Albuquerque, NM 87110

RE: Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

Dear Jeffrey Walker:
Enclosed are the analytical results for sample(s) received by the laboratory on February 25, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Alice Flanagan

Alice Flanagan
alice.flanagan@pacelabs.com
Project Manager

Enclosures

cc: Angela Bown, GHD Services, Inc,
Cassie Brown, GHD Services, Inc,
Cale Kanack, GHD

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9608 Loiret Blvd.
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CERTIFICATIONS

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 15-016-0
Illinois Certification #: 003097
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407
Utah Certification #: KS00021
Kansas Field Laboratory Accreditation: # E-92587

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SAMPLE SUMMARY

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60213687001	**GW-11102646-022416-CK-1**	Water	02/24/16 09:45	02/25/16 06:50
60213687002	**Trip Blank**	Water	02/24/16 09:45	02/25/16 06:50

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60213687001	**GW-11102646-022416-CK-1**	EPA 6010	JGP	13
		EPA 5030B/8260	JTK	57
		EPA 120.1	LDB	1
		SM 2320B	LDB	2
		SM 4500-H+B	LDB	1
		EPA 300.0	RAB	3
		EPA 353.2	AJM	1
60213687002	**Trip Blank**	EPA 5030B/8260	JTK	57

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PROJECT NARRATIVE

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

Method: **EPA 6010**
Description: 6010 MET ICP, Dissolved
Client: GHD Services_COP NM
Date: February 29, 2016

General Information:
1 sample was analyzed for EPA 6010. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3010 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/34988

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60213687001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1715586)
  - Calcium, Dissolved
- MSD (Lab ID: 1715587)
  - Calcium, Dissolved
  - Sodium, Dissolved

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

Method: **EPA 5030B/8260**
Description: 8260 MSV
Client: GHD Services_COP NM
Date: February 29, 2016

General Information:
2 samples were analyzed for EPA 5030B/8260. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MSV/74375

B: Analyte was detected in the associated method blank.
- BLANK for HBN 420361 [MSV/7437 (Lab ID: 1715889)
  - 1-Methylnaphthalene

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

QC Batch: MSV/74375

L0: Analyte recovery in the laboratory control sample (LCS) was outside QC limits.
- LCS (Lab ID: 1715890)
  - Carbon disulfide
  - Chloroethane
  - Dichlorodifluoromethane
  - Vinyl chloride

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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(913)599-5665

PROJECT NARRATIVE

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

Method: **EPA 120.1**
Description: 120.1 Specific Conductance
Client: GHD Services_COP NM
Date: February 29, 2016

General Information:
1 sample was analyzed for EPA 120.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: GHD Services_COP NM
Date: February 29, 2016

General Information:
1 sample was analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, Inc.
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(913)599-5665

PROJECT NARRATIVE

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

Method: **SM 4500-H+B**
Description: 4500H+ pH, Electrometric
Client: GHD Services_COP NM
Date: February 29, 2016

General Information:
1 sample was analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.
- GW-11102646-022416-CK-1 (Lab ID: 60213687001)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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(913)599-5665

PROJECT NARRATIVE

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: GHD Services_COP NM
Date: February 29, 2016

General Information:
1 sample was analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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(913)599-5665

PROJECT NARRATIVE

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

Method: EPA 353.2
Description: 353.2 Nitrogen, NO2/NO3 unpres
Client: GHD Services_COP NM
Date: February 29, 2016

General Information:
1 sample was analyzed for EPA 353.2. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/38256

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60213684001,60213686001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1715958)
  - Nitrogen, Nitrate
- MS (Lab ID: 1715959)
  - Nitrogen, Nitrate

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, Inc.
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ANALYTICAL RESULTS

