Final Site Closure Report
for the
Challis Farms No. 1 Lease
Washington County, Colorado
COGCC Remediation # 9054

Prepared for:

Mr. Terry Pape
HRM Resources II, LLC
410 17th Street, Suite 1600
Denver, CO 80202

Nicholson GeoSolutions, LLC
3433 East Lake Drive
Centennial, CO 80121

October 2017

1.0 INTRODUCTION

Nicholson GeoSolutions LLC was retained by HRM Resources II, LLC to perform final site closure activities at the Challis Farms No. 1 Lease, located in the NW¼ NE¼ Section 25, T1N, R54W, Washington County, Colorado. Remediation and reclamation activities were conducted in accordance with the Colorado Oil and Gas Conservation Commission (COGCC) Series 900 and 1000 Rules.

The site formerly consisted of a wellhead, one unlined skim pit, one unlined evaporation pit, a heater-treater, and a tank battery with two 400-bbl storage tanks. The well was plugged and abandoned and all surface facilities were removed from the site by others. No impacted soil was present at the wellhead area. The skim pit and evaporation pit were closed and associated impacted soil was excavated and transported to the Clean Harbors landfill located near Last Chance, Colorado for disposal. Closure of the skim pit and evaporation pit was performed by Jayhawk Grading, Inc. with oversight from Nicholson GeoSolutions.

2.0 REMEDIATION ACTIVITIES

The following sections discuss the site remediation and reclamation procedures. Photographs that document the closure of the skim pit and evaporation pit and the excavation and removal of impacted soils are included in Appendix A.

Impacted soils from both pits were excavated and trucked to the Clean Harbors landfill for disposal. Appendix B contains a summary of the landfill gatehouse tickets. Visual observations were conducted by Nicholson GeoSolutions during excavation of the pits and used to evaluate when the approximate limits of the impacted soils had been reached. Confirmation samples were then collected to assess whether compliance with the COGCC Table 910-1 standards had been achieved. In addition, a small amount of impacted soil was removed from the south side of the tank area and one confirmation sample was collected there. A total of approximately 2,304 yards of soil was excavated and transported to the landfill for disposal. Figure 1 provides the limits of the excavations and the locations of the confirmation samples. The laboratory reports are included in Appendix C.

2.1 Skim Pit Closure Activities

Closure of the unlined skim pit (COGCC pit ID #101077) was initiated on May 15th, 2017. First, the metal cage covering the pit was removed and dismantled. The scrap metal was transported off-site for recycling. Petroleum-contaminated soil was present beneath and surrounding the skim pit to an approximate maximum depth of 22 feet.

Five confirmation samples were collected from the sidewalls and base of the skim pit excavation on May 26th, 2017 and analyzed for sodium adsorption ratio (SAR), pH, conductivity, Total Volatile Petroleum Hydrocarbons (TVPH – gasoline range), Total Extractable Petroleum Hydrocarbons (TEPH – diesel and motor oil range), and BTEX compounds (benzene, toluene, ethylbenzene, and xylenes). Table 1 provides the initial confirmation sample results for the skim pit excavation.

Table 1 Skim Pit Excavation Initial Confirmation Sample Results

Sample ID, Location, and depth	pH	SAR	SC	BTEX	TVPH – Gasoline (mg/kg)	TEPH – Diesel (mg/kg)	TEPH – Motor Oil (mg/kg)
Challis-SP-1 (east – 9')	**9.16 J**	2.53	0.35	All ok	**0.879**	**595**	**283**
Challis-SP-2 (west – 9')	8.58 J	2.34	0.379	All ok	**<0.1**	**3,870**	**1,910**
Challis-SP-3 (north – 9')	8.87 J	6.17	0.373	All ok	**<0.1**	**482**	**426**
Challis-SP-4 (south – 9')	8.95 J	7.58	0.407	All ND	<0.1	<4.0	<4.0
Challis-SP-5 (bottom – 18')	**9.19 J**	7.22	0.374	All ok	**404**	**16,200 J**	**1,960 J**
Table 910-1 Standard	6-9	<12	<4.0		500[1]		

[1]The standard is 500 mg/kg for the combined TEPH and TVPH results
J= estimated concentration
Bold values exceed standards ND = Not detected

The combined results for petroleum hydrocarbons were above the standard of 500 mg/kg for the initial confirmation samples from the east, north, and west walls, and the base of the excavation. All other results were below the standards except for pH for two samples. Confirmation samples were not collected from the foundation soil beneath the skim pit berms. These berms were completely removed and the final skim pit excavation extends beyond the original footprint of the berms in all directions.

In response to the initial confirmation sample results, additional soil was removed from the east and north walls and the base of the skim pit excavation. The west wall, which was shared with the adjacent evaporation pit, was completely removed during this phase of excavation. Three additional confirmation samples were collected from the east and north walls and the base of the skim pit excavation on July 7th, 2017. Table 2 provides the additional confirmation sample results for the skim pit excavation.

Table 2 Skim Pit Excavation Additional Confirmation Sample Results

Sample ID, Location, and depth	pH	SAR	SC	BTEX	TVPH – Gasoline (mg/kg)	TEPH – Diesel (mg/kg)	TEPH – Motor Oil (mg/kg)
Challis-SP-6 (bottom – 22')	**10.2 J**	4.54	0.453	All ok	0.409	14.9	<4.0
Challis-SP-7 (east – 11')	**9.50 J**	1.76	0.164	All ok	<0.1	<4.0	<4.0
Challis-SP-8 (north – 11')	**9.57 J**	4.79	0.202	All ND	<0.1	<4.0	<4.0
Table 910-1 Standard	6-9	<12	<4.0		500[1]		

[1]The standard is 500 mg/kg for the combined TEPH and TVPH results
J= estimated concentration
Bold values exceed standards ND = Not detected

All results for the three additional confirmation samples were below the standards except for pH for all three samples. After receipt of the confirmation sample results, the excavation was backfilled using clean fill imported to the site and the area was regraded.

2.2 Evaporation Pit Closure Activities

Closure of the unlined evaporation pit was initiated on July 11th, 2017. Petroleum-contaminated soil was present beneath the evaporation pit to approximate depths ranging from 2 feet near the southeast corner of the pit to 24 feet on the north end of the pit, as shown on Figure 1.

Eight confirmation samples were collected from the sidewalls and base of the evaporation pit excavation on May 26th, 2017 and analyzed for the parameters previously listed. Table 3 provides the confirmation sample results for the evaporation pit excavation.

Table 3 Evaporation Pit Excavation Confirmation Sample Results

Sample ID, Location, and depth	pH	SAR	SC	BTEX	TVPH – Gasoline (mg/kg)	TEPH – Diesel (mg/kg)	TEPH – Motor Oil (mg/kg)
Challis-EP-1 (northeast – 17')	**9.20 J**	6.21	0.515	All ok	**186**	**6,050 J**	**1,060 J**
Challis-EP-2 (north – 17')	**9.40 J**	5.64	0.463	All ok	<0.1	<4.0	<4.0
Challis-EP-3 (northwest – 17')	**9.54 J**	6.71	0.387	All ok	<0.1	<4.0	<4.0
Challis-EP-4 (north base – 24')	**9.74 J**	5.31	0.637	All ok	<0.1	4.77	<4.0
Challis-EP-5 (southwest – 12')	**9.78 J**	6.88	0.543	All ok	<0.1	<4.0	<4.0
Challis-EP-6 (south – 6')	**9.74 J**	8.09	0.654	All ok	<0.1	22.7	13.1
Challis-EP-7 (south base – 12')	**9.91 J**	9.81	0.597	All ok	<0.1	<4.0	<4.0
Challis-EP-8 (southeast – 2')	**9.91 J**	7.82	0.683	All ok	<0.1	95.4	47.6
Table 910-1 Standard	6-9	<12	<4.0		500[1]		

[1]The standard is 500 mg/kg for the combined TEPH and TVPH results
J= estimated concentration

The combined results for petroleum hydrocarbons were above the standard of 500 mg/kg for the sample from the northeast wall adjacent to the skim pit excavation. This wall was completely removed during the subsequent phase of excavation, therefore, an additional confirmation sample was not collected for the northeast wall. All other results were below the standards except for pH for all samples. After receipt of the confirmation samples results, the excavation was backfilled using clean fill imported to the site and the area was regraded.

Four confirmation samples were collected from the foundation soil beneath the former evaporation pit berms on August 28th, 2017. The locations of the berm samples are shown on Figure 1. Table 4 provides the confirmation sample results for the evaporation pit berm soils.

Table 4 Evaporation Pit Berm Soils Confirmation Sample Results

Sample ID, Location, and depth	pH	SAR	SC	BTEX	TVPH – Gasoline (mg/kg)	TEPH – Diesel (mg/kg)	TEPH – Motor Oil (mg/kg)
Challis-EP-B-1 (north)	8.99 J	1.84	0.279	All ok	<0.1	<4.0	<4.0
Challis-EP-B-2 (west)	8.44 J	1.09	0.166	All ND	<0.1	<4.0	<4.0
Challis-EP-B-3 (south)	7.95 J	1.52	0.199	All ND	<0.1	<4.0	<4.0
Challis-EP-B-4 (southeast)	**9.32 J**	3.21	0.255	All ND	<0.1	4.96	<4.0
Table 910-1 Standard	6-9	<12	<4.0		500[1]		

[1]The standard is 500 mg/kg for the combined TEPH and TVPH results
J= estimated concentration ND = Not detected

All results for the berm samples were below the standards except for pH for sample Challis-EP-B-4 (north berm).

2.3 Tank Area Activities

A small amount of petroleum-contaminated soil (less than 10 yards) was present just south of the storage tanks to an approximate depth of about 6 inches. This soil was excavated and sent to the landfill on August 28th, 2017.

One confirmation samples were collected from the tank area excavation on August 28th, 2017 and analyzed for the parameters previously listed. Table 5 provides the confirmation sample results for the tank area excavation.

Table 5 Tank Areas Confirmation Sample Results

Sample ID, Location, and depth	pH	SAR	SC	BTEX	TVPH – Gasoline (mg/kg)	TEPH – Diesel (mg/kg)	TEPH – Motor Oil (mg/kg)
Challis-TA-1	8.88 J	3.39	0.186	All ok	<0.1	246	144
Table 910-1 Standard	6-9	<12	<4.0		500[1]		

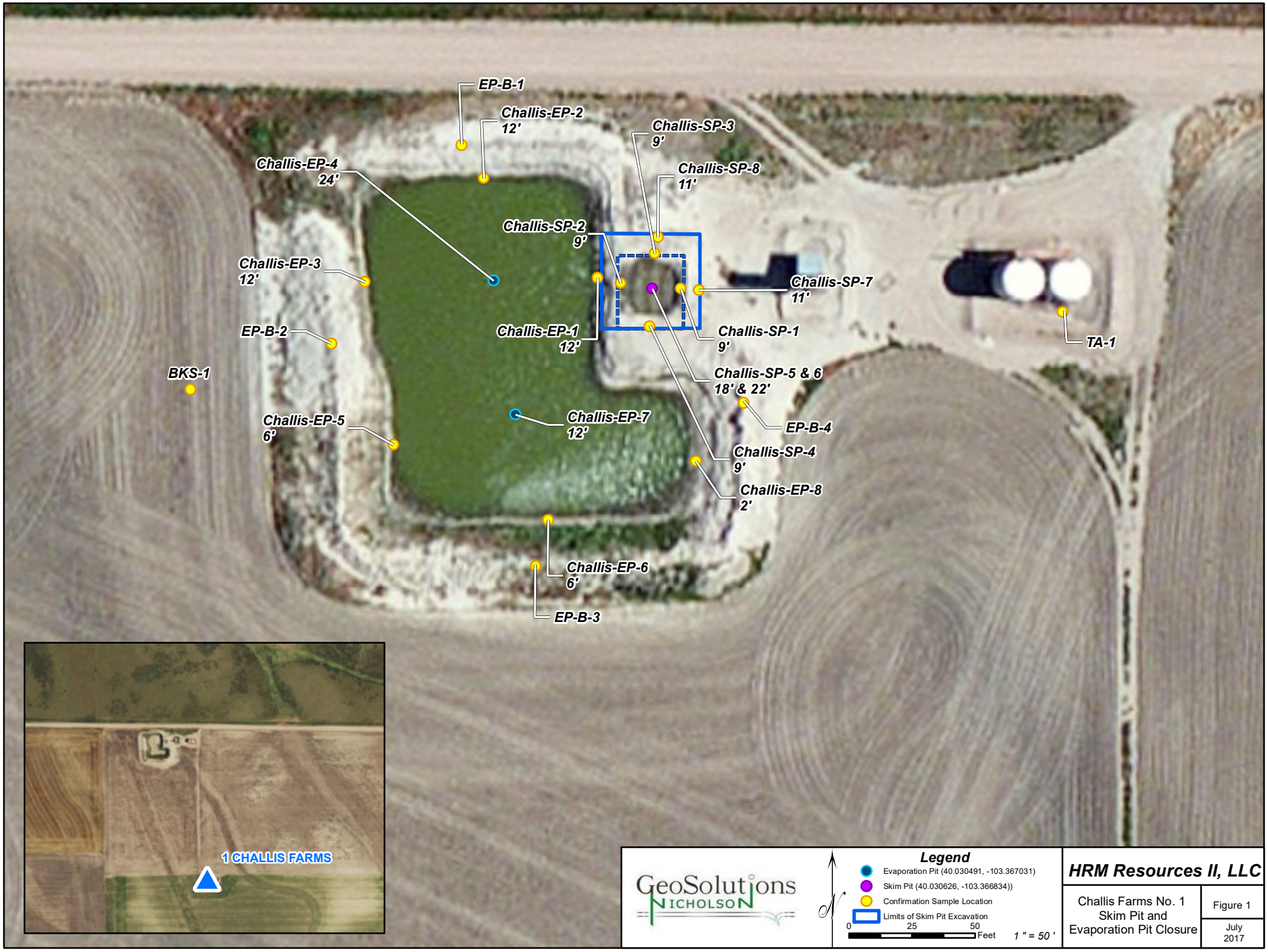
[1]The standard is 500 mg/kg for the combined TEPH and TVPH results
J= estimated concentration

All results for the tank area sample were below the standards. The excavation was backfilled using clean fill imported to the site and the area was regraded.

