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March 23, 2018

Randolph Bayliss, P.E.
NMOCD Environmental Bureau
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Subject: **2017 Annual Groundwater Report, Maverik Country Stores (Former Caribou Refinery), Kirtland, New Mexico**

Dear Mr. Bayliss:

This report provides the results of the 2017 Site activities for the Maverik Country Stores site (former Caribou Refinery) in Kirtland, New Mexico (**Figure 1**). These activities were completed during the 2017 calendar year to meet the annual monitoring requirements for the site. The scope of work completed included:

- Annual fluid level measurements of 22 on-site and off-site wells;
- Annual low-flow groundwater sampling of 9 on-site and 2 off-site wells;
- Annual analytical evaluation of VOCs and dissolved sulfate in groundwater samples from 5 on-site wells, along with analytical evaluation of VOCs from 4 on-site and 2 off-site monitoring wells.

Field methods, results, and the conclusions from the 2017 field events are discussed below.

Annual Groundwater Sampling

Annual groundwater sampling activities were conducted on December 27 and 28, 2017. Prior to well sampling, site-wide fluid levels were measured using an oil/water interface probe (**Table 1**) for compilation of the site potentiometric surface map (**Figure 2**). Fluid levels were not obtainable from the following eight site wells:

- MW-01: The well has a blockage approximately 2 feet below ground surface that prevented collection of a fluid level measurement;
- MW-08: The well was inaccessible;

None of the monitoring wells contained measurable thicknesses of LNAPL during this event. Based on the December 2017 groundwater elevations, the groundwater flow direction is to the south-southwest across the site toward the San Juan River. This flow direction is consistent with past monitoring events. The average of horizontal gradient calculations at the site was 0.006 ft/ft (**Figure 2**).

Seven monitoring wells and the four injection wells were sampled as part of the regular annual groundwater sampling event. All wells were sampled utilizing a peristaltic pump and flow-through cell. Groundwater field parameters pH, temperature, conductivity, dissolved oxygen (DO), and oxidation reduction potential (ORP) were measured using a flow through cell and YSI 556 MPS during groundwater sampling. Groundwater samples were sent to ALS in Fort Collins, Colorado under chain-of-custody (COC) protocol and analyzed for volatile organic compounds (VOCs) using EPA Method 8260C. In addition, the groundwater samples collected from MW-17 and the four injection wells (INJ-North, INJ-South, INJ-East, and INJ-West) were analyzed for dissolved sulfate using EPA Method 300.0. Laboratory deliverables are provided in **Attachment A**. Results of the groundwater sampling are summarized in **Table 2**. The results show that constituents of concern BTEX and 1,2 dichloroethane (1,2-DCA) concentrations are confined within the slurry wall impoundment area (**Figure 3**). Dissolved sulfate was detected in MW-17 and the four injection wells. No VOC concentrations were detected in down-gradient wells (MW-10, MW-19, and MW-20) outside the slurry wall, cross gradient wells (MW-9, MW-16, and MW-21) **(Table 2)**. Due to lack of water, up-gradient wells (north of MW-17), MW-18 and MW-22 were unable to be sampled in 2017.

Summary and Conclusions

The annual groundwater sampling was completed during the week of December 26th, 2017. Fluid levels were measured in 22 wells to establish groundwater flow conditions. Across the site groundwater flow is to the south-southwest, toward the San Juan River. Groundwater results were below New Mexico Groundwater Standards for all 8260 VOCs with the exception of injection well INJ-North located within the slurry wall impoundment area. Groundwater sampled from INJ-North exceeded the New Mexico Groundwater Standards of 10 µg/L for Benzene with a detection of 58 µg/L. This detection is consistent with the 48 µg/L Benzene detection from the previous 2016 sampling.

The groundwater sampling data suggest that the In Situ Chemical Oxidation (ISCO) injections were successful in decreasing the concentrations of VOCs within the slurry wall. Overall, the slurry wall impoundment is functioning as designed and no off-site migration of constituents of concern is occurring. During 2017 Maverik conducted an additional round of ISCO injections to treat the VOC's that persist within the slurry wall.

Sincerely,

TRC
Results you can rely on

Jason Jayroe
Project Manager

Tables

Table 1 – Groundwater Elevation Table
Table 2 – Analytical Results Table

Figures

Figure 1 – Site Location Map
Figure 2 – Potentiometric Surface Map, December 2017
Figure 3 – Onsite and Offsite BTEX Concentration Map, December 2017

Attachments

Attachment A – Laboratory Data

Table 1
Monitoring Well Construction Summary and December 2017 Fluid Levels, Maverik Country Stores, Inc. (Former Caribou Refinery)