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

Sample: GW-11102646-022416-CK-1 **Lab ID: 60213687001** Collected: 02/24/16 09:45 Received: 02/25/16 06:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Arsenic, Dissolved	ND	ug/L	10.0	1	02/25/16 15:05	02/26/16 14:47	7440-38-2	
Barium, Dissolved	**104**	ug/L	10.0	1	02/25/16 15:05	02/26/16 14:47	7440-39-3	
Cadmium, Dissolved	ND	ug/L	5.0	1	02/25/16 15:05	02/26/16 14:47	7440-43-9	
Calcium, Dissolved	**135000**	ug/L	100	1	02/25/16 15:05	02/26/16 14:47	7440-70-2	M1
Chromium, Dissolved	ND	ug/L	5.0	1	02/25/16 15:05	02/26/16 14:47	7440-47-3	
Cobalt, Dissolved	ND	ug/L	5.0	1	02/25/16 15:05	02/26/16 14:47	7440-48-4	
Iron, Dissolved	ND	ug/L	50.0	1	02/25/16 15:05	02/26/16 14:47	7439-89-6	
Magnesium, Dissolved	**46000**	ug/L	50.0	1	02/25/16 15:05	02/26/16 14:47	7439-95-4	
Manganese, Dissolved	**554**	ug/L	5.0	1	02/25/16 15:05	02/26/16 14:47	7439-96-5	
Potassium, Dissolved	**2670**	ug/L	500	1	02/25/16 15:05	02/26/16 14:47	7440-09-7	
Sodium, Dissolved	**554000**	ug/L	1000	2	02/25/16 15:05	02/26/16 14:21	7440-23-5	M1
Total Hardness by 2340B, Dissolved	**527000**	ug/L	500	1	02/25/16 15:05	02/26/16 14:47		
Zinc, Dissolved	ND	ug/L	50.0	1	02/25/16 15:05	02/26/16 14:47	7440-66-6	
8260 MSV	Analytical Method: EPA 5030B/8260							
Acetone	ND	ug/L	50.0	5		02/26/16 15:55	67-64-1	
Benzene	**18.9**	ug/L	5.0	5		02/26/16 15:55	71-43-2	
Bromobenzene	ND	ug/L	5.0	5		02/26/16 15:55	108-86-1	
Bromodichloromethane	ND	ug/L	5.0	5		02/26/16 15:55	75-27-4	
Bromoform	ND	ug/L	5.0	5		02/26/16 15:55	75-25-2	
Bromomethane	ND	ug/L	25.0	5		02/26/16 15:55	74-83-9	
2-Butanone (MEK)	ND	ug/L	50.0	5		02/26/16 15:55	78-93-3	
Carbon disulfide	ND	ug/L	25.0	5		02/26/16 15:55	75-15-0	L1
Carbon tetrachloride	ND	ug/L	5.0	5		02/26/16 15:55	56-23-5	
Chlorobenzene	ND	ug/L	5.0	5		02/26/16 15:55	108-90-7	
Chloroethane	ND	ug/L	5.0	5		02/26/16 15:55	75-00-3	L3
Chloroform	ND	ug/L	5.0	5		02/26/16 15:55	67-66-3	
Chloromethane	ND	ug/L	5.0	5		02/26/16 15:55	74-87-3	
Cyclohexane	**333**	ug/L	5.0	5		02/26/16 15:55	110-82-7	
1,2-Dibromo-3-chloropropane	ND	ug/L	12.5	5		02/26/16 15:55	96-12-8	
Dibromochloromethane	ND	ug/L	5.0	5		02/26/16 15:55	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	5.0	5		02/26/16 15:55	106-93-4	
1,2-Dichlorobenzene	ND	ug/L	5.0	5		02/26/16 15:55	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	5.0	5		02/26/16 15:55	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	5.0	5		02/26/16 15:55	106-46-7	
Dichlorodifluoromethane	ND	ug/L	5.0	5		02/26/16 15:55	75-71-8	L3
1,1-Dichloroethane	ND	ug/L	5.0	5		02/26/16 15:55	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	5		02/26/16 15:55	107-06-2	
1,2-Dichloroethene (Total)	ND	ug/L	5.0	5		02/26/16 15:55	540-59-0	
1,1-Dichloroethene	ND	ug/L	5.0	5		02/26/16 15:55	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	5		02/26/16 15:55	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	5		02/26/16 15:55	156-60-5	
1,2-Dichloropropane	ND	ug/L	5.0	5		02/26/16 15:55	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	5.0	5		02/26/16 15:55	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	5.0	5		02/26/16 15:55	10061-02-6	
Ethylbenzene	**101**	ug/L	5.0	5		02/26/16 15:55	100-41-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