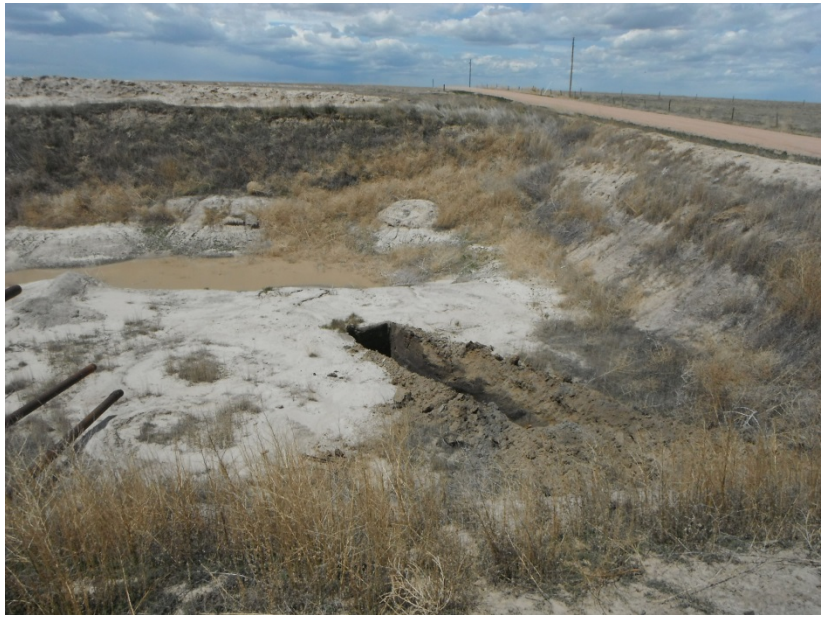
2.4 Data Quality Review

A data quality review was conducted using the quality assurance reports supplied by the laboratory and standard EPA data validation guidance. All analyses were conducted within the recommended holding times, except for pH for all samples. All pH results were qualified as estimated "J". All method blank results were reported as not detected above the method reporting limits. All laboratory control sample (LCS), surrogate, laboratory duplicate, and matrix spike/matrix spike duplicate (MS/MSD) recoveries were within the laboratory control limits, except for the following: for Lab Report L912791, the surrogate recoveries for the BTEX analyses for sample Challis-SP-2 and the TEPH analyses for sample Challis-SP-5 were low; for Lab Report L912793 the surrogate recovery for the TEPH analyses for sample Challis-EP-1 and the MS recovery for xylenes for all samples were low. These parameters were qualified as estimated "J" for positive results and "UJ" for non-detect results for the associated samples.

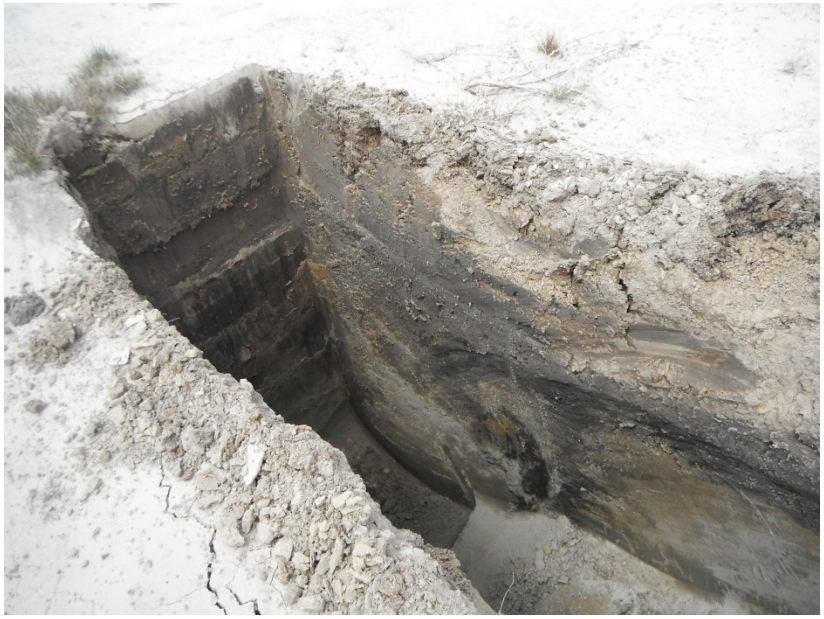
All results are usable for the intended purposes of this remediation.


EP-B-1
Challis-EP-2
12'
Challis-SP-3
9'
Challis-EP-4
24'
Challis-SP-8
11'
Challis-SP-2
9'
Challis-EP-3
12'
Challis-SP-7
11'
EP-B-2
Challis-EP-1
12'
Challis-SP-1
9'
TA-1
BKS-1
Challis-SP-5 & 6
18' & 22'
Challis-EP-5
6'
Challis-EP-7
12'
EP-B-4
Challis-SP-4
9'
Challis-EP-8
2'
Challis-EP-6
6'
EP-B-3
1 CHALLIS FARMS
Legend
Evaporation Pit (40.030491, -103.367031)
Skim Pit (40.030626, -103.366834))
Confirmation Sample Location
Limits of Skim Pit Excavation
0
25
50
Feet
1 " = 50 '
GeoSolutions
NICHOLSON
HRM Resources II, LLC
Challis Farms No. 1
Skim Pit and
Evaporation Pit Closure
Figure 1
July
2017