Well ID	Completion Date	Total Depth (ft. BGS)	Well Diameter (in.)	Top of Steel Casing Elevation (ft. AMSL)	Top of PVC Casing Elevation (ft. AMSL)	Ground Surface Elevation (ft. AMSL)	Top of Screen (ft. BGS)	Bottom of Screen (ft. BGS)	Screen Length (ft.)	Top of Screen Elevation (ft. AMSL)	Bottom of Screen Elevation (ft. AMSL)	Depth to Groundwater (ft.) December 2017	Product Thickness (ft.)	Groundwater Elevation (ft. AMSL)	Comments
MW-1	1987	21.5	2	5207.79	5207.24	5205.75	11.5	21.5	10	5194.25	5184.25	NA	NA	NA	Well damaged
MW-2	1987	15	2	5197.10	5196.93	5195.25	5	15	10	5190.25	5180.25	12.67	NA	5184.26	
MW-3	1987	14.5	2	5183.00	5181.46	5181.06	4.5	14.5	10	5176.56	5166.56	4.73	NA	5176.73	Well damaged
MW-4	1987	15	2	5178.41	5177.1	5176.14	5	15	10	5171.14	5161.14	NM	NA	NM	Converted to irrigation well
MW-5	1987	15	2	5175.62	5175.09	5173.67	5	15	10	5168.67	5158.67	8.21	NA	5166.88	
MW-6	1987	15.5	2	5176.40	5176.01	5174.23	5.5	15.5	10	5168.73	5158.73	NM	NA	NM	Well not located
MW-7	1987	15	2	5183.71	5182.84	5181.73	5	15	10	5176.73	5166.73	8.46	NA	5174.38	
MW-8	1987	15	2	5186.00	5185.87	5184.02	5	15	10	5179.02	5169.02	NM	NA	NM	
MW-9	1987	15	2	5191.39	5191.22	5189.33	5	15	10	5184.33	5174.33	8.92	NA	5182.30	
MW-10	1987	12.5	2	5189.80	5189.30	5187.47	2.5	12.5	10	5184.97	5174.97	6.31	NA	5182.99	
MW-11	1987	33	2	5197.26	5197.15	5194.97	23	33	10	5171.97	5161.97	NM	NA	NM	Abandoned 1990
MW-12	1987	12	2	5196.66	5196.19	5194.80	2	12	10	5192.80	5182.80	NM	NA	NM	Abandoned 1990
MW-13	1987	5	2	5187.76	NA	5187.56	0	5	5	5187.56	5182.56	NM	NA	NM	Destroyed
MW-14	1989	6	2	NA	5194.47	5190.70	1	6	5	5189.70	5184.70	NM	NA	NM	
MW-15	1989	6	2	NA	5188.80	5185.40	1	6	5	5184.40	5179.40	Dry	NA	NA	
MW-16	1990	13	2	NA	5194.98	5193.74	3	13	10	5190.74	5180.74	11.29	NA	5183.69	
MW-17	1993	15	2	5196.49	5195.91	5193.43	5	15	10	5188.43	5178.43	13.04	NA	5182.87	
MW-18	1993	15	2	5202.27	5201.75	5199.14	5	15	10	5194.14	5184.14	Dry	NA	NA	
MW-19	1990	12.5	2	NA	5189.54	5188.28	2.5	12.5	10	5185.78	5175.78	7.86	NA	5181.68	
MW-20	1990	12	2	NA	5191.05	5190.10	2	12	10	5188.10	5178.10	9.44	NA	5181.61	
MW-21	1990	13	2	NA	5194.81	5193.62	3	13	10	5190.62	5180.62	11.04	NA	5183.77	
MW-22	1990	13	2	NA	5195.86	5194.58	3	13	10	5191.58	5181.58	Dry	NA	NA	
P-1	1993	8	2	NA	5197.66	5195.74	3	8	5	5192.74	5187.74	Dry	NA	NA	
P-2	1993	8	2	NA	5192.32	5190.50	3	8	5	5187.50	5182.50	9.34	NA	5182.98	
P-3	1993	8	2	NA	5193.21	5191.44	3	8	5	5188.44	5183.44	Dry	NA	NA	
P-4	1993	8	2	NA	5198.82	5197.06	3	8	5	5194.06	5189.06	Dry	NA	NA	
INJ-N	2012	15	2	NA	NA	NA	5	15	10	NA	NA	12.56	NA	NA	
INJ-E	2012	15	2	NA	NA	NA	5	15	10	NA	NA	12.86	NA	NA	
INJ-S	2012	15	2	NA	NA	NA	5	15	10	NA	NA	12.94	NA	NA	
INJ-W	2012	15	2	NA	NA	NA	5	15	10	NA	NA	12.26	NA	NA	

Notes:

AMSL = Above mean sea level
BGS = Below ground surface
NM = Not Measured
NA = Not Applicable
ft =feet
in = inches

Table 2 Groundwater Results, Annually Sampled Monitoring Wells Maverik Country Stores, Inc. (Former Caribou Refinery)

Sample Name	Groundwater Standard*	Injection North	Injection North	Injection North	Injection North	Injection West	Injection West	Injection West	Injection West	Injection South	Injection South	Injection South	Injection South	Injection East	Injection East	Injection East	Injection East
Date		12/7/2014	12/11/2015	12/27/2016	12/28/2017	12/7/2014	12/11/2015	12/27/2016	12/28/2017	12/7/2014	12/11/2015	12/27/2016	12/27/2017	12/7/2014	12/11/2015	12/27/2016	12/27/2017
Analyte		ug/L	µg/L	µg/L	µg/L	ug/L	µg/L	µg/L	µg/L	ug/L	µg/L	µg/L	µg/L	ug/L	µg/L	µg/L	µg/L
Benzene	10	1	**370**	**48**	**58**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	NS	<1	**229**	**19**	**2.3**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethyl-Benzene	750	<1	**402**	**10**	**2.6**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Xylenes	100	<1	**2,270**	**1,070**	**56**	<1	<1	<1	<1	<1	<1	0.33	<1	<1	<1	<1	<1
1,2-DCA	10	**18**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dis. Sulfate	6000000	1275000	**5,815,000**	**3,100,000**	**2,800,000**	675000	**5,423,000**	**4,400,000**	**2,700,000**	295000	**2,305,000**	**1,900,000**	**1,800,000**	295000	**3,002,000**	**1,600,000**	**1,800,000**

Sample Name	Groundwater Standard*	MW-17	MW-17	MW-17	MW-17	MW-117 (MW-17 Dup)	MW-117 (MW-17 Dup)	MW-117 (MW-17 Dup)	MW-117 (MW-17 Dup)	MW-22	MW-22	MW-18	MW-18	MW-18
Date		12/7/2014	12/11/2015	12/27/2016	12/28/2017	12/7/2014	12/11/2015	12/27/2016	12/26/2017	12/7/2014	12/27/2016	12/7/2014	12/10/2015	12/27/2016
Analyte		ug/L	µg/L	µg/L	µg/L	ug/L	µg/L	µg/L	µg/L	ug/L	µg/L	ug/L	µg/L	µg/L
Benzene	10	<1	**290**	**0.74**	**2.7**	<1	**276**	**1.1**	**2.8**	**4**	**2.5**	**<1**	<1	<1
Toluene	NS	<1	**11**	**<1**	<1	<1	**10**	<1	<1	<1	<1	<1	<1	<1
Ethyl-Benzene	750	<1	**151**	**1.9**	**0.35**	<1	**143**	**3.4**	**0.39**	<1	**0.67**	**<1**	<1	<1
Total Xylenes	100	<1	**227**	**5.74**	**1.4**	<1	**222**	**13.2**	**1.5**	<1	**7.12**	**<1**	<1	<1
1,2-DCA	10	<1	<1	0.44	<1	<1	<1	0.39	<1	<1	**1.7**	**<1**	<1	<1
Dis. Sulfate	6000000	355000	**2,914,000**	**4,400,000**	**3,300,000**	360000	**3,512,000**	**3,800,000**	**3,300,000**	NS	NS	NS	NS	NS