Sample: GW-11102646-022416-CK-1 **Lab ID: 60213687001** Collected: 02/24/16 09:45 Received: 02/25/16 06:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 5030B/8260							
2-Hexanone	ND	ug/L	50.0	5		02/26/16 15:55	591-78-6	
Isopropylbenzene (Cumene)	**35.9**	ug/L	5.0	5		02/26/16 15:55	98-82-8	
Methyl acetate	ND	ug/L	5.0	5		02/26/16 15:55	79-20-9	
Methylcyclohexane	**343**	ug/L	5.0	5		02/26/16 15:55	108-87-2	
Methylene chloride	ND	ug/L	5.0	5		02/26/16 15:55	75-09-2	
1-Methylnaphthalene	**39.3**	ug/L	25.0	5		02/26/16 15:55	90-12-0	B
2-Methylnaphthalene	**39.3**	ug/L	25.0	5		02/26/16 15:55	91-57-6	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	50.0	5		02/26/16 15:55	108-10-1	
Methyl-tert-butyl ether	ND	ug/L	5.0	5		02/26/16 15:55	1634-04-4	
Naphthalene	ND	ug/L	50.0	5		02/26/16 15:55	91-20-3	
Styrene	ND	ug/L	5.0	5		02/26/16 15:55	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0	5		02/26/16 15:55	79-34-5	
Tetrachloroethene	ND	ug/L	5.0	5		02/26/16 15:55	127-18-4	
Toluene	ND	ug/L	5.0	5		02/26/16 15:55	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/L	5.0	5		02/26/16 15:55	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	5.0	5		02/26/16 15:55	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	5.0	5		02/26/16 15:55	79-00-5	
Trichloroethene	ND	ug/L	5.0	5		02/26/16 15:55	79-01-6	
Trichlorofluoromethane	ND	ug/L	5.0	5		02/26/16 15:55	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	5.0	5		02/26/16 15:55	76-13-1	
Vinyl chloride	ND	ug/L	5.0	5		02/26/16 15:55	75-01-4	L3
Xylene (Total)	**863**	ug/L	15.0	5		02/26/16 15:55	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	101	%	77-130	5		02/26/16 15:55	460-00-4	
1,2-Dichloroethane-d4 (S)	102	%	81-127	5		02/26/16 15:55	17060-07-0	
Toluene-d8 (S)	104	%	80-120	5		02/26/16 15:55	2037-26-5	
Preservation pH	**1.0**		0.10	5		02/26/16 15:55		
120.1 Specific Conductance	Analytical Method: EPA 120.1							
Specific Conductance	**3890**	umhos/cm	1.0	1		02/26/16 12:15		
2320B Alkalinity	Analytical Method: SM 2320B							
Alkalinity,Bicarbonate (CaCO3)	**833**	mg/L	20.0	1		02/26/16 08:31		
Alkalinity, Total as CaCO3	**833**	mg/L	20.0	1		02/26/16 08:31		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B							
pH at 25 Degrees C	**7.8**	Std. Units	0.10	1		02/26/16 12:05		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**29.2**	mg/L	5.0	5		02/25/16 11:40	16887-00-6	
Fluoride	**0.50**	mg/L	0.20	1		02/25/16 11:23	16984-48-8	
Sulfate	**819**	mg/L	50.0	50		02/25/16 10:13	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2							
Nitrogen, Nitrate	ND	mg/L	0.10	1		02/26/16 08:04		

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

Sample: Trip Blank **Lab ID: 60213687002** Collected: 02/24/16 09:45 Received: 02/25/16 06:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 5030B/8260							
Acetone	ND	ug/L	10.0	1		02/26/16 16:10	67-64-1	
Benzene	ND	ug/L	1.0	1		02/26/16 16:10	71-43-2	
Bromobenzene	ND	ug/L	1.0	1		02/26/16 16:10	108-86-1	
Bromodichloromethane	ND	ug/L	1.0	1		02/26/16 16:10	75-27-4	
Bromoform	ND	ug/L	1.0	1		02/26/16 16:10	75-25-2	
Bromomethane	ND	ug/L	5.0	1		02/26/16 16:10	74-83-9	
2-Butanone (MEK)	ND	ug/L	10.0	1		02/26/16 16:10	78-93-3	
Carbon disulfide	ND	ug/L	5.0	1		02/26/16 16:10	75-15-0	L3
Carbon tetrachloride	ND	ug/L	1.0	1		02/26/16 16:10	56-23-5	
Chlorobenzene	ND	ug/L	1.0	1		02/26/16 16:10	108-90-7	
Chloroethane	ND	ug/L	1.0	1		02/26/16 16:10	75-00-3	L3
Chloroform	ND	ug/L	1.0	1		02/26/16 16:10	67-66-3	
Chloromethane	ND	ug/L	1.0	1		02/26/16 16:10	74-87-3	
Cyclohexane	ND	ug/L	1.0	1		02/26/16 16:10	110-82-7	
1,2-Dibromo-3-chloropropane	ND	ug/L	2.5	1		02/26/16 16:10	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	1		02/26/16 16:10	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	1		02/26/16 16:10	106-93-4	
1,2-Dichlorobenzene	ND	ug/L	1.0	1		02/26/16 16:10	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	1		02/26/16 16:10	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	1		02/26/16 16:10	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	1		02/26/16 16:10	75-71-8	L3
1,1-Dichloroethane	ND	ug/L	1.0	1		02/26/16 16:10	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		02/26/16 16:10	107-06-2	
1,2-Dichloroethene (Total)	ND	ug/L	1.0	1		02/26/16 16:10	540-59-0	
1,1-Dichloroethene	ND	ug/L	1.0	1		02/26/16 16:10	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		02/26/16 16:10	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		02/26/16 16:10	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	1		02/26/16 16:10	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	1.0	1		02/26/16 16:10	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	1		02/26/16 16:10	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	1		02/26/16 16:10	100-41-4	
2-Hexanone	ND	ug/L	10.0	1		02/26/16 16:10	591-78-6	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	1		02/26/16 16:10	98-82-8	
Methyl acetate	ND	ug/L	1.0	1		02/26/16 16:10	79-20-9	
Methylcyclohexane	ND	ug/L	1.0	1		02/26/16 16:10	108-87-2	
Methylene chloride	ND	ug/L	1.0	1		02/26/16 16:10	75-09-2	
1-Methylnaphthalene	**5.9**	ug/L	5.0	1		02/26/16 16:10	90-12-0	B
2-Methylnaphthalene	**5.9**	ug/L	5.0	1		02/26/16 16:10	91-57-6	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10.0	1		02/26/16 16:10	108-10-1	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		02/26/16 16:10	1634-04-4	
Naphthalene	ND	ug/L	10.0	1		02/26/16 16:10	91-20-3	
Styrene	ND	ug/L	1.0	1		02/26/16 16:10	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	1		02/26/16 16:10	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	1		02/26/16 16:10	127-18-4	
Toluene	ND	ug/L	1.0	1		02/26/16 16:10	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	1		02/26/16 16:10	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	1		02/26/16 16:10	71-55-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