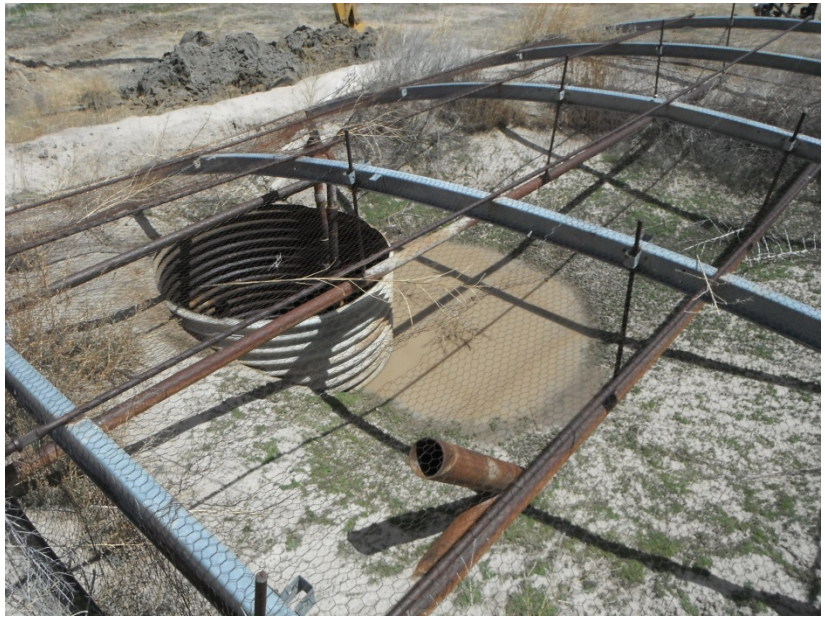
APPENDIX A
Photographs



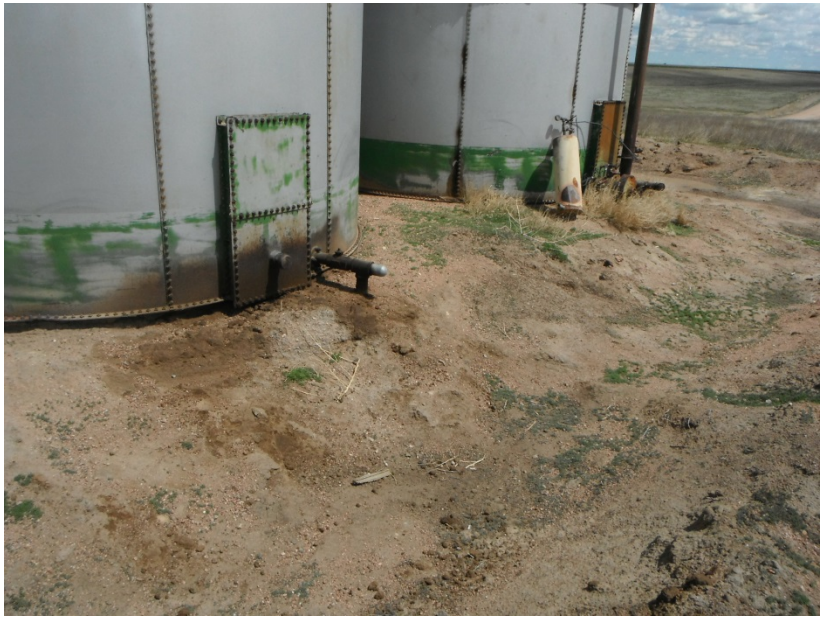
Evaporation pit prior to excavation



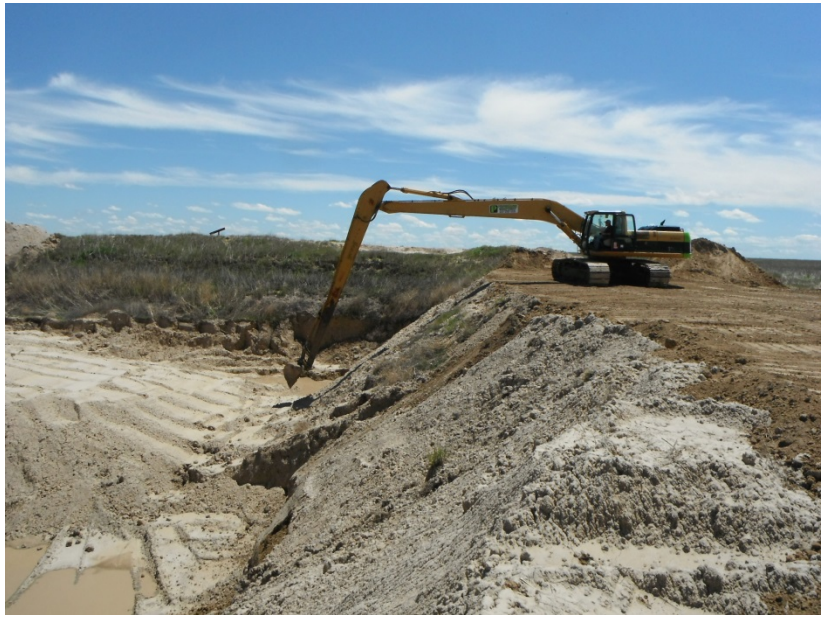
Impacted soil beneath evaporation pit



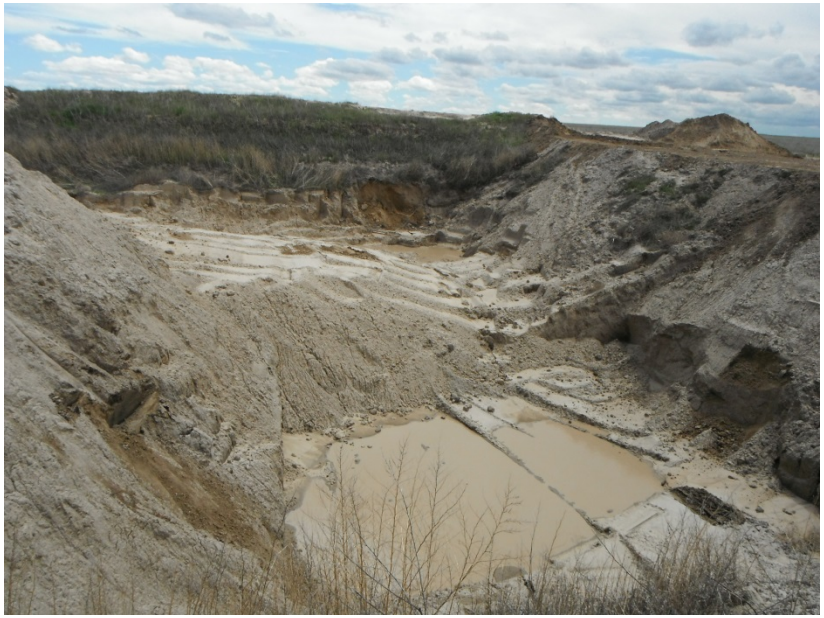
Skim pit prior to excavation



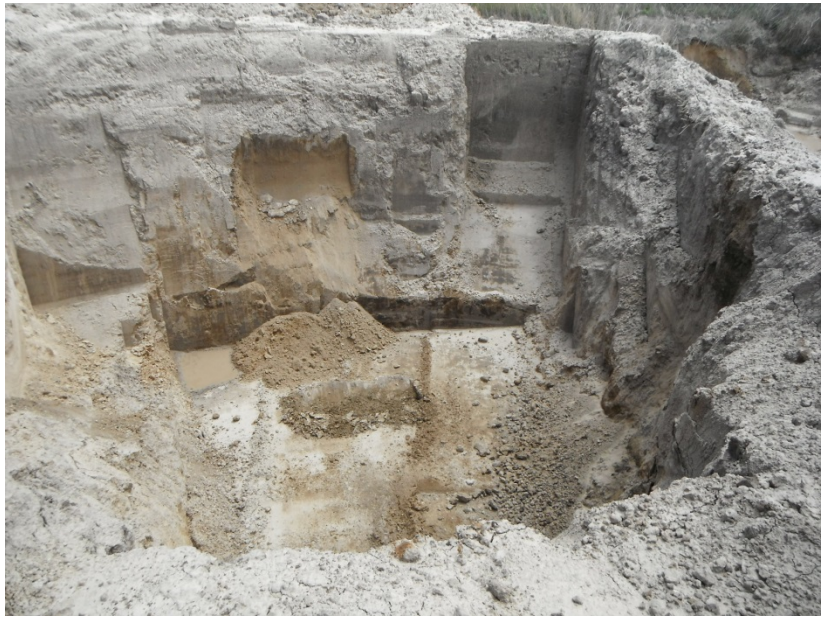
Impacted soil near storage tanks



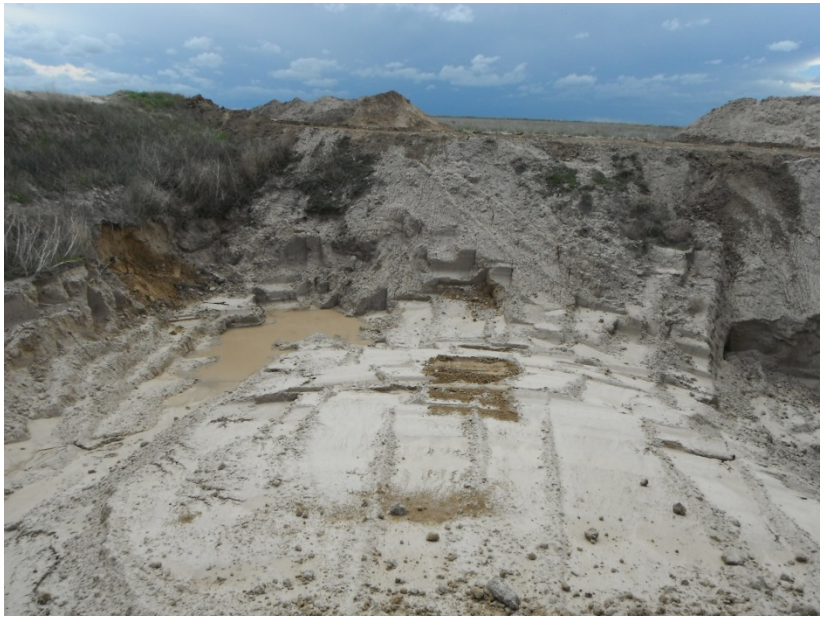
Excavation of evaporation pit



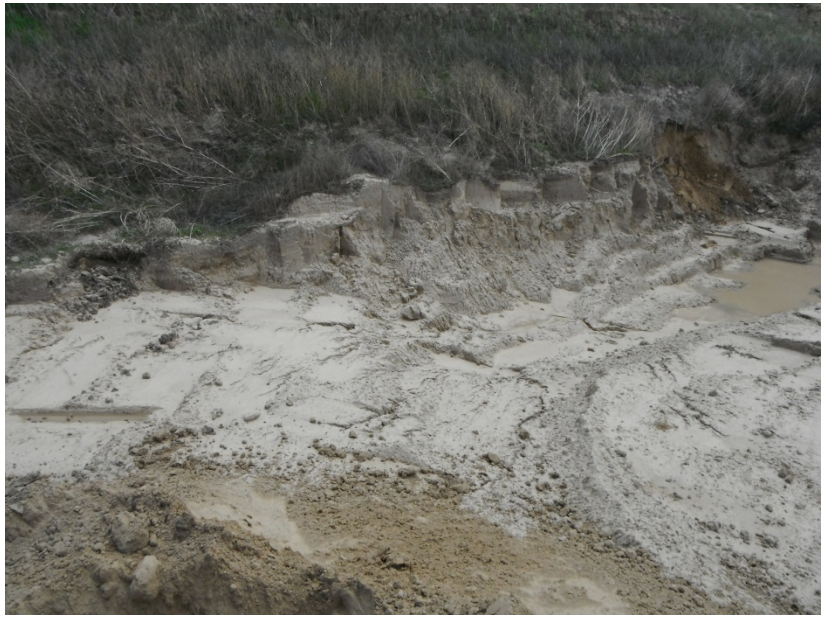
Evaporation pit after initial excavation looking south



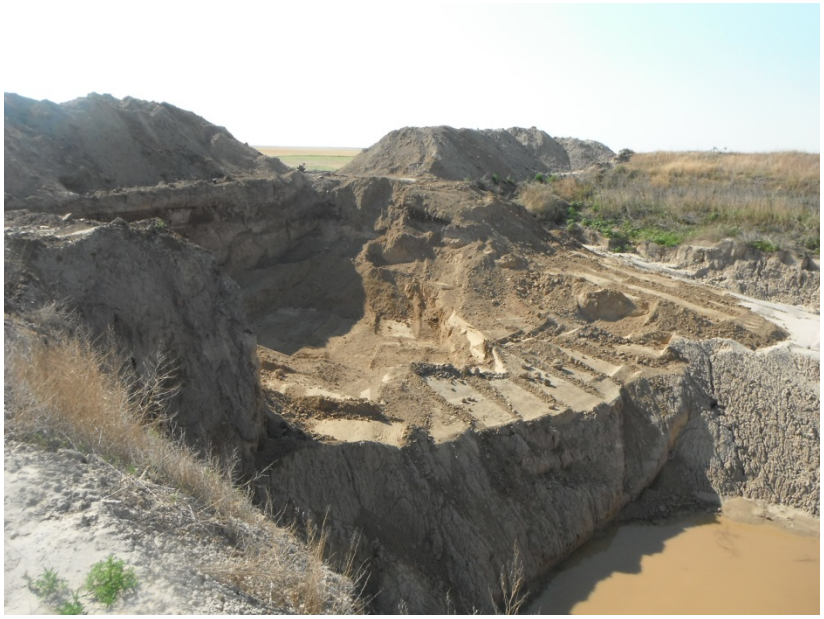
Skim pit after initial excavation



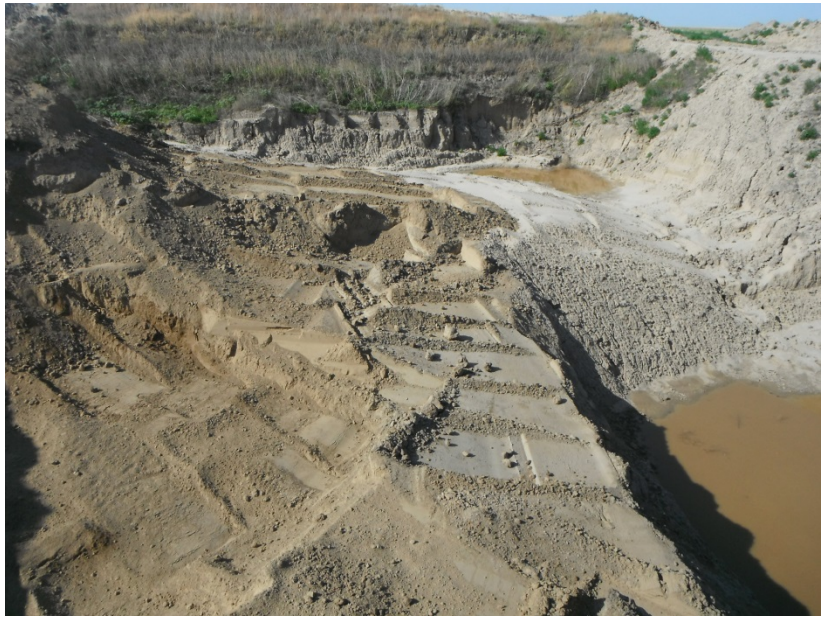
Evaporation pit after initial excavation looking north



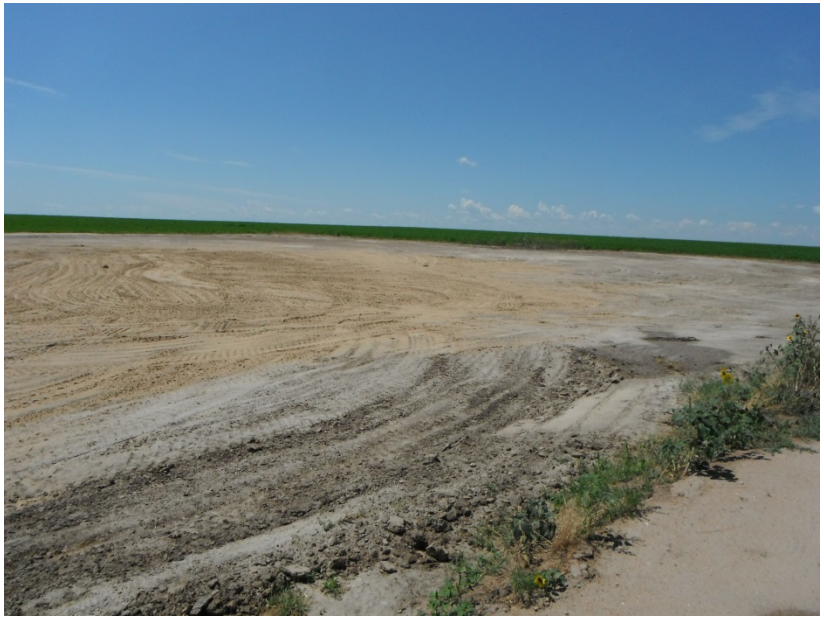
Southeast corner of evaporation pit after excavation



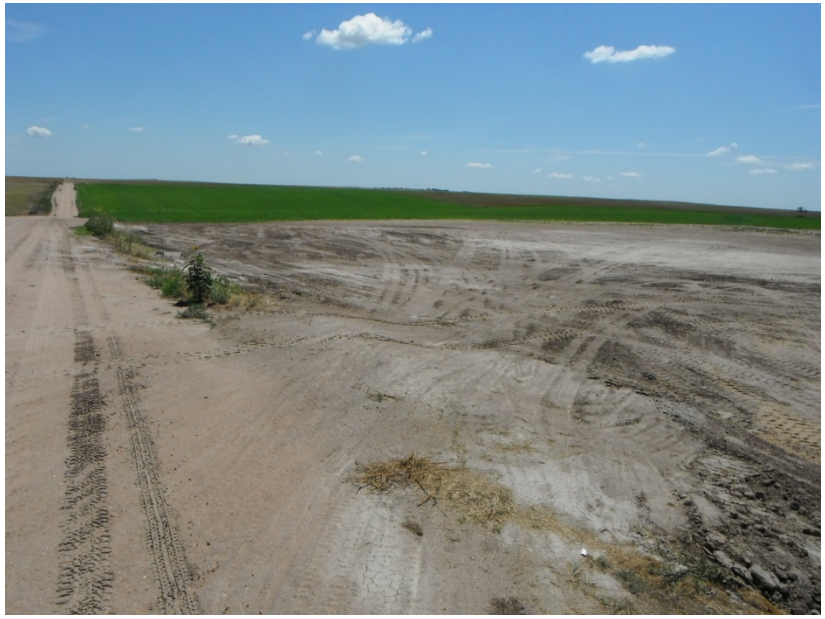
Skim pit and evaporation pit after removal of shared wall