Sample Name	Groundwater Standard*	MW-10	MW-10	MW-10	MW-10	MW-19	MW-19	MW-19	MW-19	MW-20	MW-20	MW-20	MW-20	MW-21	MW-21	MW-21	MW-21
Date		12/7/2014	12/10/2015	12/27/2016	12/27/2017	12/7/2014	12/10/2015	12/27/2016	12/27/2017	12/7/2014	12/10/2015	12/27/2016	12/27/2017	12/7/2014	12/10/2015	12/27/2016	12/27/2017
Analyte		ug/L	µg/L	µg/L	µg/L	ug/L	µg/L	µg/L	µg/L	ug/L	µg/L	µg/L	µg/L	ug/L	µg/L	µg/L	µg/L
Benzene	10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	NS	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethyl-Benzene	750	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Xylenes	100	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-DCA	10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dis. Sulfate	6000000	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Sample Name	Groundwater Standard*	MW-9	MW-9	MW-9	MW-9	MW-16	MW-16	MW-16	MW-16
Date		12/7/2014	12/10/2015	12/28/2016	12/27/2017	12/7/2014	12/10/2015	12/28/2016	12/27/2017
Analyte		ug/L	µg/L	µg/L	µg/L	ug/L	µg/L	µg/L	µg/L
Benzene	10	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	NS	<1	<1	<1	<1	<1	<1	<1	<1
Ethyl-Benzene	750	<1	<1	<1	<1	<1	<1	<1	<1
Total Xylenes	100	<1	<1	<1	<1	<1	<1	<1	<1
1,2-DCA	10	<1	<1	<1	<1	<1	<1	<1	<1
Dis. Sulfate	6000000	NS	NS	NS	NS	NS	NS	NS	NS

Notes:

* Groundwater Standards based on the New Mexico Administrative Code Section 20.6.2.3103

NS - Not sampled

J - Estimated result. Result is less than RL

U - Undetected at the reporting limit or at the reported concentration; result is considered to be a false positive

Bold - Detected result

Highlighted - Result Exceeds New Mexico Groundwater Standard

LEGEND

- MW-2 — MONITORING WELL
- P1 — PIEZOMETER
- E. Gray — PRIVATE WELL
- SLURRY WALL
- MAVERIK CARIBOU FORMER REFINERY BOUNDARY
- WESTSIDE IRRIGATION DITCH FILLED IN LOCATION

Co. Road 6261

Co. Road 6257

O. Curley

I. Hull

Co. Road D 6255

E. Mclemore

E. Gray

J.L. Flack

R. Neff

Co. Road D 6259

Co. Road D 6263

MW-15

(Out of Service)

MW-3

G. Nelson

MW-7

DITCH IS FILLED IN AT THIS LOCATION

R. Jackson

A. Jackson

Ryan

MW-4

Co. Road D 6271

MW-8

M. Stone

WM. H. Walker

MW-5

CO. Road 6100

U.S. Highway 64

Road

MW-1

MW-2

MW-21

MW-20

MW-10

MW-19

P1

P2

P3

P4

MW-22

MW-17

MW-18

MW-16

MW-14

MW-9

WESTSIDE IRRIGATION DITCH

MURRAY PROPERTY DITCH

DITCH IS FILLED IN AT THIS LOCATION

FARMER'S MUTUAL IRRIGATION DITCH

100 0 200

SCALE IN FEET

TRC

2017 ANNUAL GROUNDWATER REPORT
MAVERIK CARIBOU FORMER REFINERY
KIRTLAND, NEW MEXICO

DATE: 01-18-18 | DRWN: ERH

SITE LOCATION MAP
DECEMBER 2017

FIGURE 1

LEGEND

- MW-2 — MONITORING WELL
- P1 — PIEZOMETER
- E. Gray — PRIVATE WELL
- SLURRY WALL
- MAVERIK CARIBOU FORMER REFINERY BOUNDARY
- GROUNDWATER ELEVATION CONTOURS
- WESTSIDE IRRIGATION DITCH FILLED IN LOCATION

Co. Road 6257

Co. Road 6261

Co. Road D 6259

Co. Road D 6263

Co. Road D 6271

CO. Road 6100

U.S. Highway 64

Road

E. Mclemore

E. Gray

R. Neff

J.L. Flack

O. Curley

I. Hull

MW-2
5184.26

MW-1
NA

MW-21
5183.77

MW-20
5181.61

MW-10
5189.99

MW-19
5181.68

MW-22

MW-17

MW-18
NA

P1

P2

P3

P4

MW-16
5183.69

MW-14
NM

MW-9
5182.30

WESTSIDE
IRRIGATION
DITCH

FARMER'S MUTUAL
IRRIGATION DITCH

MURRAY
PROPERTY DITCH

5185

5183

5181

5179

5177

5175

5173

5171

5169

5167

MW-15
NA

DITCH IS FILLED IN
AT THIS LOCATION

(Out of Service)

MW-7
5175.95

DITCH IS FILLED IN
AT THIS LOCATION

MW-3
5176.73

G. Nelson

R. Jackson

Ryan

A. Jackson

MW-4
NM

MW-8
NM

M. Stone

WM. H. Walker

MW-5
5166.88

100 0 200

SCALE IN FEET

TRC

2017 ANNUAL GROUNDWATER REPORT
MAVERIK CARIBOU FORMER REFINERY
KIRTLAND, NEW MEXICO

DATE: 01-18-18 | DRWN: ERH

POTENTIOMETRIC SURFACE MAP
DECEMBER 2017

FIGURE 2

LEGEND

- MW-2 — MONITORING WELL
- P1 — PIEZOMETER
- INJ-W — INJECTION WELLS
- E. Gray — PRIVATE WELL
- SLURRY WALL
- MAVERIK CARIBOU FORMER REFINERY BOUNDARY
- WESTSIDE IRRIGATION DITCH FILLED IN LOCATION

ALL RESULTS ARE IN MICROGRAMS PER LITER (µg/L)
J - ESTIMATED CONCENTRATION

Co. Road 6257
Co. Road 6261
Co. Road D 6259
Co. Road D 6263
Co. Road D 6271
CO. Road 6100
U.S. Highway 64
Road
E. Mclemore
E. Gray
R. Neff
J.L. Flack
I. Hull
O. Curley
G. Nelson
R. Jackson
A. Jackson
Ryan
WM. H. Walker
M. Stone