Sample: Trip Blank **Lab ID: 60213687002** Collected: 02/24/16 09:45 Received: 02/25/16 06:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 5030B/8260							
1,1,2-Trichloroethane	ND	ug/L	1.0	1		02/26/16 16:10	79-00-5	
Trichloroethene	ND	ug/L	1.0	1		02/26/16 16:10	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	1		02/26/16 16:10	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	1		02/26/16 16:10	76-13-1	
Vinyl chloride	ND	ug/L	1.0	1		02/26/16 16:10	75-01-4	L3
Xylene (Total)	ND	ug/L	3.0	1		02/26/16 16:10	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	102	%	77-130	1		02/26/16 16:10	460-00-4	
1,2-Dichloroethane-d4 (S)	103	%	81-127	1		02/26/16 16:10	17060-07-0	
Toluene-d8 (S)	101	%	80-120	1		02/26/16 16:10	2037-26-5	
Preservation pH	**1.0**		0.10	1		02/26/16 16:10		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

QC Batch: MPRP/34988
QC Batch Method: EPA 3010
Analysis Method: EPA 6010
Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 60213687001

METHOD BLANK: 1715584 Matrix: Water
Associated Lab Samples: 60213687001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	ug/L	ND	10.0	02/26/16 13:59	
Barium, Dissolved	ug/L	ND	10.0	02/26/16 13:59	
Cadmium, Dissolved	ug/L	ND	5.0	02/26/16 13:59	
Calcium, Dissolved	ug/L	ND	100	02/26/16 13:59	
Chromium, Dissolved	ug/L	ND	5.0	02/26/16 13:59	
Cobalt, Dissolved	ug/L	ND	5.0	02/26/16 13:59	
Iron, Dissolved	ug/L	ND	50.0	02/26/16 13:59	
Magnesium, Dissolved	ug/L	ND	50.0	02/26/16 13:59	
Manganese, Dissolved	ug/L	ND	5.0	02/26/16 13:59	
Potassium, Dissolved	ug/L	ND	500	02/26/16 13:59	
Sodium, Dissolved	ug/L	ND	500	02/26/16 13:59	
Total Hardness by 2340B, Dissolved	ug/L	ND	500	02/26/16 13:59	
Zinc, Dissolved	ug/L	ND	50.0	02/26/16 13:59	

LABORATORY CONTROL SAMPLE: 1715585

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	ug/L	1000	941	94	80-120	
Barium, Dissolved	ug/L	1000	988	99	80-120	
Cadmium, Dissolved	ug/L	1000	1000	100	80-120	
Calcium, Dissolved	ug/L	10000	10000	100	80-120	
Chromium, Dissolved	ug/L	1000	983	98	80-120	
Cobalt, Dissolved	ug/L	1000	1030	103	80-120	
Iron, Dissolved	ug/L	10000	10400	104	80-120	
Magnesium, Dissolved	ug/L	10000	10200	102	80-120	
Manganese, Dissolved	ug/L	1000	991	99	80-120	
Potassium, Dissolved	ug/L	10000	10100	101	80-120	
Sodium, Dissolved	ug/L	10000	10200	102	80-120	
Total Hardness by 2340B, Dissolved	ug/L		67100			
Zinc, Dissolved	ug/L	1000	1010	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1715586 1715587