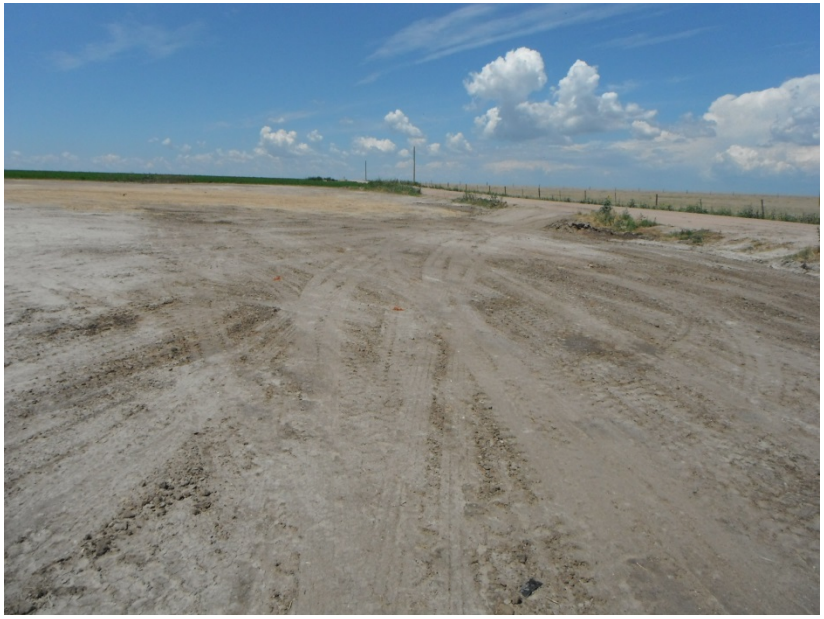
Evaporation pit after removal of NE wall



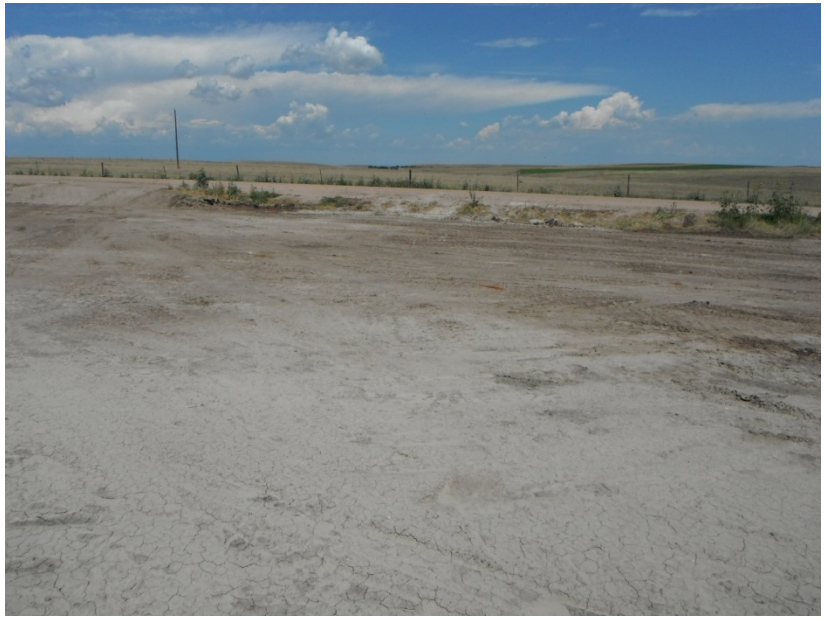
Evaporation pit area after backfilling looking southwest



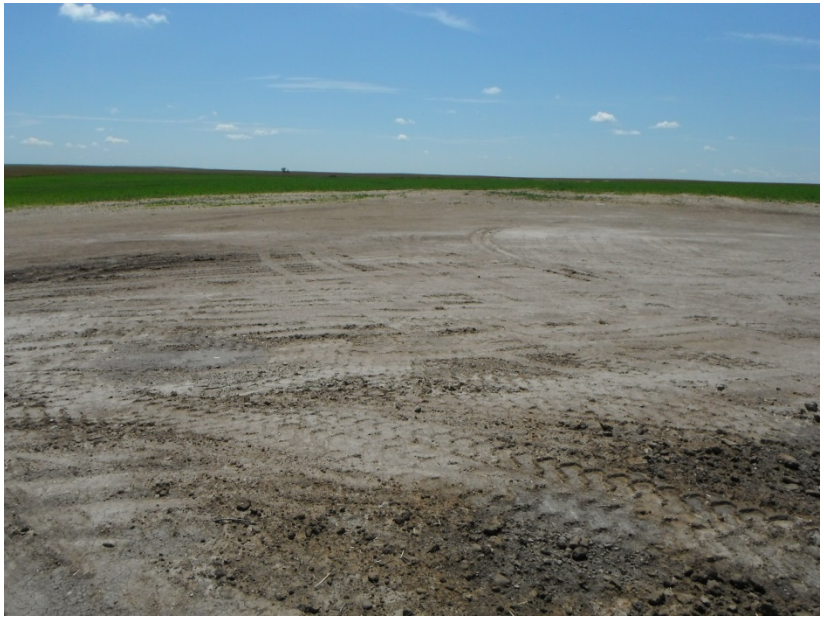
Tank area after regrading looking southeast



Lease site after regrading northwest



Tank and skim pit area after regrading looking northwest



Evaporation pit area after regrading looking south

APPENDIX B
Landfill Gatehouse Tickets

1248

INVOICE

Invoice No 1001959028

REMIT TO:
Clean Harbors Env. Services
PO Box 3442
Boston, MA 02241-3442

EIN: 04-2698999

AUG 14 2017

BY: _____

OFFICE:
Clean Harbors Environmental Services, Inc.
42 Longwater Drive
Norwell, MA 02061
(781) 849-1800

If you have any questions regarding this invoice, please contact your customer service representative at the telephone number listed above

SOLD TO:
Terry Pape
HRM Resources LLC
410 17th Street, Suite 1600
Denver, CO 80202 - 0000

JOB SITE/GENERATOR:
HRM Resources II LLC
5 miles East of Woodrow
Woodrow, CO 80757 - 0000

Job Description: Disposal of CH1417453B to Deer Trail

**** Payable In USD funds ****

Last Service Date	Invoice No	Customer	Branch	Sales Order	Purchase Order	Terms
24 Jul 2017	1001959028	HR6756	A6	1703416232	No PO Needed	NET 15 DAYS

Last Service Date	Task	Task Type	Description	Total
31 Jul 2017	1703416232-002	DISPOSAL	Disposal of CH1417453B to Deer Trail	

SUBTOTAL

TAX

PLEASE PAY THIS AMOUNT → INVOICE TOTAL

REMIT PAYMENT BY → DUE DATE

7-31-17

WELL # Challis Farms
A/C # 9061
OK
DESC Pit closure - disposal contaminated soil

Interest will be charged at a rate of 1.5% per month for all past due amounts.

Invoice Date: 04 Aug 2017

PLEASE RETURN A COPY OF INVOICE WITH PAYMENT - THANK YOU

JP

CleanHarbors

INVOICE

Invoice No 1001959028

TASK 1703416232-002 - Disposal of CH1417453B to Deer Trail

Manifest Info	Item ID	Description	Manifest Qty	Manifest UOM	Billing Qty	Billing UOM	Unit Price	Amount
		17 Jul 2017						
7/24 not 7/17								
BOL88331 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
		20 Jul 2017						
BOL88281 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88282 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88286 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88287 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88288 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88289 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88290 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88291 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88292 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88293 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88294 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88298 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88302 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
		21 Jul 2017						
BOL88306 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88307 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88308 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
		24 Jul 2017						

CleanHarbors

INVOICE

Invoice No 1001959028

TASK 1703416232-002 - Disposal of CH1417453B to Deer Trail

Manifest Info	Item ID	Description	Manifest Qty	Manifest UOM	Billing Qty	Billing UOM	Unit Price	Amount
BOL88319 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88320 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88321 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88322 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88323 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88324 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88325 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88326 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88327 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88328 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88330 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
		31 Jul 2017						
	FACTAX	10% Surcharge						

28 ~~63~~ loads

→ 504 yards

Invoice Date: 04 Aug 2017

1248

INVOICE

Invoice No 1001959036

RECEIVED
AUG 14 2017

REMIT TO:
Clean Harbors Env. Services
PO Box 3442
Boston, MA 02241-3442

EIN: 04-2698999

OFFICE:
Clean Harbors Environmental Services, Inc.
42 Longwater Drive
Norwell, MA 02061
(781) 849-1800

If you have any questions regarding this invoice, please contact your customer service representative at the telephone number listed above

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HRM Resources LLC
410 17th Street, Suite 1600
Denver, CO 80202 - 0000

JOB SITE/GENERATOR:
HRM Resources II LLC
5 miles East of Woodrow
Woodrow, CO 80757 - 0000

Job Description: Disposal of CH1417453B to Deer Trail

**** Payable in USD funds ****

Last Service Date	Invoice No	Customer	Branch	Sales Order	Purchase Order	Terms
20 Jul 2017	1001959036	HR6756	A6	1703416232	No PO Needed	NET 15 DAYS

Last Service Date	Task	Task Type	Description	Total
31 Jul 2017	1703416232-001	DISPOSAL	Disposal of CH1417453B to Deer Trail	

SUBTOTAL

TAX

PLEASE PAY THIS AMOUNT → INVOICE TOTAL

REMIT PAYMENT BY → DUE DATE

7-31-17

WELL # Challis Farms
A/C # 9061
OK
DESC Pit closure - disposal of contaminated soil

Interest will be charged at a rate of 1.5% per month for all past due amounts.

GP

Invoice Date: 04 Aug 2017

PLEASE RETURN A COPY OF INVOICE WITH PAYMENT - THANK YOU

CleanHarbors

INVOICE

Invoice No 1001959036

TASK 1703416232-001 - Disposal of CH1417453B to Deer Trail

Manifest Info	Item ID	Description	Manifest Qty	Manifest UOM	Billing Qty	Billing UOM	Unit Price	Amount
		11 Jul 2017						
BOL88113 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88114 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88115 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
		12 Jul 2017						
BOL88129 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88130 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88131 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88132 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88134 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88135 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88136 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88137 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88140 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88143 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88145 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88147 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
		13 Jul 2017						
BOL88151 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88152 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88153	DISPSL /	Oil contaminated soil	26	TON	1.000	MIN		

Invoice Date: 04 Aug 2017

INVOICE

Invoice No 1001959036

TASK 1703416232-001 - Disposal of CH1417453B to Deer Trail

Manifest Info	Item ID	Description	Manifest Qty	Manifest UOM	Billing Qty	Billing UOM	Unit Price	Amount
1	CNO	CH1417453B						
BOL88154 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88157 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88158 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88159 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88160 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88163 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88165 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88166 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
		14 Jul 2017						
BOL88173 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88174 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88175 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88177 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88178 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88179 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88181 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88183 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88184 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88189 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88190 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		

Invoice Date: 04 Aug 2017

INVOICE

Invoice No 1001959036

TASK 1703416232-001 - Disposal of CH1417453B to Deer Trail

Manifest Info	Item ID	Description	Manifest Qty	Manifest UOM	Billing Qty	Billing UOM	Unit Price	Amount
BOL88191 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
		17 Jul 2017						
BOL88193 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88194 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88195 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88196 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88198 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88199 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88200 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88201 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88202 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88203 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88204 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88205 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88207 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88208 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88209 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88210 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
		18 Jul 2017						
BOL88212 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88213 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		

Invoice Date: 04 Aug 2017

INVOICE
Invoice No 1001959036

TASK 1703416232-001 - Disposal of CH1417453B to Deer Trail

Manifest Info	Item ID	Description	Manifest Qty	Manifest UOM	Billing Qty	Billing UOM	Unit Price	Amount
BOL88214 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88215 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88218 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88219 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88220 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88221 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88223 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88224 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88225 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88228 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88232 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88233 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88234 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88236 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88238 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88239 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88240 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
		19 Jul 2017						
BOL88242 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88244 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88245 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		

Invoice Date: 04 Aug 2017

INVOICE

Invoice No 1001959036

TASK 1703416232-001 - Disposal of CH1417453B to Deer Trail

Manifest Info	Item ID	Description	Manifest Qty	Manifest UOM	Billing Qty	Billing UOM	Unit Price	Amount
BOL88246 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88248 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88249 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88250 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88251 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88252 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88254 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88255 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88256 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88258 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88259 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88262 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88263 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88265 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88266 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88267 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88270 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88272 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88273 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88275 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88276	DISPSL /	Oil contaminated soil	26	TON	1.000	MIN		

Invoice Date: 04 Aug 2017

INVOICE
Invoice No 1001959036

TASK 1703416232-001 - Disposal of CH1417453B to Deer Trail

Manifest Info	Item ID	Description	Manifest Qty	Manifest UOM	Billing Qty	Billing UOM	Unit Price	Amount
1	CNO	CH1417453B						
		20 Jul 2017						
BOL88278 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88279 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
BOL88280 1	DISPSL / CNO	Oil contaminated soil CH1417453B	26	TON	1.000	MIN		
		31 Jul 2017						
	FACTAX	10% Surcharge						