MW-1 NA
MW-2 5184.26
MW-3 5176.73
MW-4 NM
MW-5 5166.88
MW-7 5175.95
MW-8 NM
MW-9 5182.30
MW-10 5189.99
MW-13 NA
MW-14 NM
MW-15 NA
MW-16 5183.69
MW-17
MW-19 5181.68
MW-20 5181.61
MW-21 5183.77
MW-22
P1
P2
P3
P4
INJ-W
INJ-N
INJ-E
INJ-S
SW1
SW2
SW13

INJ-W (Within Slurry Wall)	12/28/17
Benzene	<1
Toluene	<1
Ethyl-Benzene	<1
Total Xylenes	<1
1, 2 DCA	<1

MW-21 (On-Site)	12/27/17
Benzene	<1
Toluene	<1
Ethyl-Benzene	<1
Total Xylenes	<1
1, 2 DCA	<1

MW-17 (Within Slurry Wall)	12/28/17
Benzene	2.7
Toluene	<1
Ethyl-Benzene	0.35
Total Xylenes	1.4
1, 2 DCA	<1

MW-20 (On-Site)	12/27/17
Benzene	<1
Toluene	<1
Ethyl-Benzene	<1
Total Xylenes	<1
1, 2 DCA	<1

MW-10 (On-Site)	12/27/17
Benzene	<1
Toluene	<1
Ethyl-Benzene	<1
Total Xylenes	<1
1, 2 DCA	<1

INJ-N (Within Slurry Wall)	12/28/17
Benzene	**58**
Toluene	2.3
Ethyl-Benzene	2.61
Total Xylenes	56
1, 2 DCA	<1

MW-19 (On-Site)	12/27/17
Benzene	<1
Toluene	<1
Ethyl-Benzene	<1
Total Xylenes	<1
1, 2 DCA	<1

MW-16 (Off-Site)	12/27/17
Benzene	<1
Toluene	<1
Ethyl-Benzene	<1
Total Xylenes	<1
1, 2 DCA	<1

INJ-E (Within Slurry Wall)	12/28/17
Benzene	<1
Toluene	<1
Ethyl-Benzene	<1
Total Xylenes	<1
1, 2 DCA	<1

MW-9 (Off Site)	12/27/17
Benzene	<1
Toluene	<1
Ethyl-Benzene	<1
Total Xylenes	<1
1, 2 DCA	<1

INJ-S (Within Slurry Wall)	12/28/17
Benzene	<1
Toluene	<1
Ethyl-Benzene	<1
Total Xylenes	<1
1, 2 DCA	<1

FARMER'S MUTUAL IRRIGATION DITCH
WESTSIDE IRRIGATION DITCH
MURRAY PROPERTY DITCH
DITCH IS FILLED IN AT THIS LOCATION
DITCH IS FILLED IN AT THIS LOCATION
(Out of Service)

100 0 200
SCALE IN FEET

TRC

2017 ANNUAL GROUNDWATER REPORT
MAVERIK CARIBOU FORMER REFINERY
KIRTLAND, NEW MEXICO

DATE: 01-18-18 | DRWN: ERH

BTEX CONCENTRATION MAP
DECEMBER 2017

FIGURE 3

Thursday, January 11, 2018

Jason Jayroe
TRC
131 East Lincoln Ave.
Fort Collins, CO 80524

Re: ALS Workorder: 1712524
Project Name: Maverik Kirtland
Project Number:

Dear Mr. Jayroe:

Twelve water samples were received from TRC, on 12/29/2017. The samples were scheduled for the following analyses:

GC/MS Volatiles
Inorganics

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Marcela M. Hobgood
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Connecticut (CT)	PH-0232
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
L-A-B (DoD ELAP/ISO 170250)	L2257
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1712524

GC/MS Volatiles:
The samples were analyzed using GC/MS following the current revision of SOP 525 based on SW-846 Method 8260C.

All surrogate recoveries were within acceptance criteria with the following exceptions:

Surrogate	Sample	Direction
Dibromofluorobenzene	-1, -2, -4, -5 and -6	Low

The low surrogate recoveries are due to the basic PH of the samples. No further action was taken.

All remaining acceptance criteria were met.

Inorganics:
The samples were analyzed following EMSL procedures for the current revision of the following SOP and method:

Analyte	Method	SOP #
Sulfate	300.0 Revision 2.1	1113

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1712524
Client Name: TRC
Client Project Name: Maverik Kirtland
Client Project Number:
Client PO Number:

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
Inj-West	1712524-1		WATER	28-Dec-17	8:00
MW-17	1712524-2		WATER	28-Dec-17	8:30
MW-117	1712524-3		WATER	26-Dec-17	16:00
Inj-North	1712524-4		WATER	28-Dec-17	9:10
Inj-South	1712524-5		WATER	27-Dec-17	7:30
Inj-East	1712524-6		WATER	27-Dec-17	8:00
MW-21	1712524-7		WATER	27-Dec-17	9:00
MW-20	1712524-8		WATER	27-Dec-17	9:20
MW-10	1712524-9		WATER	27-Dec-17	13:30
MW-19	1712524-10		WATER	27-Dec-17	14:30
MW-16	1712524-11		WATER	27-Dec-17	15:35
MW-9	1712524-12		WATER	27-Dec-17	16:15

ALS Environmental

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Chain-of-Custody

Form 202r8

WORKORDER # 1712524

PROJECT NAME	Maverik Kirtland	SAMPLER	Jjayroe	DATE	12/29/2017	PAGE 1 of 2
PROJECT No.		SITE ID		TURNAROUND	Normal	DISPOSAL By Lab or Return to Client
		EDD FORMAT				
		PURCHASE ORDER				
COMPANY NAME	TRC	BILL TO COMPANY				
SEND REPORT TO	Jason Jayroe	INVOICE ATTN TO	Jason Jayroe			
ADDRESS	131 East Lincoln Ave Suite 200	ADDRESS				
CITY / STATE / ZIP	Fort Collins, CO 80524	CITY / STATE / ZIP				
PHONE	9704843263	PHONE				
FAX	9704843250	FAX				
E-MAIL	jjayroe@trcsolutions.com	E-MAIL				