Parameter	Units	60213687001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	ug/L	ND	1000	1000	984	1020	98	101	75-125	3	20	
Barium, Dissolved	ug/L	104	1000	1000	1050	1120	95	101	75-125	6	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1715586 1715587

Parameter	Units	60213687001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Cadmium, Dissolved	ug/L	ND	1000	1000	995	1030	99	103	75-125	3	20	
Calcium, Dissolved	ug/L	135000	10000	10000	141000	148000	56	127	75-125	5	20	M1
Chromium, Dissolved	ug/L	ND	1000	1000	960	973	96	97	75-125	1	20	
Cobalt, Dissolved	ug/L	ND	1000	1000	941	974	94	97	75-125	3	20	
Iron, Dissolved	ug/L	ND	10000	10000	9730	10400	97	104	75-125	7	20	
Magnesium, Dissolved	ug/L	46000	10000	10000	55900	56800	98	108	75-125	2	20	
Manganese, Dissolved	ug/L	554	1000	1000	1510	1540	96	99	75-125	2	20	
Potassium, Dissolved	ug/L	2670	10000	10000	12700	13600	100	109	75-125	7	20	
Sodium, Dissolved	ug/L	554000	10000	10000	561000	580000	76	264	75-125	3	20	M1
Total Hardness by 2340B, Dissolved	ug/L	527000			581000	603000				4		
Zinc, Dissolved	ug/L	ND	1000	1000	968	1000	97	100	75-125	3	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

QC Batch: MSV/74375 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Water 10 mL Purge
Associated Lab Samples: 60213687001, 60213687002

METHOD BLANK: 1715889 Matrix: Water
Associated Lab Samples: 60213687001, 60213687002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	1.0	02/26/16 14:55	
1,1,2,2-Tetrachloroethane	ug/L	ND	1.0	02/26/16 14:55	
1,1,2-Trichloroethane	ug/L	ND	1.0	02/26/16 14:55	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	1.0	02/26/16 14:55	
1,1-Dichloroethane	ug/L	ND	1.0	02/26/16 14:55	
1,1-Dichloroethene	ug/L	ND	1.0	02/26/16 14:55	
1,2,4-Trichlorobenzene	ug/L	ND	1.0	02/26/16 14:55	
1,2-Dibromo-3-chloropropane	ug/L	ND	2.5	02/26/16 14:55	
1,2-Dibromoethane (EDB)	ug/L	ND	1.0	02/26/16 14:55	
1,2-Dichlorobenzene	ug/L	ND	1.0	02/26/16 14:55	
1,2-Dichloroethane	ug/L	ND	1.0	02/26/16 14:55	
1,2-Dichloroethene (Total)	ug/L	ND	1.0	02/26/16 14:55	
1,2-Dichloropropane	ug/L	ND	1.0	02/26/16 14:55	
1,3-Dichlorobenzene	ug/L	ND	1.0	02/26/16 14:55	
1,4-Dichlorobenzene	ug/L	ND	1.0	02/26/16 14:55	
1-Methylnaphthalene	ug/L	6.0	5.0	02/26/16 14:55	
2-Butanone (MEK)	ug/L	ND	10.0	02/26/16 14:55	
2-Hexanone	ug/L	ND	10.0	02/26/16 14:55	
2-Methylnaphthalene	ug/L	ND	5.0	02/26/16 14:55	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	10.0	02/26/16 14:55	
Acetone	ug/L	ND	10.0	02/26/16 14:55	
Benzene	ug/L	ND	1.0	02/26/16 14:55	
Bromobenzene	ug/L	ND	1.0	02/26/16 14:55	
Bromodichloromethane	ug/L	ND	1.0	02/26/16 14:55	
Bromoform	ug/L	ND	1.0	02/26/16 14:55	
Bromomethane	ug/L	ND	5.0	02/26/16 14:55	
Carbon disulfide	ug/L	ND	5.0	02/26/16 14:55	
Carbon tetrachloride	ug/L	ND	1.0	02/26/16 14:55	
Chlorobenzene	ug/L	ND	1.0	02/26/16 14:55	
Chloroethane	ug/L	ND	1.0	02/26/16 14:55	
Chloroform	ug/L	ND	1.0	02/26/16 14:55	
Chloromethane	ug/L	ND	1.0	02/26/16 14:55	
cis-1,2-Dichloroethene	ug/L	ND	1.0	02/26/16 14:55	
cis-1,3-Dichloropropene	ug/L	ND	1.0	02/26/16 14:55	
Cyclohexane	ug/L	ND	1.0	02/26/16 14:55	
Dibromochloromethane	ug/L	ND	1.0	02/26/16 14:55	
Dichlorodifluoromethane	ug/L	ND	1.0	02/26/16 14:55	
Ethylbenzene	ug/L	ND	1.0	02/26/16 14:55	
Isopropylbenzene (Cumene)	ug/L	ND	1.0	02/26/16 14:55	
Methyl acetate	ug/L	ND	1.0	02/26/16 14:55	
Methyl-tert-butyl ether	ug/L	ND	1.0	02/26/16 14:55	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