100 loads

→ 1,800 yards

APPENDIX C
Laboratory Reports

ANALYTICAL REPORT

June 09, 2017

HRM Resources, LLC - Denver, CO

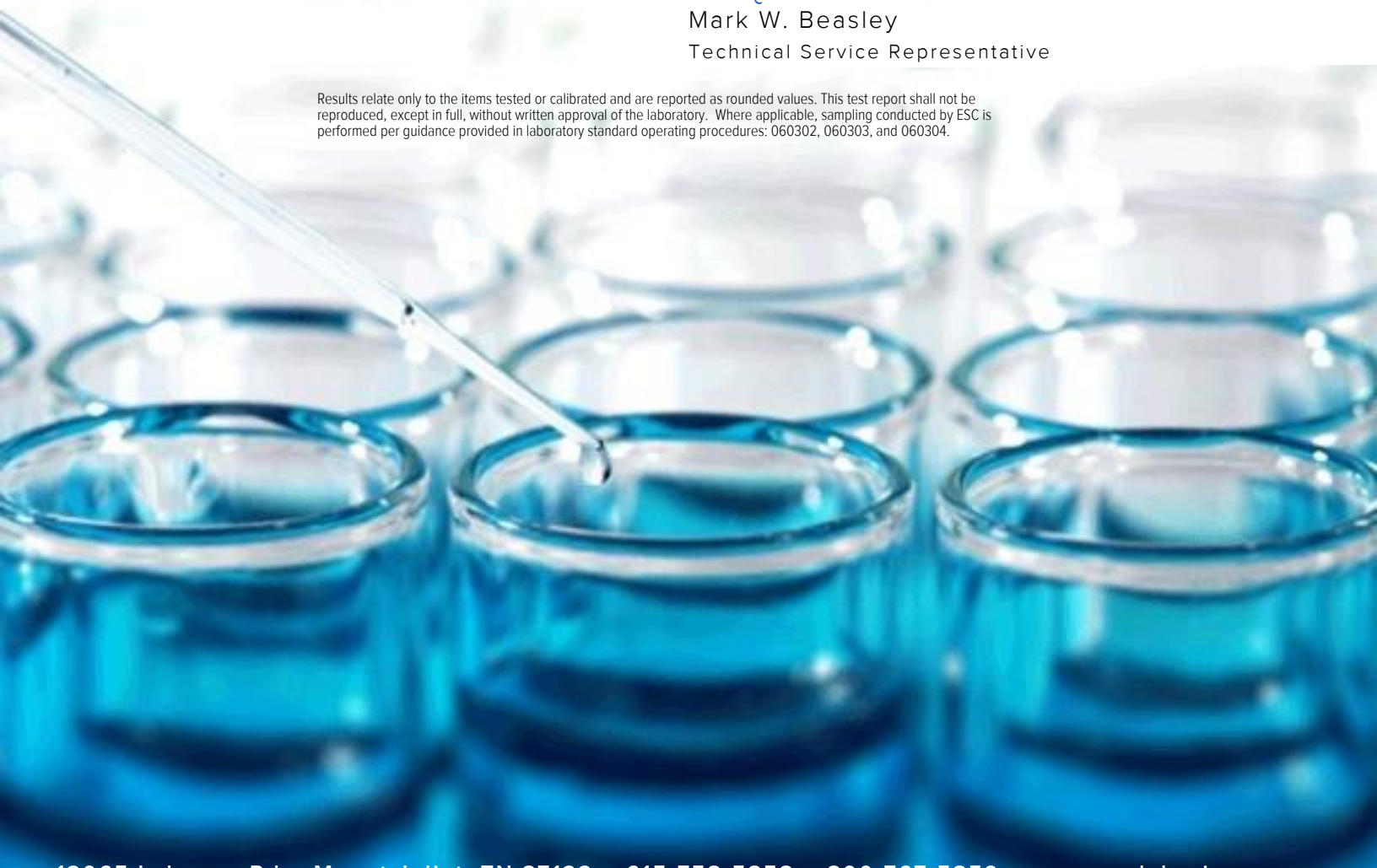
Sample Delivery Group:	L912791
Samples Received:	05/31/2017
Project Number:	
Description:	HRM Challis Farms

Report To:

Dave Nicholson
410 17th St., Ste. 1600
Denver, CO 80202

Entire Report Reviewed By:

Mark W. Beasley
Technical Service Representative



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CHALLIS-SP-1 L912791-01 Solid

Collected by: DK Nicholson
Collected date/time: 05/26/17 13:00
Received date/time: 05/31/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG986214	1	06/06/17 10:15	06/07/17 11:33	NJB
Wet Chemistry by Method 9045D	WG984643	1	06/01/17 13:02	06/01/17 14:01	MHM
Wet Chemistry by Method 9050AMod	WG984725	1	06/01/17 15:14	06/01/17 15:14	MAJ
Volatile Organic Compounds (GC) by Method 8015/8021	WG985812	1	05/26/17 13:00	06/04/17 03:27	ACG
Semi-Volatile Organic Compounds (GC) by Method 8015	WG986134	5	06/07/17 07:13	06/08/17 06:18	ACM

CHALLIS-SP-2 L912791-02 Solid

Collected by: DK Nicholson
Collected date/time: 05/26/17 13:05
Received date/time: 05/31/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG986214	1	06/06/17 10:15	06/07/17 11:36	NJB
Wet Chemistry by Method 9045D	WG984643	1	06/01/17 13:02	06/01/17 14:01	MHM
Wet Chemistry by Method 9050AMod	WG984725	1	06/01/17 15:14	06/01/17 15:14	MAJ
Volatile Organic Compounds (GC) by Method 8015/8021	WG985812	1	05/26/17 13:05	06/04/17 03:48	ACG
Semi-Volatile Organic Compounds (GC) by Method 8015	WG986134	10	06/07/17 07:13	06/08/17 07:07	ACM

CHALLIS-SP-3 L912791-03 Solid

Collected by: DK Nicholson
Collected date/time: 05/26/17 13:10
Received date/time: 05/31/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG986214	1	06/06/17 10:15	06/07/17 11:39	NJB
Wet Chemistry by Method 9045D	WG984643	1	06/01/17 13:02	06/01/17 14:01	MHM
Wet Chemistry by Method 9050AMod	WG984725	1	06/01/17 15:14	06/01/17 15:14	MAJ
Volatile Organic Compounds (GC) by Method 8015/8021	WG985812	1	05/26/17 13:10	06/04/17 04:10	ACG
Semi-Volatile Organic Compounds (GC) by Method 8015	WG986134	10	06/07/17 07:13	06/08/17 06:51	ACM

CHALLIS-SP-4 L912791-04 Solid

Collected by: DK Nicholson
Collected date/time: 05/26/17 13:15
Received date/time: 05/31/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG986214	1	06/06/17 10:15	06/07/17 11:42	NJB
Wet Chemistry by Method 9045D	WG984643	1	06/01/17 13:02	06/01/17 14:01	MHM
Wet Chemistry by Method 9050AMod	WG984725	1	06/01/17 15:14	06/01/17 15:14	MAJ
Volatile Organic Compounds (GC) by Method 8015	WG985812	1	05/26/17 13:15	06/04/17 04:33	ACG
Volatile Organic Compounds (GC) by Method 8021	WG985812	23.75	05/26/17 13:15	06/06/17 18:16	BMB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG986134	1	06/07/17 07:13	06/07/17 15:35	ACM

CHALLIS-SP-5 L912791-05 Solid

Collected by: DK Nicholson
Collected date/time: 05/26/17 13:20
Received date/time: 05/31/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG986214	1	06/06/17 10:15	06/07/17 11:45	NJB
Wet Chemistry by Method 9045D	WG984643	1	06/01/17 13:02	06/01/17 14:01	MHM
Wet Chemistry by Method 9050AMod	WG984725	1	06/01/17 15:14	06/01/17 15:14	MAJ
Volatile Organic Compounds (GC) by Method 8015/8021	WG985812	98	05/26/17 13:20	06/03/17 22:15	ACG
Semi-Volatile Organic Compounds (GC) by Method 8015	WG986134	100	06/07/17 07:13	06/08/17 06:34	ACM

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
Technical Service Representative

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	2.53		1	06/07/2017 11:33	WG986214

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	su				
pH	9.16	T8	1	06/01/2017 14:01	WG984643

Sample Narrative:

9045D L912791-01 WG984643: 9.16 at 21.4c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	umhos/cm				
Specific Conductance	350		1	06/01/2017 15:14	WG984725

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Benzene	0.00105		0.000500	1	06/04/2017 03:27	WG985812
Toluene	ND		0.00500	1	06/04/2017 03:27	WG985812
Ethylbenzene	ND		0.000500	1	06/04/2017 03:27	WG985812
Total Xylene	0.00464		0.00150	1	06/04/2017 03:27	WG985812
TPH (GC/FID) Low Fraction	0.879		0.100	1	06/04/2017 03:27	WG985812
(S) a,a,a-Trifluorotoluene(FID)	*88.2*		*77.0-120*		*06/04/2017 03:27*	WG985812
(S) a,a,a-Trifluorotoluene(PID)	*93.5*		*75.0-128*		*06/04/2017 03:27*	WG985812

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
C10-C28 Diesel Range	595		20.0	5	06/08/2017 06:18	WG986134
C28-C40 Oil Range	283		20.0	5	06/08/2017 06:18	WG986134
(S) o-Terphenyl	*22.0*		*18.0-148*		*06/08/2017 06:18*	WG986134

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	2.34		1	06/07/2017 11:36	WG986214

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.58	T8	1	06/01/2017 14:01	WG984643

Sample Narrative:

9045D L912791-02 WG984643: 8.58 at 20.9c

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	379		1	06/01/2017 15:14	WG984725

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00108		0.000500	1	06/04/2017 03:48	WG985812
Toluene	ND		0.00500	1	06/04/2017 03:48	WG985812
Ethylbenzene	ND		0.000500	1	06/04/2017 03:48	WG985812
Total Xylene	ND		0.00150	1	06/04/2017 03:48	WG985812
TPH (GC/FID) Low Fraction	ND		0.100	1	06/04/2017 03:48	WG985812
(S) a,a,a-Trifluorotoluene(FID)	*68.1*	J2	*77.0-120*		*06/04/2017 03:48*	WG985812
(S) a,a,a-Trifluorotoluene(PID)	*72.5*	J2	*75.0-128*		*06/04/2017 03:48*	WG985812

Sample Narrative:

8015/8021 L912791-02 WG985812: Surrogate failure due to matrix interference.

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	3870		40.0	10	06/08/2017 07:07	WG986134
C28-C40 Oil Range	1910		40.0	10	06/08/2017 07:07	WG986134
(S) o-Terphenyl	*32.4*		*18.0-148*		*06/08/2017 07:07*	WG986134

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	6.17		1	06/07/2017 11:39	WG986214

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.87	T8	1	06/01/2017 14:01	WG984643

Sample Narrative:

9045D L912791-03 WG984643: 8.87 at 20.7c

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	373		1	06/01/2017 15:14	WG984725

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00149		0.000500	1	06/04/2017 04:10	WG985812
Toluene	ND		0.00500	1	06/04/2017 04:10	WG985812
Ethylbenzene	ND		0.000500	1	06/04/2017 04:10	WG985812
Total Xylene	ND		0.00150	1	06/04/2017 04:10	WG985812
TPH (GC/FID) Low Fraction	ND		0.100	1	06/04/2017 04:10	WG985812
(S) a,a,a-Trifluorotoluene(FID)	*82.8*		*77.0-120*		*06/04/2017 04:10*	WG985812
(S) a,a,a-Trifluorotoluene(PID)	*88.1*		*75.0-128*		*06/04/2017 04:10*	WG985812

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	482		40.0	10	06/08/2017 06:51	WG986134
C28-C40 Oil Range	426		40.0	10	06/08/2017 06:51	WG986134
(S) o-Terphenyl	*84.8*		*18.0-148*		*06/08/2017 06:51*	WG986134

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	7.58		1	06/07/2017 11:42	WG986214

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.95	T8	1	06/01/2017 14:01	WG984643

Sample Narrative:

9045D L912791-04 WG984643: 8.95 at 20.8c

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	407		1	06/01/2017 15:14	WG984725

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.0119	23.75	06/06/2017 18:16	WG985812
Toluene	ND		0.119	23.75	06/06/2017 18:16	WG985812
Ethylbenzene	ND		0.0119	23.75	06/06/2017 18:16	WG985812
Total Xylene	ND		0.0356	23.75	06/06/2017 18:16	WG985812
TPH (GC/FID) Low Fraction	ND		0.100	1	06/04/2017 04:33	WG985812
(S) a,a,a-Trifluorotoluene(FID)	*94.8*		*77.0-120*		*06/04/2017 04:33*	WG985812
(S) a,a,a-Trifluorotoluene(FID)	*98.1*		*77.0-120*		*06/06/2017 18:16*	WG985812
(S) a,a,a-Trifluorotoluene(PID)	*101*		*75.0-128*		*06/04/2017 04:33*	WG985812
(S) a,a,a-Trifluorotoluene(PID)	*104*		*75.0-128*		*06/06/2017 18:16*	WG985812

Sample Narrative:

8015/8021 L912791-04 WG985812: No stir bars remain for analysis.