Lab ID	Field ID	Matrix	Sample Date	Sample Time	# Bottles	Pres.	QC	BTEX, 1,2 DCA	Sulfate
1	Inj-West	GW	12/28/2017	*0800	4	HCL		X	X
2	MW-17	GW	12/28/2017	*0830	4	HCL		X	X
3	MW-117	GW	12/26/2017	*1600	4	HCL		X	X
4	Inj-North	GW	12/28/2017	*0910	4	HCL		X	X
5	Inj-South	GW	12/27/2017	*0730	4	HCL		X	X
6	Inj-East	GW	12/27/2017	*0800	4	HCL		X	X
7	MW-21	GW	12/27/2017	*0900	3	HCL		X	
8	MW-20	GW	12/27/2017	*0920	3	HCL		X	
9	MW-10	GW	12/27/2017	*1330	3	HCL		X	
10	MW-19	GW	12/27/2017	*1430	3	HCL		X	

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

For metals or anions, please detail analytes below.

Comments:	QC PACKAGE (check below)
	LEVEL II (Standard QC)
	LEVEL III (Std QC + forms)
	LEVEL IV (Std QC + forms + raw data)

Preservative Key: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaHSO4 7-Other 8-4 degrees C 9-5035

	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY		Jason Jayroe	12/29/17	1600
RECEIVED BY		SHAY AVERY	12-29-17	~~1240~~ 1420
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

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Chain-of-Custody

Form 202r8

WORKORDER # 1712524

PAGE 2 of 2

PROJECT NAME	Maverik Kirtland	SAMPLER	Jjayroe	DATE	12/29/2017	DISPOSAL	By Lab or Return to Client
PROJECT No.		SITE ID		TURNAROUND	Normal		
		EDD FORMAT					
COMPANY NAME	TRC	PURCHASE ORDER					
SEND REPORT TO	Jason Jayroe	BILL TO COMPANY					
ADDRESS	131 East Lincoln Ave Suite 200	INVOICE ATTN TO	Jason Jayroe				
CITY / STATE / ZIP	Fort Collins, CO 80524	ADDRESS					
PHONE	9704843263	CITY / STATE / ZIP					
FAX	9704843250	PHONE					
E-MAIL	jjayroe@trcsolutions.com	FAX					
		E-MAIL					

Lab ID	Field ID	Matrix	Sample Date	Sample Time	# Bottles	Pres.	QC	BTEX, 1,2 DCA	Sulfate
11	MW-16	GW	12/27/2017	*1535	3	HCL		X	
12	MW-9	GW	12/27/2017	*1615	3	HCL		X	

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

For metals or anions, please detail analytes below.

Comments:	QC PACKAGE (check below)	
		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
		LEVEL IV (Std QC + forms + raw data)

Preservative Key: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaHSO4 7-Other 8-4 degrees C 9-5035

	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY		Jason Jayroe	12/29/17	1600
RECEIVED BY		SHAY AVERY	12-29-17	1240
RELINQUISHED BY				1420
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

6 of 23

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: TRC Workorder No: 1712524

Project Manager: JK Initials: _____ Date: _____

1. Does this project require any special handling in addition to standard ALS procedures?		YES	(NO)
2. Are custody seals on shipping containers intact?	(NONE)	YES	NO
3. Are Custody seals on sample containers intact?	(NONE)	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		(YES)	NO
5. Are the COC and bottle labels complete and legible?		YES	(NO)
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		(YES)	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF	(YES)	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	N/A	(YES)	NO
9. Are all aqueous non-preserved samples pH 4-9?	(N/A)	YES	NO
10. Is there sufficient sample for the requested analyses?		(YES)	NO
11. Were all samples placed in the proper containers for the requested analyses?		(YES)	NO
12. Are all samples within holding times for the requested analyses?		(YES)	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		(YES)	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ____ < green pea ____ > green pea	N/A	(YES)	NO
15. Do any water samples contain sediment? Amount Amount of sediment: _x_ dusting ____ moderate ____ heavy	N/A	(YES)	NO
16. Were the samples shipped on ice?		(YES)	NO
17. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4	RAD ONLY	YES	(NO)

Cooler #:	1							
Temperature (°C):	7.1							
No. of custody seals on cooler:	0							
DOT Survey/ Acceptance Information — External µR/hr reading:	N/A							
Background µR/hr reading:	10							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? **YES / NO / NA** (If no, see Form 008.)

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

- SULFATE BOTTLES HAVE A PH BETWEEN 12 AND 13, BUT DO NOT LIST A PRESERVATIVE TYPE.
- ALL SAMPLES HAVE A DUSTING OF SEDIMENT

If applicable, was the client contacted? YES / (NO) / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: 12-29-17

*IR Gun #2: Oakton, SN 29922500201-0066
*IR Gun #4: Oakton, SN 2372220101-0002

Form 201r24.xls (06/04/2012)

Client: TRC **Date:** *11-Jan-18*
Project: Maverik Kirtland **Work Order:** 1712524
Sample ID: Inj-West **Lab ID:** 1712524-1
Legal Location: **Matrix:** WATER
Collection Date: 12/28/2017 08:00 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS Volatiles			**SW8260_25**	Prep Date: **1/2/2018**		PrepBy: **JXK**
1,2-DICHLOROETHANE	ND		1	UG/L	1	1/2/2018 14:15
BENZENE	ND		1	UG/L	1	1/2/2018 14:15
ETHYLBENZENE	ND		1	UG/L	1	1/2/2018 14:15
M+P-XYLENE	ND		1	UG/L	1	1/2/2018 14:15
O-XYLENE	ND		1	UG/L	1	1/2/2018 14:15
TOLUENE	ND		1	UG/L	1	1/2/2018 14:15
Surr: 4-BROMOFLUOROBENZENE	*100*		*85-115*	*%REC*	1	1/2/2018 14:15
Surr: DIBROMOFLUOROMETHANE	*39*	*	*84-118*	*%REC*	1	1/2/2018 14:15
Surr: TOLUENE-D8	*106*		*85-115*	*%REC*	1	1/2/2018 14:15
Ion Chromatography			**EPA300.0**	Prep Date: **1/8/2018**		PrepBy: **AMW**
SULFATE	**2700**		**120**	**MG/L**	125	1/8/2018 19:52