METHOD BLANK: 1715889 Matrix: Water
Associated Lab Samples: 60213687001, 60213687002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methylcyclohexane	ug/L	ND	1.0	02/26/16 14:55	
Methylene chloride	ug/L	ND	1.0	02/26/16 14:55	
Naphthalene	ug/L	ND	10.0	02/26/16 14:55	
Styrene	ug/L	ND	1.0	02/26/16 14:55	
Tetrachloroethene	ug/L	ND	1.0	02/26/16 14:55	
Toluene	ug/L	ND	1.0	02/26/16 14:55	
trans-1,2-Dichloroethene	ug/L	ND	1.0	02/26/16 14:55	
trans-1,3-Dichloropropene	ug/L	ND	1.0	02/26/16 14:55	
Trichloroethene	ug/L	ND	1.0	02/26/16 14:55	
Trichlorofluoromethane	ug/L	ND	1.0	02/26/16 14:55	
Vinyl chloride	ug/L	ND	1.0	02/26/16 14:55	
Xylene (Total)	ug/L	ND	3.0	02/26/16 14:55	
1,2-Dichloroethane-d4 (S)	%	102	81-127	02/26/16 14:55	
4-Bromofluorobenzene (S)	%	104	77-130	02/26/16 14:55	
Toluene-d8 (S)	%	101	80-120	02/26/16 14:55	

LABORATORY CONTROL SAMPLE: 1715890

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	20	21.1	106	81-116	
1,1,2,2-Tetrachloroethane	ug/L	20	20.9	104	72-117	
1,1,2-Trichloroethane	ug/L	20	19.8	99	79-108	
1,1,2-Trichlorotrifluoroethane	ug/L	20	22.4	112	80-120	
1,1-Dichloroethane	ug/L	20	20.5	103	83-117	
1,1-Dichloroethene	ug/L	20	19.5	98	74-114	
1,2,4-Trichlorobenzene	ug/L	20	22.9	115	78-120	
1,2-Dibromo-3-chloropropane	ug/L	20	22.8	114	73-124	
1,2-Dibromoethane (EDB)	ug/L	20	21.8	109	81-120	
1,2-Dichlorobenzene	ug/L	20	22.2	111	84-117	
1,2-Dichloroethane	ug/L	20	19.6	98	72-116	
1,2-Dichloroethene (Total)	ug/L	40	39.4	98	80-120	
1,2-Dichloropropane	ug/L	20	20.1	100	80-120	
1,3-Dichlorobenzene	ug/L	20	20.9	104	80-120	
1,4-Dichlorobenzene	ug/L	20	20.8	104	80-120	
1-Methylnaphthalene	ug/L	20	19.3	97	47-169	
2-Butanone (MEK)	ug/L	100	106	106	67-129	
2-Hexanone	ug/L	100	115	115	70-128	
2-Methylnaphthalene	ug/L	20	19.4	97	36-172	
4-Methyl-2-pentanone (MIBK)	ug/L	100	113	113	80-120	
Acetone	ug/L	100	114	114	56-142	
Benzene	ug/L	20	20.3	102	79-116	
Bromobenzene	ug/L	20	20.0	100	80-120	
Bromodichloromethane	ug/L	20	21.1	105	80-120	
Bromoform	ug/L	20	20.1	100	73-114	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