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	ND		4.00	1	06/07/2017 15:35	WG986134
C28-C40 Oil Range	ND		4.00	1	06/07/2017 15:35	WG986134
(S) o-Terphenyl	*75.9*		*18.0-148*		*06/07/2017 15:35*	WG986134

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	7.22		1	06/07/2017 11:45	WG986214

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	9.19	T8	1	06/01/2017 14:01	WG984643

Sample Narrative:

9045D L912791-05 WG984643: 9.19 at 20.9c

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	374		1	06/01/2017 15:14	WG984725

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.0650		0.0490	98	06/03/2017 22:15	WG985812
Toluene	ND		0.490	98	06/03/2017 22:15	WG985812
Ethylbenzene	ND		0.0490	98	06/03/2017 22:15	WG985812
Total Xylene	1.62		0.147	98	06/03/2017 22:15	WG985812
TPH (GC/FID) Low Fraction	404		9.80	98	06/03/2017 22:15	WG985812
(S) a,a,a-Trifluorotoluene(FID)	*95.9*		*77.0-120*		*06/03/2017 22:15*	WG985812
(S) a,a,a-Trifluorotoluene(PID)	*104*		*75.0-128*		*06/03/2017 22:15*	WG985812

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	16200		400	100	06/08/2017 06:34	WG986134
C28-C40 Oil Range	1960		400	100	06/08/2017 06:34	WG986134
(S) o-Terphenyl	*6.73*	J7	*18.0-148*		*06/08/2017 06:34*	WG986134

L912711-01 Original Sample (OS) • Duplicate (DUP)

(OS) L912711-01 06/01/17 14:01 • (DUP) WG984643-3 06/01/17 14:01

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	6.99	6.98	1	0.143	T8	1

L912793-08 Original Sample (OS) • Duplicate (DUP)

(OS) L912793-08 06/01/17 14:01 • (DUP) WG984643-4 06/01/17 14:01

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	9.91	9.90	1	0.101	T8	1

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG984643-1 06/01/17 14:01 • (LCSD) WG984643-2 06/01/17 14:01

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
pH	6.38	6.38	6.35	100	99.5	98.7-101			0.471	1

Method Blank (MB)

(MB) WG984725-5 06/01/17 15:14

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	1.11			

L912486-01 Original Sample (OS) • Duplicate (DUP)

(OS) L912486-01 06/01/17 15:14 • (DUP) WG984725-1 06/01/17 15:14

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	2820	2820	1	0.0355		20

L912793-08 Original Sample (OS) • Duplicate (DUP)

(OS) L912793-08 06/01/17 15:14 • (DUP) WG984725-4 06/01/17 15:14

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	683	683	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG984725-2 06/01/17 15:14 • (LCSD) WG984725-3 06/01/17 15:14

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCSD Result umhos/cm	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Specific Conductance	169	170	170	101	100	90.0-110			0.000	20

Method Blank (MB)

(MB) R3223251-5 06/03/17 19:38

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	0.000281	J	0.000150	0.00500
Ethylbenzene	U		0.000110	0.000500
Total Xylene	U		0.000460	0.00150
TPH (GC/FID) Low Fraction	0.0599	J	0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	*98.0*			*77.0-120*
(S) a,a,a-Trifluorotoluene(PID)	*105*			*75.0-128*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3223251-1 06/03/17 17:47 • (LCSD) R3223251-2 06/03/17 18:09

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.0500	0.0495	0.0514	99.0	103	71.0-121			3.81	20
Toluene	0.0500	0.0514	0.0511	103	102	72.0-120			0.460	20
Ethylbenzene	0.0500	0.0530	0.0529	106	106	76.0-121			0.180	20
Total Xylene	0.150	0.161	0.162	108	108	75.0-124			0.190	20
(S) a,a,a-Trifluorotoluene(FID)				*97.8*	*97.3*	*77.0-120*				
(S) a,a,a-Trifluorotoluene(PID)				*103*	*102*	*75.0-128*				

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3223251-3 06/03/17 18:32 • (LCSD) R3223251-4 06/03/17 18:54

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	6.07	6.66	110	121	70.0-136			9.35	20
(S) a,a,a-Trifluorotoluene(FID)				*102*	*103*	*77.0-120*				
(S) a,a,a-Trifluorotoluene(PID)				*112*	*113*	*75.0-128*				

L912791-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L912791-05 06/03/17 22:15 • (MS) R3223251-6 06/03/17 20:23 • (MSD) R3223251-7 06/03/17 20:45

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Benzene	0.0500	0.0650	4.74	5.00	95.5	101	98	10.0-146			5.20	29
Toluene	0.0500	ND	5.10	5.41	104	111	98	10.0-143			5.92	30
Ethylbenzene	0.0500	ND	5.21	5.56	106	113	98	10.0-147			6.36	31
Total Xylene	0.150	1.62	17.8	19.0	110	118	98	10.0-149			6.59	30
(S) a,a,a-Trifluorotoluene(FID)					*94.2*	*95.7*		*77.0-120*				

L912791-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L912791-05 06/03/17 22:15 • (MS) R3223251-6 06/03/17 20:23 • (MSD) R3223251-7 06/03/17 20:45

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
(S) a,a,a-Trifluorotoluene(PID)					*102*	*101*		*75.0-128*				

L912791-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L912791-05 06/03/17 22:15 • (MS) R3223251-8 06/03/17 21:07 • (MSD) R3223251-9 06/03/17 21:30

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	404	930	889	97.5	89.9	98	10.0-147			4.50	30
(S) a,a,a-Trifluorotoluene(FID)					*102*	*100*		*77.0-120*				
(S) a,a,a-Trifluorotoluene(PID)					*111*	*111*		*75.0-128*				

Method Blank (MB)

(MB) R3224032-1 06/07/17 14:40

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
C10-C28 Diesel Range	U		1.61	4.00
C28-C40 Oil Range	U		0.274	4.00
(S) o-Terphenyl	*103*			*18.0-148*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3224032-2 06/07/17 14:58 • (LCSD) R3224032-3 06/07/17 15:17

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	%	%	%			%	%
C10-C28 Diesel Range	60.0	44.8	44.0	74.7	73.3	50.0-150			1.87	20
(S) o-Terphenyl				*83.9*	*93.4*	*18.0-148*				

ANALYTICAL REPORT

June 08, 2017

HRM Resources, LLC - Denver, CO

Sample Delivery Group:	L912793
Samples Received:	05/31/2017
Project Number:	
Description:	HRM Challis Farms

Report To: Dave Nicholson
410 17th St., Ste. 1600
Denver, CO 80202

Entire Report Reviewed By:

Mark W. Beasley
Technical Service Representative

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CHALLIS-EP-1 L912793-01 Solid

Collected by: DK Nicholson
Collected date/time: 05/26/17 13:25
Received date/time: 05/31/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG986214	1	06/06/17 10:15	06/07/17 11:47	NJB
Wet Chemistry by Method 9045D	WG984643	1	06/01/17 13:02	06/01/17 14:01	MHM
Wet Chemistry by Method 9050AMod	WG984725	1	06/01/17 15:14	06/01/17 15:14	MAJ
Volatile Organic Compounds (GC) by Method 8015/8021	WG986439	50	06/03/17 18:11	06/08/17 10:35	BMB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG986133	20	06/05/17 21:35	06/07/17 03:49	ACM

CHALLIS-EP-2 L912793-02 Solid

Collected by: DK Nicholson
Collected date/time: 05/26/17 13:30
Received date/time: 05/31/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG986214	1	06/06/17 10:15	06/07/17 11:50	NJB
Wet Chemistry by Method 9045D	WG984643	1	06/01/17 13:02	06/01/17 14:01	MHM
Wet Chemistry by Method 9050AMod	WG984725	1	06/01/17 15:14	06/01/17 15:14	MAJ
Volatile Organic Compounds (GC) by Method 8015/8021	WG986439	1	06/03/17 18:11	06/07/17 14:57	BMB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG986133	1	06/05/17 21:35	06/07/17 03:07	ACM

CHALLIS-EP-3 L912793-03 Solid

Collected by: DK Nicholson
Collected date/time: 05/26/17 13:35
Received date/time: 05/31/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG986214	1	06/06/17 10:15	06/07/17 11:53	NJB
Wet Chemistry by Method 9045D	WG984643	1	06/01/17 13:02	06/01/17 14:01	MHM
Wet Chemistry by Method 9050AMod	WG984725	1	06/01/17 15:14	06/01/17 15:14	MAJ
Volatile Organic Compounds (GC) by Method 8015/8021	WG986439	1	06/03/17 18:11	06/07/17 19:24	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG986133	1	06/05/17 21:35	06/07/17 01:45	ACM

CHALLIS-EP-4 L912793-04 Solid

Collected by: DK Nicholson
Collected date/time: 05/26/17 13:40
Received date/time: 05/31/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG986214	1	06/06/17 10:15	06/07/17 11:56	NJB
Wet Chemistry by Method 9045D	WG984643	1	06/01/17 13:02	06/01/17 14:01	MHM
Wet Chemistry by Method 9050AMod	WG984725	1	06/01/17 15:14	06/01/17 15:14	MAJ
Volatile Organic Compounds (GC) by Method 8015/8021	WG986439	1	06/03/17 18:11	06/07/17 19:46	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG986133	1	06/05/17 21:35	06/07/17 01:58	ACM

CHALLIS-EP-5 L912793-05 Solid

Collected by: DK Nicholson
Collected date/time: 05/26/17 13:45
Received date/time: 05/31/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG986214	1	06/06/17 10:15	06/07/17 12:04	NJB
Wet Chemistry by Method 9045D	WG984643	1	06/01/17 13:02	06/01/17 14:01	MHM
Wet Chemistry by Method 9050AMod	WG984725	1	06/01/17 15:14	06/01/17 15:14	MAJ
Volatile Organic Compounds (GC) by Method 8015/8021	WG986439	1	06/03/17 18:11	06/07/17 20:08	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG986133	1	06/05/17 21:35	06/07/17 02:11	ACM

CHALLIS-EP-6 L912793-06 Solid

Collected by: DK Nicholson
Collected date/time: 05/26/17 13:50
Received date/time: 05/31/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG986214	1	06/06/17 10:15	06/07/17 12:06	NJB
Wet Chemistry by Method 9045D	WG984643	1	06/01/17 13:02	06/01/17 14:01	MHM
Wet Chemistry by Method 9050AMod	WG984725	1	06/01/17 15:14	06/01/17 15:14	MAJ
Volatile Organic Compounds (GC) by Method 8015/8021	WG986351	1	06/03/17 18:11	06/07/17 02:10	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG986133	1	06/05/17 21:35	06/07/17 03:22	ACM

CHALLIS-EP-7 L912793-07 Solid

Collected by: DK Nicholson
Collected date/time: 05/26/17 13:52
Received date/time: 05/31/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG986214	1	06/06/17 10:15	06/07/17 12:09	NJB
Wet Chemistry by Method 9045D	WG984643	1	06/01/17 13:02	06/01/17 14:01	MHM
Wet Chemistry by Method 9050AMod	WG984725	1	06/01/17 15:14	06/01/17 15:14	MAJ
Volatile Organic Compounds (GC) by Method 8015/8021	WG986351	1	06/03/17 18:11	06/07/17 02:32	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG986133	1	06/05/17 21:35	06/07/17 02:26	ACM

CHALLIS-EP-8 L912793-08 Solid

Collected by: DK Nicholson
Collected date/time: 05/26/17 13:55
Received date/time: 05/31/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG986214	1	06/06/17 10:15	06/07/17 12:12	NJB
Wet Chemistry by Method 9045D	WG984643	1	06/01/17 13:02	06/01/17 14:01	MHM
Wet Chemistry by Method 9050AMod	WG984725	1	06/01/17 15:14	06/01/17 15:14	MAJ
Volatile Organic Compounds (GC) by Method 8015/8021	WG986351	1	06/03/17 18:11	06/06/17 17:06	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG986133	1	06/05/17 21:35	06/07/17 03:36	ACM

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
Technical Service Representative

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	6.21		1	06/07/2017 11:47	WG986214

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	9.20	T8	1	06/01/2017 14:01	WG984643

Sample Narrative:

9045D L912793-01 WG984643: 9.20 at 21.0c

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	515		1	06/01/2017 15:14	WG984725

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.0250	50	06/08/2017 10:35	WG986439
Toluene	ND		0.250	50	06/08/2017 10:35	WG986439
Ethylbenzene	1.90		0.0250	50	06/08/2017 10:35	WG986439
Total Xylene	1.74		0.0750	50	06/08/2017 10:35	WG986439
TPH (GC/FID) Low Fraction	186		5.00	50	06/08/2017 10:35	WG986439
(S) a,a,a-Trifluorotoluene(FID)	*102*		*77.0-120*		*06/08/2017 10:35*	WG986439
(S) a,a,a-Trifluorotoluene(PID)	*93.9*		*75.0-128*		*06/08/2017 10:35*	WG986439

Sample Narrative:

8015/8021 L912793-01 WG986439: Nontarget and target compounds are too large to run at a lower dilution.