Client: TRC **Date:** *11-Jan-18*
Project: Maverik Kirtland **Work Order:** 1712524
Sample ID: MW-17 **Lab ID:** 1712524-2
Legal Location: **Matrix:** WATER
Collection Date: 12/28/2017 08:30 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS Volatiles			**SW8260_25**	Prep Date: **1/2/2018**		PrepBy: **JXK**
1,2-DICHLOROETHANE	ND		1	UG/L	1	1/2/2018 14:36
BENZENE	**2.7**		**1**	**UG/L**	1	1/2/2018 14:36
ETHYLBENZENE	**0.35**	J	**1**	**UG/L**	1	1/2/2018 14:36
M+P-XYLENE	**1.4**		**1**	**UG/L**	1	1/2/2018 14:36
O-XYLENE	ND		1	UG/L	1	1/2/2018 14:36
TOLUENE	ND		1	UG/L	1	1/2/2018 14:36
Surr: 4-BROMOFLUOROBENZENE	*103*		*85-115*	*%REC*	1	1/2/2018 14:36
Surr: DIBROMOFLUOROMETHANE	*81*	*	*84-118*	*%REC*	1	1/2/2018 14:36
Surr: TOLUENE-D8	*100*		*85-115*	*%REC*	1	1/2/2018 14:36
Ion Chromatography			**EPA300.0**	Prep Date: **1/8/2018**		PrepBy: **AMW**
SULFATE	**3300**		**100**	**MG/L**	100	1/8/2018 20:07

Client: TRC **Date:** *11-Jan-18*
Project: Maverik Kirtland **Work Order:** 1712524
Sample ID: MW-117 **Lab ID:** 1712524-3
Legal Location: **Matrix:** WATER
Collection Date: 12/26/2017 16:00 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS Volatiles			**SW8260_25**	Prep Date: **1/2/2018**		PrepBy: **JXK**
1,2-DICHLOROETHANE	ND		1	UG/L	1	1/2/2018 14:57
BENZENE	**2.8**		**1**	**UG/L**	1	1/2/2018 14:57
ETHYLBENZENE	**0.39**	J	**1**	**UG/L**	1	1/2/2018 14:57
M+P-XYLENE	**1.5**		**1**	**UG/L**	1	1/2/2018 14:57
O-XYLENE	ND		1	UG/L	1	1/2/2018 14:57
TOLUENE	ND		1	UG/L	1	1/2/2018 14:57
Surr: 4-BROMOFLUOROBENZENE	*97*		*85-115*	*%REC*	1	1/2/2018 14:57
Surr: DIBROMOFLUOROMETHANE	*86*		*84-118*	*%REC*	1	1/2/2018 14:57
Surr: TOLUENE-D8	*101*		*85-115*	*%REC*	1	1/2/2018 14:57
Ion Chromatography			**EPA300.0**	Prep Date: **1/8/2018**		PrepBy: **AMW**
SULFATE	**3300**		**100**	**MG/L**	100	1/8/2018 20:22

Client: TRC **Date:** *11-Jan-18*
Project: Maverik Kirtland **Work Order:** 1712524
Sample ID: Inj-North **Lab ID:** 1712524-4
Legal Location: **Matrix:** WATER
Collection Date: 12/28/2017 09:10 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS Volatiles			**SW8260_25**	Prep Date: **1/2/2018**		PrepBy: **JXK**
1,2-DICHLOROETHANE	ND		1	UG/L	1	1/2/2018 18:32
BENZENE	**58**		**1**	**UG/L**	1	1/2/2018 18:32
ETHYLBENZENE	**2.6**		**1**	**UG/L**	1	1/2/2018 18:32
M+P-XYLENE	**40**		**1**	**UG/L**	1	1/2/2018 18:32
O-XYLENE	**16**		**1**	**UG/L**	1	1/2/2018 18:32
TOLUENE	**2.3**		**1**	**UG/L**	1	1/2/2018 18:32
Surr: 4-BROMOFLUOROBENZENE	*102*		*85-115*	*%REC*	1	1/2/2018 18:32
Surr: DIBROMOFLUOROMETHANE	*29*	*	*84-118*	*%REC*	1	1/2/2018 18:32
Surr: TOLUENE-D8	*102*		*85-115*	*%REC*	1	1/2/2018 18:32
Ion Chromatography			**EPA300.0**	Prep Date: **1/8/2018**		PrepBy: **AMW**
SULFATE	**2800**		**120**	**MG/L**	125	1/8/2018 21:07

Client: TRC **Date:** *11-Jan-18*
Project: Maverik Kirtland **Work Order:** 1712524
Sample ID: Inj-South **Lab ID:** 1712524-5
Legal Location: **Matrix:** WATER
Collection Date: 12/27/2017 07:30 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS Volatiles			**SW8260_25**	Prep Date: **1/2/2018**		PrepBy: **JXK**
1,2-DICHLOROETHANE	ND		1	UG/L	1	1/2/2018 15:18
BENZENE	ND		1	UG/L	1	1/2/2018 15:18
ETHYLBENZENE	ND		1	UG/L	1	1/2/2018 15:18
M+P-XYLENE	ND		1	UG/L	1	1/2/2018 15:18
O-XYLENE	ND		1	UG/L	1	1/2/2018 15:18
TOLUENE	ND		1	UG/L	1	1/2/2018 15:18
Surr: 4-BROMOFLUOROBENZENE	*99*		*85-115*	*%REC*	1	1/2/2018 15:18
Surr: DIBROMOFLUOROMETHANE	*36*	*	*84-118*	*%REC*	1	1/2/2018 15:18
Surr: TOLUENE-D8	*98*		*85-115*	*%REC*	1	1/2/2018 15:18
Ion Chromatography			**EPA300.0**	Prep Date: **1/8/2018**		PrepBy: **AMW**
SULFATE	**1800**		**120**	**MG/L**	125	1/8/2018 21:22