LABORATORY CONTROL SAMPLE: 1715890

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Bromomethane	ug/L	20	27.9	139	49-153	
Carbon disulfide	ug/L	20	24.5	123	82-121	L0
Carbon tetrachloride	ug/L	20	20.7	103	80-116	
Chlorobenzene	ug/L	20	19.9	100	80-120	
Chloroethane	ug/L	20	27.0	135	67-124	L0
Chloroform	ug/L	20	19.2	96	79-120	
Chloromethane	ug/L	20	35.1	175	10-192	
cis-1,2-Dichloroethene	ug/L	20	19.7	99	80-120	
cis-1,3-Dichloropropene	ug/L	20	21.8	109	80-120	
Cyclohexane	ug/L	20	21.8	109	80-123	
Dibromochloromethane	ug/L	20	21.9	109	80-120	
Dichlorodifluoromethane	ug/L	20	76.5	383	22-167	L0
Ethylbenzene	ug/L	20	20.1	101	80-120	
Isopropylbenzene (Cumene)	ug/L	20	19.9	99	80-120	
Methyl acetate	ug/L	20	20.9	104	52-121	
Methyl-tert-butyl ether	ug/L	20	23.3	117	79-117	
Methylcyclohexane	ug/L	20	21.5	107	79-124	
Methylene chloride	ug/L	20	20.2	101	80-120	
Naphthalene	ug/L	20	22.0	110	74-125	
Styrene	ug/L	20	19.9	99	80-120	
Tetrachloroethene	ug/L	20	19.1	95	80-120	
Toluene	ug/L	20	19.7	99	80-120	
trans-1,2-Dichloroethene	ug/L	20	19.7	98	78-108	
trans-1,3-Dichloropropene	ug/L	20	22.8	114	85-120	
Trichloroethene	ug/L	20	18.6	93	76-114	
Trichlorofluoromethane	ug/L	20	23.3	117	78-132	
Vinyl chloride	ug/L	20	32.8	164	69-129	L0
Xylene (Total)	ug/L	60	60.3	100	80-120	
1,2-Dichloroethane-d4 (S)	%			102	81-127	
4-Bromofluorobenzene (S)	%			101	77-130	
Toluene-d8 (S)	%			100	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

QC Batch: WET/60312
QC Batch Method: EPA 120.1
Analysis Method: EPA 120.1
Analysis Description: 120.1 Specific Conductance
Associated Lab Samples: 60213687001

METHOD BLANK: 1716291
Matrix: Water
Associated Lab Samples: 60213687001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Specific Conductance	umhos/cm	ND	1.0	02/26/16 12:15	

SAMPLE DUPLICATE: 1716292

Parameter	Units	60213687001 Result	Dup Result	RPD	Max RPD	Qualifiers
Specific Conductance	umhos/cm	3890	3880	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

QC Batch: WET/60298
QC Batch Method: SM 2320B
Analysis Method: SM 2320B
Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60213687001

METHOD BLANK: 1715793
Matrix: Water
Associated Lab Samples: 60213687001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	20.0	02/26/16 08:22	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	20.0	02/26/16 08:22	

LABORATORY CONTROL SAMPLE: 1715794

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	543	109	90-110	

SAMPLE DUPLICATE: 1715795

Parameter	Units	60213597001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	762	763	0	10	
Alkalinity,Bicarbonate (CaCO3)	mg/L	762	763	0	10	

SAMPLE DUPLICATE: 1715796

Parameter	Units	60213605001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	264	264	0	10	
Alkalinity,Bicarbonate (CaCO3)	mg/L	264	264	0	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

QC Batch: WET/60313
QC Batch Method: SM 4500-H+B
Analysis Method: SM 4500-H+B
Analysis Description: 4500H+B pH
Associated Lab Samples: 60213687001

SAMPLE DUPLICATE: 1716301

Parameter	Units	60213687001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.8	7.8	0	5	H6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

QC Batch: WETA/38253
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60213687001

METHOD BLANK: 1715365 Matrix: Water
Associated Lab Samples: 60213687001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	02/25/16 09:03	
Fluoride	mg/L	ND	0.20	02/25/16 09:03	
Sulfate	mg/L	ND	1.0	02/25/16 09:03	

LABORATORY CONTROL SAMPLE: 1715366

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.0	100	90-110	
Fluoride	mg/L	2.5	2.7	109	90-110	
Sulfate	mg/L	5	5.3	106	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1715367 1715368

Parameter	Units	60213498001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	47.5	25	25	71.9	72.0	98	98	80-120	0	15	
Fluoride	mg/L	0.49J	12.5	12.5	12.7	12.8	98	98	80-120	1	15	
Sulfate	mg/L	384	250	250	608	611	90	91	80-120	0	15	

MATRIX SPIKE SAMPLE: 1715369

Parameter	Units	60213580003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	110	50	160	100	80-120	
Fluoride	mg/L	<2.0	25	26.5	98	80-120	
Sulfate	mg/L	510	250	740	92	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

QC Batch: WETA/38256
QC Batch Method: EPA 353.2
Analysis Method: EPA 353.2
Analysis Description: 353.2 Nitrate + Nitrite, Unpres.
Associated Lab Samples: 60213687001

METHOD BLANK: 1715956 Matrix: Water
Associated Lab Samples: 60213687001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Nitrate	mg/L	ND	0.10	02/26/16 07:49	

LABORATORY CONTROL SAMPLE: 1715957

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrate	mg/L	1.6	1.7	104	85-115	

MATRIX SPIKE SAMPLE: 1715958

Parameter	Units	60213684001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrate	mg/L	3.3	1.6	4.7	83	85-115	M1

MATRIX SPIKE SAMPLE: 1715959

Parameter	Units	60213686001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrate	mg/L	3.3	1.6	4.6	81	85-115	M1