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	6050		80.0	20	06/07/2017 03:49	WG986133
C28-C40 Oil Range	1060		80.0	20	06/07/2017 03:49	WG986133
(S) o-Terphenyl	*0.000*	J7	*18.0-148*		*06/07/2017 03:49*	WG986133

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	5.64		1	06/07/2017 11:50	WG986214

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	su				
pH	9.40	T8	1	06/01/2017 14:01	WG984643

Sample Narrative:

9045D L912793-02 WG984643: 9.40 at 21.0c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	umhos/cm				
Specific Conductance	463		1	06/01/2017 15:14	WG984725

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Benzene	0.000561		0.000500	1	06/07/2017 14:57	WG986439
Toluene	ND		0.00500	1	06/07/2017 14:57	WG986439
Ethylbenzene	ND		0.000500	1	06/07/2017 14:57	WG986439
Total Xylene	ND		0.00150	1	06/07/2017 14:57	WG986439
TPH (GC/FID) Low Fraction	ND		0.100	1	06/07/2017 14:57	WG986439
(S) a,a,a-Trifluorotoluene(FID)	*95.8*		*77.0-120*		*06/07/2017 14:57*	WG986439
(S) a,a,a-Trifluorotoluene(PID)	*101*		*75.0-128*		*06/07/2017 14:57*	WG986439

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
C10-C28 Diesel Range	ND		4.00	1	06/07/2017 03:07	WG986133
C28-C40 Oil Range	ND		4.00	1	06/07/2017 03:07	WG986133
(S) o-Terphenyl	*87.4*		*18.0-148*		*06/07/2017 03:07*	WG986133

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	6.71		1	06/07/2017 11:53	WG986214

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	9.54	T8	1	06/01/2017 14:01	WG984643

Sample Narrative:

9045D L912793-03 WG984643: 9.54 at 21.0c

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	387		1	06/01/2017 15:14	WG984725

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.000669		0.000500	1	06/07/2017 19:24	WG986439
Toluene	ND		0.00500	1	06/07/2017 19:24	WG986439
Ethylbenzene	ND		0.000500	1	06/07/2017 19:24	WG986439
Total Xylene	ND		0.00150	1	06/07/2017 19:24	WG986439
TPH (GC/FID) Low Fraction	ND		0.100	1	06/07/2017 19:24	WG986439
(S) a,a,a-Trifluorotoluene(FID)	*95.8*		*77.0-120*		*06/07/2017 19:24*	WG986439
(S) a,a,a-Trifluorotoluene(PID)	*101*		*75.0-128*		*06/07/2017 19:24*	WG986439

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	ND		4.00	1	06/07/2017 01:45	WG986133
C28-C40 Oil Range	ND		4.00	1	06/07/2017 01:45	WG986133
(S) o-Terphenyl	*85.8*		*18.0-148*		*06/07/2017 01:45*	WG986133

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	5.31		1	06/07/2017 11:56	WG986214

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	su				
pH	9.74	T8	1	06/01/2017 14:01	WG984643

Sample Narrative:

9045D L912793-04 WG984643: 9.74 at 20.9c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	umhos/cm				
Specific Conductance	637		1	06/01/2017 15:14	WG984725

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Benzene	0.00113		0.000500	1	06/07/2017 19:46	WG986439
Toluene	ND		0.00500	1	06/07/2017 19:46	WG986439
Ethylbenzene	0.000516		0.000500	1	06/07/2017 19:46	WG986439
Total Xylene	ND		0.00150	1	06/07/2017 19:46	WG986439
TPH (GC/FID) Low Fraction	ND		0.100	1	06/07/2017 19:46	WG986439
(S) a,a,a-Trifluorotoluene(FID)	*95.7*		*77.0-120*		*06/07/2017 19:46*	WG986439
(S) a,a,a-Trifluorotoluene(PID)	*101*		*75.0-128*		*06/07/2017 19:46*	WG986439

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
C10-C28 Diesel Range	4.77		4.00	1	06/07/2017 01:58	WG986133
C28-C40 Oil Range	ND		4.00	1	06/07/2017 01:58	WG986133
(S) o-Terphenyl	*84.7*		*18.0-148*		*06/07/2017 01:58*	WG986133

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	6.88		1	06/07/2017 12:04	WG986214

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	9.78	T8	1	06/01/2017 14:01	WG984643

Sample Narrative:

9045D L912793-05 WG984643: 9.78 at 21.1c

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	543		1	06/01/2017 15:14	WG984725

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.000993		0.000500	1	06/07/2017 20:08	WG986439
Toluene	ND		0.00500	1	06/07/2017 20:08	WG986439
Ethylbenzene	ND		0.000500	1	06/07/2017 20:08	WG986439
Total Xylene	0.00153		0.00150	1	06/07/2017 20:08	WG986439
TPH (GC/FID) Low Fraction	ND		0.100	1	06/07/2017 20:08	WG986439
(S) a,a,a-Trifluorotoluene(FID)	*96.2*		*77.0-120*		*06/07/2017 20:08*	WG986439
(S) a,a,a-Trifluorotoluene(PID)	*101*		*75.0-128*		*06/07/2017 20:08*	WG986439

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	ND		4.00	1	06/07/2017 02:11	WG986133
C28-C40 Oil Range	ND		4.00	1	06/07/2017 02:11	WG986133
(S) o-Terphenyl	*88.7*		*18.0-148*		*06/07/2017 02:11*	WG986133

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	8.09		1	06/07/2017 12:06	WG986214

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	su				
pH	9.74	T8	1	06/01/2017 14:01	WG984643

Sample Narrative:

9045D L912793-06 WG984643: 9.74 at 21.0c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	umhos/cm				
Specific Conductance	654		1	06/01/2017 15:14	WG984725

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Benzene	0.000907		0.000500	1	06/07/2017 02:10	WG986351
Toluene	ND		0.00500	1	06/07/2017 02:10	WG986351
Ethylbenzene	ND		0.000500	1	06/07/2017 02:10	WG986351
Total Xylene	ND		0.00150	1	06/07/2017 02:10	WG986351
TPH (GC/FID) Low Fraction	ND		0.100	1	06/07/2017 02:10	WG986351
(S) a,a,a-Trifluorotoluene(FID)	*89.7*		*77.0-120*		*06/07/2017 02:10*	WG986351
(S) a,a,a-Trifluorotoluene(PID)	*98.9*		*75.0-128*		*06/07/2017 02:10*	WG986351

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
C10-C28 Diesel Range	22.7		4.00	1	06/07/2017 03:22	WG986133
C28-C40 Oil Range	13.1		4.00	1	06/07/2017 03:22	WG986133
(S) o-Terphenyl	*81.5*		*18.0-148*		*06/07/2017 03:22*	WG986133

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	9.81		1	06/07/2017 12:09	WG986214

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	su				
pH	9.91	T8	1	06/01/2017 14:01	WG984643

Sample Narrative:

9045D L912793-07 WG984643: 9.91 at 21.0c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	umhos/cm				
Specific Conductance	597		1	06/01/2017 15:14	WG984725

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Benzene	0.00106		0.000500	1	06/07/2017 02:32	WG986351
Toluene	ND		0.00500	1	06/07/2017 02:32	WG986351
Ethylbenzene	ND		0.000500	1	06/07/2017 02:32	WG986351
Total Xylene	0.00150	B	0.00150	1	06/07/2017 02:32	WG986351
TPH (GC/FID) Low Fraction	ND		0.100	1	06/07/2017 02:32	WG986351
(S) a,a,a-Trifluorotoluene(FID)	*89.2*		*77.0-120*		*06/07/2017 02:32*	WG986351
(S) a,a,a-Trifluorotoluene(PID)	*98.4*		*75.0-128*		*06/07/2017 02:32*	WG986351

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
C10-C28 Diesel Range	ND		4.00	1	06/07/2017 02:26	WG986133
C28-C40 Oil Range	ND		4.00	1	06/07/2017 02:26	WG986133
(S) o-Terphenyl	*86.8*		*18.0-148*		*06/07/2017 02:26*	WG986133

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	7.82		1	06/07/2017 12:12	WG986214

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	9.91	T8	1	06/01/2017 14:01	WG984643

Sample Narrative:

9045D L912793-08 WG984643: 9.91 at 20.9c

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	683		1	06/01/2017 15:14	WG984725

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00103		0.000500	1	06/06/2017 17:06	WG986351
Toluene	ND		0.00500	1	06/06/2017 17:06	WG986351
Ethylbenzene	ND		0.000500	1	06/06/2017 17:06	WG986351
Total Xylene	ND	J3 J6	0.00150	1	06/06/2017 17:06	WG986351
TPH (GC/FID) Low Fraction	ND		0.100	1	06/06/2017 17:06	WG986351
(S) a,a,a-Trifluorotoluene(FID)	*89.6*		*77.0-120*		*06/06/2017 17:06*	WG986351
(S) a,a,a-Trifluorotoluene(PID)	*98.6*		*75.0-128*		*06/06/2017 17:06*	WG986351

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	95.4		4.00	1	06/07/2017 03:36	WG986133
C28-C40 Oil Range	47.6		4.00	1	06/07/2017 03:36	WG986133
(S) o-Terphenyl	*72.4*		*18.0-148*		*06/07/2017 03:36*	WG986133

L912711-01 Original Sample (OS) • Duplicate (DUP)

(OS) L912711-01 06/01/17 14:01 • (DUP) WG984643-3 06/01/17 14:01

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	6.99	6.98	1	0.143	T8	1

L912793-08 Original Sample (OS) • Duplicate (DUP)

(OS) L912793-08 06/01/17 14:01 • (DUP) WG984643-4 06/01/17 14:01

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	9.91	9.90	1	0.101	T8	1

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG984643-1 06/01/17 14:01 • (LCSD) WG984643-2 06/01/17 14:01

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
pH	6.38	6.38	6.35	100	99.5	98.7-101			0.471	1

Method Blank (MB)

(MB) WG984725-5 06/01/17 15:14

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	umhos/cm		umhos/cm	umhos/cm
Specific Conductance	1.11			

L912486-01 Original Sample (OS) • Duplicate (DUP)

(OS) L912486-01 06/01/17 15:14 • (DUP) WG984725-1 06/01/17 15:14

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	umhos/cm	umhos/cm		%		%
Specific Conductance	2820	2820	1	0.0355		20

L912793-08 Original Sample (OS) • Duplicate (DUP)

(OS) L912793-08 06/01/17 15:14 • (DUP) WG984725-4 06/01/17 15:14

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	umhos/cm	umhos/cm		%		%
Specific Conductance	683	683	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG984725-2 06/01/17 15:14 • (LCSD) WG984725-3 06/01/17 15:14

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	umhos/cm	umhos/cm	umhos/cm	%	%	%			%	%
Specific Conductance	169	170	170	101	100	90.0-110			0.000	20

Method Blank (MB)

(MB) R3223556-5 06/06/17 12:16

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	0.000646	J	0.000150	0.00500
Ethylbenzene	0.000238	J	0.000110	0.000500
Total Xylene	U		0.000460	0.00150
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	*93.5*			*77.0-120*
(S) a,a,a-Trifluorotoluene(PID)	*103*			*75.0-128*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3223556-1 06/06/17 10:24 • (LCSD) R3223556-2 06/06/17 10:46

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.0500	0.0473	0.0467	94.6	93.3	71.0-121			1.33	20
Toluene	0.0500	0.0470	0.0454	94.0	90.9	72.0-120			3.44	20
Ethylbenzene	0.0500	0.0470	0.0459	94.0	91.7	76.0-121			2.42	20
Total Xylene	0.150	0.141	0.136	93.7	90.4	75.0-124			3.55	20
(S) a,a,a-Trifluorotoluene(FID)				*93.3*	*93.8*	*77.0-120*				
(S) a,a,a-Trifluorotoluene(PID)				*101*	*102*	*75.0-128*				

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3223556-3 06/06/17 11:09 • (LCSD) R3223556-4 06/06/17 11:31

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	6.36	6.63	116	121	70.0-136			4.14	20
(S) a,a,a-Trifluorotoluene(FID)				*104*	*104*	*77.0-120*				
(S) a,a,a-Trifluorotoluene(PID)				*111*	*111*	*75.0-128*				

L912793-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L912793-08 06/06/17 17:06 • (MS) R3223556-6 06/06/17 17:28 • (MSD) R3223556-7 06/06/17 17:50

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Benzene	0.0500	0.00103	0.0258	0.0275	49.5	53.0	1	10.0-146			6.55	29
Toluene	0.0500	ND	0.0235	0.0236	43.9	44.2	1	10.0-143			0.540	30
Ethylbenzene	0.0500	ND	0.0188	0.0165	37.0	32.5	1	10.0-147			12.9	31
Total Xylene	0.150	ND	0.0548	0.0418	35.8	27.2	1	10.0-149	J6	J3 J6	26.9	30
(S) a,a,a-Trifluorotoluene(FID)					*81.2*	*90.1*		*77.0-120*				

L912793-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L912793-08 06/06/17 17:06 • (MS) R3223556-6 06/06/17 17:28 • (MSD) R3223556-7 06/06/17 17:50

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
(S) a,a,a-Trifluorotoluene(PID)					*87.5*	*97.0*		*75.0-128*				

L912793-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L912793-08 06/06/17 17:06 • (MS) R3223556-8 06/06/17 18:12 • (MSD) R3223556-9 06/06/17 18:35