Client: TRC **Date:** *11-Jan-18*
Project: Maverik Kirtland **Work Order:** 1712524
Sample ID: Inj-East **Lab ID:** 1712524-6
Legal Location: **Matrix:** WATER
Collection Date: 12/27/2017 08:00 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS Volatiles			**SW8260_25**	Prep Date: **1/2/2018**		PrepBy: **JXK**
1,2-DICHLOROETHANE	ND		1	UG/L	1	1/2/2018 15:39
BENZENE	ND		1	UG/L	1	1/2/2018 15:39
ETHYLBENZENE	ND		1	UG/L	1	1/2/2018 15:39
M+P-XYLENE	ND		1	UG/L	1	1/2/2018 15:39
O-XYLENE	ND		1	UG/L	1	1/2/2018 15:39
TOLUENE	ND		1	UG/L	1	1/2/2018 15:39
Surr: 4-BROMOFLUOROBENZENE	*99*		*85-115*	*%REC*	1	1/2/2018 15:39
Surr: DIBROMOFLUOROMETHANE	*35*	*	*84-118*	*%REC*	1	1/2/2018 15:39
Surr: TOLUENE-D8	*98*		*85-115*	*%REC*	1	1/2/2018 15:39
Ion Chromatography			**EPA300.0**	Prep Date: **1/8/2018**		PrepBy: **AMW**
SULFATE	**1800**		**120**	**MG/L**	125	1/8/2018 21:37

Client: TRC **Date:** *11-Jan-18*
Project: Maverik Kirtland **Work Order:** 1712524
Sample ID: MW-21 **Lab ID:** 1712524-7
Legal Location: **Matrix:** WATER
Collection Date: 12/27/2017 09:00 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS Volatiles			**SW8260_25**	Prep Date: **1/2/2018**		PrepBy: **JXK**
1,2-DICHLOROETHANE	ND		1	UG/L	1	1/2/2018 16:00
BENZENE	ND		1	UG/L	1	1/2/2018 16:00
ETHYLBENZENE	ND		1	UG/L	1	1/2/2018 16:00
M+P-XYLENE	ND		1	UG/L	1	1/2/2018 16:00
O-XYLENE	ND		1	UG/L	1	1/2/2018 16:00
TOLUENE	ND		1	UG/L	1	1/2/2018 16:00
Surr: 4-BROMOFLUOROBENZENE	*98*		*85-115*	*%REC*	1	1/2/2018 16:00
Surr: DIBROMOFLUOROMETHANE	*95*		*84-118*	*%REC*	1	1/2/2018 16:00
Surr: TOLUENE-D8	*97*		*85-115*	*%REC*	1	1/2/2018 16:00

Client: TRC **Date:** *11-Jan-18*
Project: Maverik Kirtland **Work Order:** 1712524
Sample ID: MW-20 **Lab ID:** 1712524-8
Legal Location: **Matrix:** WATER
Collection Date: 12/27/2017 09:20 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS Volatiles			**SW8260_25**	Prep Date: **1/2/2018**		PrepBy: **JXK**
1,2-DICHLOROETHANE	ND		1	UG/L	1	1/2/2018 16:21
BENZENE	ND		1	UG/L	1	1/2/2018 16:21
ETHYLBENZENE	ND		1	UG/L	1	1/2/2018 16:21
M+P-XYLENE	ND		1	UG/L	1	1/2/2018 16:21
O-XYLENE	ND		1	UG/L	1	1/2/2018 16:21
TOLUENE	ND		1	UG/L	1	1/2/2018 16:21
Surr: 4-BROMOFLUOROBENZENE	*96*		*85-115*	*%REC*	1	1/2/2018 16:21
Surr: DIBROMOFLUOROMETHANE	*96*		*84-118*	*%REC*	1	1/2/2018 16:21
Surr: TOLUENE-D8	*99*		*85-115*	*%REC*	1	1/2/2018 16:21

Client: TRC **Date:** *11-Jan-18*
Project: Maverik Kirtland **Work Order:** 1712524
Sample ID: MW-10 **Lab ID:** 1712524-9
Legal Location: **Matrix:** WATER
Collection Date: 12/27/2017 13:30 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS Volatiles		**SW8260_25**		Prep Date: **1/2/2018**		PrepBy: **JXK**
1,2-DICHLOROETHANE	ND		1	UG/L	1	1/2/2018 16:42
BENZENE	ND		1	UG/L	1	1/2/2018 16:42
ETHYLBENZENE	ND		1	UG/L	1	1/2/2018 16:42
M+P-XYLENE	ND		1	UG/L	1	1/2/2018 16:42
O-XYLENE	ND		1	UG/L	1	1/2/2018 16:42
TOLUENE	ND		1	UG/L	1	1/2/2018 16:42
Surr: 4-BROMOFLUOROBENZENE	*96*		*85-115*	*%REC*	1	1/2/2018 16:42
Surr: DIBROMOFLUOROMETHANE	*100*		*84-118*	*%REC*	1	1/2/2018 16:42
Surr: TOLUENE-D8	*103*		*85-115*	*%REC*	1	1/2/2018 16:42

Client: TRC **Date:** *11-Jan-18*
Project: Maverik Kirtland **Work Order:** 1712524
Sample ID: MW-19 **Lab ID:** 1712524-10
Legal Location: **Matrix:** WATER
Collection Date: 12/27/2017 14:30 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS Volatiles		**SW8260_25**		Prep Date: **1/2/2018**		PrepBy: **JXK**
1,2-DICHLOROETHANE	ND		1	UG/L	1	1/2/2018 17:03
BENZENE	ND		1	UG/L	1	1/2/2018 17:03
ETHYLBENZENE	ND		1	UG/L	1	1/2/2018 17:03
M+P-XYLENE	ND		1	UG/L	1	1/2/2018 17:03
O-XYLENE	ND		1	UG/L	1	1/2/2018 17:03
TOLUENE	ND		1	UG/L	1	1/2/2018 17:03
Surr: 4-BROMOFLUOROBENZENE	*99*		*85-115*	*%REC*	1	1/2/2018 17:03
Surr: DIBROMOFLUOROMETHANE	*98*		*84-118*	*%REC*	1	1/2/2018 17:03
Surr: TOLUENE-D8	*100*		*85-115*	*%REC*	1	1/2/2018 17:03