SAMPLE DUPLICATE: 1715960

Parameter	Units	60213758001 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Nitrate	mg/L	61.8	62.9	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
H6	Analysis initiated outside of the 15 minute EPA required holding time.
L0	Analyte recovery in the laboratory control sample (LCS) was outside QC limits.
L1	Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results for this analyte in associated samples may be biased high.
L3	Analyte recovery in the laboratory control sample (LCS) exceeded QC limits. Analyte presence below reporting limits in associated samples. Results unaffected by high bias.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

Pace Analytical Services, Inc.
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(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 11102646 COP Mangum No 1
Pace Project No.: 60213687

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60213687001	GW-11102646-022416-CK-1	EPA 3010	MPRP/34988	EPA 6010	ICP/25635
60213687001	GW-11102646-022416-CK-1	EPA 5030B/8260	MSV/74375		
60213687002	Trip Blank	EPA 5030B/8260	MSV/74375		
60213687001	GW-11102646-022416-CK-1	EPA 120.1	WET/60312		
60213687001	GW-11102646-022416-CK-1	SM 2320B	WET/60298		
60213687001	GW-11102646-022416-CK-1	SM 4500-H+B	WET/60313		
60213687001	GW-11102646-022416-CK-1	EPA 300.0	WETA/38253		
60213687001	GW-11102646-022416-CK-1	EPA 353.2	WETA/38256		

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Sample Condition Upon Receipt
ESI Tech Spec Client

WO# : 60213687

60213687

Client Name: GHD

Optional
Proj Due Date:
Proj Name:

Courier: FedEx ☑ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Other ☐ Client ☐

Tracking #: 782452858038 Pace Shipping Label Used? Yes ☐ No ☑

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☐ Foam ☐ None ☑ Other ☐

Thermometer Used: CF +0.8 T-239 / CF +0.7 T-282 **Type of Ice:** Wet Blue None (circle one) ☐ Samples received on ice, cooling process has begun.

Cooler Temperature: 3.5

Temperature should be above freezing to 6°C

Date and initials of person examining contents: pv 2/25/16

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	6. pH NO3
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests? pv 2/25/16	☑Yes ☐No ☐N/A	12.
Sample labels match COC:	☑Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: WT		13.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	14.
Exceptions: VOA, Coliform, O&G, WI-DRO (water)	☑Yes ☐No	Initial when completed / Lot # of added preservative
Trip Blank present:	☐Yes ☐No ☑N/A	
Pace Trip Blank lot # (if purchased):		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:
Additional labels attached to 5035A vials in the field?	☐Yes ☐No ☑N/A	18.

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.

Start: 0657	Start:
End: 0700	End:
Temp:	Temp:

Project Manager Review: AAF Date: 2/26/16

Pace Analytical

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

60213687

Page : 1 Of 1

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:	
Company: GHD Services_COP NM	Report To: Jeff Walker	Attention:	
Address: 6121 Indian School Rd	Copy To: Cale Kanack	Company Name:	Regulatory Agency
Albuquerque, NM 87110	Angela Bown	Address:	
Email: jeff.walker@ghd.com	Purchase Order #:	Pace Quote:	
Phone: (505)274-8982 Fax:	Project Name: 11102646 COP Mangum No 1	Pace Project Manager: alice.flanagan@pacelabs.com,	State / Location NM
Requested Due Date: 24-HR TAT	Project #: 11102646	Pace Profile #:	

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	8260 Full List	6010 Dissolved Metals**	7470 Mercury, dissolved	300.0 Cl,SO4,F	Total Alkalinity	Bicarbonate Alkalinity	Total Hardness	pH	Specific Conductance	Nitrates		Residual Chlorine (Y/N)	
1	GW-11102646-022416-CK-1	WT	G	2-24-16	1B3F	2-24-16	0945		8	1		1	6	2.0			1BP2u		X	X		X	X	X	X	X	X	6D69/H		METALS LIST
2	TRIP BLANK	✓	✓	—	—	—	—		3				3						X							3D69/H			UPDATE **
3																														REMOVE Cu, Pb, Hg, Se, Ag
4																														
5																														
6																														ADD Na, K, Ca, Mg
7																														
8																														
9																														SAMPLE WAS FIELD FILTERED
10																														
11																														
12																														

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
* 24-HR TAT *	Cale Kanack / GHD	2-24-16	1430	[illegible] / GHD	2-24-16	1430				
	[illegible]	2-24-16	1500	[illegible]	2/25/16	0650	3-5	Y	Y	Y

SAMPLER NAME AND SIGNATURE		
PRINT Name of SAMPLER:	CALE KANACK	
SIGNATURE of SAMPLER:	[signature]	DATE Signed: 2-24-16