Client: TRC **Date:** *11-Jan-18*
Project: Maverik Kirtland **Work Order:** 1712524
Sample ID: MW-16 **Lab ID:** 1712524-11
Legal Location: **Matrix:** WATER
Collection Date: 12/27/2017 15:35 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS Volatiles			**SW8260_25**	Prep Date: **1/2/2018**		PrepBy: **JXK**
1,2-DICHLOROETHANE	ND		1	UG/L	1	1/2/2018 17:24
BENZENE	ND		1	UG/L	1	1/2/2018 17:24
ETHYLBENZENE	ND		1	UG/L	1	1/2/2018 17:24
M+P-XYLENE	ND		1	UG/L	1	1/2/2018 17:24
O-XYLENE	ND		1	UG/L	1	1/2/2018 17:24
TOLUENE	ND		1	UG/L	1	1/2/2018 17:24
Surr: 4-BROMOFLUOROBENZENE	*101*		*85-115*	*%REC*	1	1/2/2018 17:24
Surr: DIBROMOFLUOROMETHANE	*98*		*84-118*	*%REC*	1	1/2/2018 17:24
Surr: TOLUENE-D8	*104*		*85-115*	*%REC*	1	1/2/2018 17:24

Client: TRC **Date:** *11-Jan-18*
Project: Maverik Kirtland **Work Order:** 1712524
Sample ID: MW-9 **Lab ID:** 1712524-12
Legal Location: **Matrix:** WATER
Collection Date: 12/27/2017 16:15 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS Volatiles			**SW8260_25**	Prep Date: **1/2/2018**		PrepBy: **JXK**
1,2-DICHLOROETHANE	ND		1	UG/L	1	1/2/2018 17:45
BENZENE	ND		1	UG/L	1	1/2/2018 17:45
ETHYLBENZENE	ND		1	UG/L	1	1/2/2018 17:45
M+P-XYLENE	ND		1	UG/L	1	1/2/2018 17:45
O-XYLENE	ND		1	UG/L	1	1/2/2018 17:45
TOLUENE	ND		1	UG/L	1	1/2/2018 17:45
Surr: 4-BROMOFLUOROBENZENE	*100*		*85-115*	*%REC*	1	1/2/2018 17:45
Surr: DIBROMOFLUOROMETHANE	*96*		*84-118*	*%REC*	1	1/2/2018 17:45
Surr: TOLUENE-D8	*101*		*85-115*	*%REC*	1	1/2/2018 17:45

Client:	TRC	**Date:**	*11-Jan-18*
Project:	Maverik Kirtland	**Work Order:**	1712524
Sample ID:	MW-9	**Lab ID:**	1712524-12
Legal Location:		**Matrix:**	WATER
Collection Date:	12/27/2017 16:15	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.

- Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.

G - Sample density differs by more than 15% of LCS density.

D - DER is greater than Control Limit

M - Requested MDC not met.

LT - Result is less than requested MDC but greater than achieved MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

Batch ID: **VL180102-3-1** Instrument ID: **HPV3** Method: **SW8260_25**

LCS Sample ID: **VL180102-3** Units: **%REC** Analysis Date: **1/2/2018 12:45**

Client ID: Run ID: **VL180102-3** Prep Date: **1/2/2018** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
Surr: 4-BROMOFLUOROBENZENE	23.8		25		95	85-115					
Surr: DIBROMOFLUOROMETHANE	23.9		25		96	84-118					
Surr: TOLUENE-D8	22.7		25		91	85-115					
1,2-DICHLOROETHANE	8.44	1	10		84	74-128				20	
BENZENE	9.57	1	10		96	83-117				20	
ETHYLBENZENE	9.8	1	10		98	81-113				20	
M+P-XYLENE	19.5	1	20		97	82-115				20	
O-XYLENE	9.94	1	10		99	81-115				20	
TOLUENE	9.9	1	10		99	82-113				20	

LCSD Sample ID: **VL180102-3** Units: **%REC** Analysis Date: **1/2/2018 13:06**

Client ID: Run ID: **VL180102-3** Prep Date: **1/2/2018** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
Surr: 4-BROMOFLUOROBENZENE	23.9		25		96	85-115			0		
Surr: DIBROMOFLUOROMETHANE	24.7		25		99	84-118			3		
Surr: TOLUENE-D8	25.5		25		102	85-115			12		
1,2-DICHLOROETHANE	9.23	1	10		92	74-128		8.44	9	20	
BENZENE	10.1	1	10		101	83-117		9.57	5	20	
ETHYLBENZENE	10.4	1	10		104	81-113		9.8	6	20	
M+P-XYLENE	20.4	1	20		102	82-115		19.5	4	20	
O-XYLENE	10.1	1	10		101	81-115		9.94	1	20	
TOLUENE	10.3	1	10		103	82-113		9.9	4	20	

QC BATCH REPORT

Batch ID: **VL180102-3-1** Instrument ID: **HPV3** Method: **SW8260_25**

MB Sample ID: **VL180102-3** Units: **%REC** Analysis Date: **1/2/2018 13:51**

Client ID: Run ID: **VL180102-3** Prep Date: **1/2/2018** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
Surr: 4-BROMOFLUOROBENZENE	24.7		25		99	85-115					
Surr: DIBROMOFLUOROMETHANE	24.5		25		98	84-118					
Surr: TOLUENE-D8	23.6		25		95	85-115					
1,2-DICHLOROETHANE	ND	1									
BENZENE	ND	1									
ETHYLBENZENE	ND	1									
M+P-XYLENE	ND	1									
O-XYLENE	ND	1									
TOLUENE	ND	1									

The following samples were analyzed in this batch:

1712524-1	1712524-2	1712524-3
1712524-4	1712524-5	1712524-6
1712524-7	1712524-8	1712524-9
1712524-10	1712524-11	1712524-12

Client: TRC
Work Order: 1712524
Project: Maverik Kirtland

QC BATCH REPORT

Batch ID: **IC180108-2-1** Instrument ID: **IC3** Method: **EPA300.0**

LCS Sample ID: **IC180108-2** Units: **MG/L** Analysis Date: **1/8/2018 20:37**
Client ID: Run ID: **IC180108-1a1** Prep Date: **1/8/2018** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
SULFATE	50.6	1	50		101	90-110				15	

MB Sample ID: **IC180108-2** Units: **MG/L** Analysis Date: **1/8/2018 20:52**
Client ID: Run ID: **IC180108-1a1** Prep Date: **1/8/2018** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
SULFATE	ND	1									

The following samples were analyzed in this batch:

1712524-1	1712524-2	1712524-3
1712524-4	1712524-5	1712524-6