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	ND	1.91	1.92	34.0	34.3	1	10.0-147			0.770	30
(S) a,a,a-Trifluorotoluene(FID)					*89.1*	*70.9*		*77.0-120*		J2		
(S) a,a,a-Trifluorotoluene(PID)					*98.1*	*72.3*		*75.0-128*		J2		

Method Blank (MB)

(MB) R3223911-5 06/07/17 11:32

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Benzene	U		0.000120	0.000500
Toluene	U		0.000150	0.00500
Ethylbenzene	U		0.000110	0.000500
Total Xylene	U		0.000460	0.00150
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	*98.6*			*77.0-120*
(S) a,a,a-Trifluorotoluene(PID)	*103*			*75.0-128*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3223911-1 06/07/17 09:41 • (LCSD) R3223911-2 06/07/17 10:04

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Benzene	0.0500	0.0485	0.0485	96.9	96.9	71.0-121			0.000	20
Toluene	0.0500	0.0479	0.0475	95.7	95.1	72.0-120			0.710	20
Ethylbenzene	0.0500	0.0480	0.0482	96.0	96.4	76.0-121			0.330	20
Total Xylene	0.150	0.139	0.140	92.7	93.1	75.0-124			0.500	20
(S) a,a,a-Trifluorotoluene(FID)				*97.8*	*98.2*	*77.0-120*				
(S) a,a,a-Trifluorotoluene(PID)				*102*	*102*	*75.0-128*				

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3223911-3 06/07/17 10:26 • (LCSD) R3223911-4 06/07/17 10:48

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	%	%	%			%	%
TPH (GC/FID) Low Fraction	5.50	5.73	5.49	104	99.8	70.0-136			4.41	20
(S) a,a,a-Trifluorotoluene(FID)				*108*	*107*	*77.0-120*				
(S) a,a,a-Trifluorotoluene(PID)				*116*	*115*	*75.0-128*				

Method Blank (MB)

(MB) R3223528-1 06/06/17 15:16

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
C10-C28 Diesel Range	U		1.61	4.00
C28-C40 Oil Range	U		0.274	4.00
(S) o-Terphenyl	*86.5*			*18.0-148*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3223528-2 06/06/17 15:30 • (LCSD) R3223528-3 06/06/17 15:44

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
C10-C28 Diesel Range	60.0	45.5	45.8	75.8	76.3	50.0-150			0.710	20
(S) o-Terphenyl				*86.4*	*85.5*	*18.0-148*				

ANALYTICAL REPORT

July 14, 2017

HRM Resources, LLC - Denver, CO

Sample Delivery Group:	L921252
Samples Received:	07/08/2017
Project Number:	
Description:	CHALLIS FARMS

Report To: Dave Nicholson
410 17th St., Ste. 1600
Denver, CO 80202

Entire Report Reviewed By:

Jason Romer
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

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CHALLIS-SP-6 L921252-01 Solid

Collected by: DK Nicholson
Collected date/time: 07/07/17 09:10
Received date/time: 07/08/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG996718	1	07/11/17 10:00	07/12/17 17:20	ST
Wet Chemistry by Method 9045D	WG997039	1	07/10/17 09:26	07/10/17 10:09	TH
Wet Chemistry by Method 9050AMod	WG997076	1	07/10/17 17:04	07/10/17 17:04	KK
Volatile Organic Compounds (GC) by Method 8015/8021	WG998155	1	07/12/17 15:36	07/13/17 00:24	JAH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG997410	1	07/11/17 23:57	07/13/17 15:48	ACM

CHALLIS-SP-7 L921252-02 Solid

Collected by: DK Nicholson
Collected date/time: 07/07/17 09:30
Received date/time: 07/08/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG996718	1	07/11/17 10:00	07/12/17 17:23	ST
Wet Chemistry by Method 9045D	WG997039	1	07/10/17 09:26	07/10/17 10:09	TH
Wet Chemistry by Method 9050AMod	WG997076	1	07/10/17 17:04	07/10/17 17:04	KK
Volatile Organic Compounds (GC) by Method 8015/8021	WG998155	1	07/12/17 15:36	07/13/17 00:45	JAH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG997410	1	07/11/17 23:57	07/13/17 16:02	ACM

CHALLIS-SP-8 L921252-03 Solid

Collected by: DK Nicholson
Collected date/time: 07/07/17 09:50
Received date/time: 07/08/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG996718	1	07/11/17 10:00	07/12/17 17:26	ST
Wet Chemistry by Method 9045D	WG997039	1	07/10/17 09:26	07/10/17 10:09	TH
Wet Chemistry by Method 9050AMod	WG997076	1	07/10/17 17:04	07/10/17 17:04	KK
Volatile Organic Compounds (GC) by Method 8015/8021	WG998155	1	07/12/17 15:36	07/13/17 01:27	JAH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG997410	1	07/11/17 23:57	07/13/17 16:16	ACM

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jason Romer
Technical Service Representative

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	4.54		1	07/12/2017 17:20	WG996718

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	su				
pH	10.2	T8	1	07/10/2017 10:09	WG997039

Sample Narrative:

L921252-01 WG997039: 10.18 at 21.8c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	umhos/cm				
Specific Conductance	453		1	07/10/2017 17:04	WG997076

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Benzene	0.000955		0.000500	1	07/13/2017 00:24	WG998155
Toluene	ND		0.00500	1	07/13/2017 00:24	WG998155
Ethylbenzene	0.000552	B	0.000500	1	07/13/2017 00:24	WG998155
Total Xylene	0.00185		0.00150	1	07/13/2017 00:24	WG998155
TPH (GC/FID) Low Fraction	0.409		0.100	1	07/13/2017 00:24	WG998155
(S) a,a,a-Trifluorotoluene(FID)	*96.8*		*77.0-120*		*07/13/2017 00:24*	WG998155
(S) a,a,a-Trifluorotoluene(PID)	*98.2*		*75.0-128*		*07/13/2017 00:24*	WG998155

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
C10-C28 Diesel Range	14.9		4.00	1	07/13/2017 15:48	WG997410
C28-C40 Oil Range	ND		4.00	1	07/13/2017 15:48	WG997410
(S) o-Terphenyl	*55.2*		*18.0-148*		*07/13/2017 15:48*	WG997410

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.76		1	07/12/2017 17:23	WG996718

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	su				
pH	9.50	T8	1	07/10/2017 10:09	WG997039

Sample Narrative:

L921252-02 WG997039: 9.50 at 21.8c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	umhos/cm				
Specific Conductance	164		1	07/10/2017 17:04	WG997076

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Benzene	0.00121		0.000500	1	07/13/2017 00:45	WG998155
Toluene	ND		0.00500	1	07/13/2017 00:45	WG998155
Ethylbenzene	ND		0.000500	1	07/13/2017 00:45	WG998155
Total Xylene	0.00159	B	0.00150	1	07/13/2017 00:45	WG998155
TPH (GC/FID) Low Fraction	ND		0.100	1	07/13/2017 00:45	WG998155
(S) a,a,a-Trifluorotoluene(FID)	*97.7*		*77.0-120*		*07/13/2017 00:45*	WG998155
(S) a,a,a-Trifluorotoluene(PID)	*99.4*		*75.0-128*		*07/13/2017 00:45*	WG998155

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
C10-C28 Diesel Range	ND		4.00	1	07/13/2017 16:02	WG997410
C28-C40 Oil Range	ND		4.00	1	07/13/2017 16:02	WG997410
(S) o-Terphenyl	*83.5*		*18.0-148*		*07/13/2017 16:02*	WG997410

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	4.79		1	07/12/2017 17:26	WG996718

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	su				
pH	9.57	T8	1	07/10/2017 10:09	WG997039

Sample Narrative:

L921252-03 WG997039: 9.57 at 21.8c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	umhos/cm				
Specific Conductance	202		1	07/10/2017 17:04	WG997076

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Benzene	ND		0.000500	1	07/13/2017 01:27	WG998155
Toluene	ND		0.00500	1	07/13/2017 01:27	WG998155
Ethylbenzene	ND		0.000500	1	07/13/2017 01:27	WG998155
Total Xylene	ND		0.00150	1	07/13/2017 01:27	WG998155
TPH (GC/FID) Low Fraction	ND		0.100	1	07/13/2017 01:27	WG998155
(S) a,a,a-Trifluorotoluene(FID)	*98.6*		*77.0-120*		*07/13/2017 01:27*	WG998155
(S) a,a,a-Trifluorotoluene(PID)	*102*		*75.0-128*		*07/13/2017 01:27*	WG998155

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
C10-C28 Diesel Range	ND		4.00	1	07/13/2017 16:16	WG997410
C28-C40 Oil Range	ND		4.00	1	07/13/2017 16:16	WG997410
(S) o-Terphenyl	*73.3*		*18.0-148*		*07/13/2017 16:16*	WG997410

L921164-03 Original Sample (OS) • Duplicate (DUP)

(OS) L921164-03 07/10/17 10:09 • (DUP) WG997039-3 07/10/17 10:09

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	8.00	8.00	1	0.000	T8	1

Sample Narrative:

OS: 8.00 at 22.2c

DUP: 8.00 at 22.2c

L921252-03 Original Sample (OS) • Duplicate (DUP)

(OS) L921252-03 07/10/17 10:09 • (DUP) WG997039-4 07/10/17 10:09

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	9.57	9.55	1	0.209	T8	1

Sample Narrative:

OS: 9.57 at 21.8c

DUP: 9.55 at 21.8c

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG997039-1 07/10/17 10:09 • (LCSD) WG997039-2 07/10/17 10:09

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
pH	6.38	6.40	6.39	100	100	98.4-102			0.156	1

Sample Narrative:

LCS: 6.40 at 21.1c

LCSD: 6.39 at 21.1c

Method Blank (MB)

(MB) WG997076-1 07/10/17 17:04

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	3.97			

L921164-01 Original Sample (OS) • Duplicate (DUP)

(OS) L921164-01 07/10/17 17:04 • (DUP) WG997076-4 07/10/17 17:04

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	1010	976	1	3.42		20

L921252-03 Original Sample (OS) • Duplicate (DUP)

(OS) L921252-03 07/10/17 17:04 • (DUP) WG997076-5 07/10/17 17:04

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	202	202	1	0.149		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG997076-2 07/10/17 17:04 • (LCSD) WG997076-3 07/10/17 17:04

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCSD Result umhos/cm	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Specific Conductance	1070	1070	1060	100	99.1	90.0-110			0.939	20

Method Blank (MB)

(MB) R3233144-5 07/12/17 22:19

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	0.000442	J	0.000150	0.00500
Ethylbenzene	0.000127	J	0.000110	0.000500
Total Xylene	U		0.000460	0.00150
TPH (GC/FID) Low Fraction	0.0367	J	0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	*99.6*			*77.0-120*
(S) a,a,a-Trifluorotoluene(PID)	*101*			*75.0-128*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3233144-1 07/12/17 19:10 • (LCSD) R3233144-2 07/12/17 19:31

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.0500	0.0475	0.0495	95.0	99.1	71.0-121			4.26	20
Toluene	0.0500	0.0481	0.0502	96.2	100	72.0-120			4.20	20
Ethylbenzene	0.0500	0.0518	0.0543	104	109	76.0-121			4.68	20
Total Xylene	0.150	0.161	0.168	108	112	75.0-124			3.77	20
(S) a,a,a-Trifluorotoluene(FID)				*98.5*	*98.1*	*77.0-120*				
(S) a,a,a-Trifluorotoluene(PID)				*103*	*105*	*75.0-128*				

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3233144-3 07/12/17 21:16 • (LCSD) R3233144-4 07/12/17 21:37

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	4.69	4.85	85.2	88.1	70.0-136			3.30	20
(S) a,a,a-Trifluorotoluene(FID)				*104*	*105*	*77.0-120*				
(S) a,a,a-Trifluorotoluene(PID)				*113*	*112*	*75.0-128*				

L921740-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L921740-01 07/13/17 13:56 • (MS) R3233144-6 07/13/17 14:18 • (MSD) R3233144-7 07/13/17 15:41

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Benzene	0.0500	U	0.0169	0.0203	33.8	40.6	1	10.0-146			18.3	29
Toluene	0.0500	0.000184	0.0157	0.0206	31.1	40.8	1	10.0-143			26.5	30
Ethylbenzene	0.0500	U	0.0160	0.0217	32.1	43.4	1	10.0-147			30.0	31
Total Xylene	0.150	U	0.0473	0.0656	31.5	43.7	1	10.0-149	J6	J3 J6	32.4	30
(S) a,a,a-Trifluorotoluene(FID)					*98.2*	*99.6*		*77.0-120*				

L921740-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L921740-01 07/13/17 13:56 • (MS) R3233144-6 07/13/17 14:18 • (MSD) R3233144-7 07/13/17 15:41

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
(S) a,a,a-Trifluorotoluene(PID)					*103*	*100*		*75.0-128*				

L921740-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L921740-01 07/13/17 13:56 • (MS) R3233144-8 07/13/17 16:02 • (MSD) R3233144-9 07/13/17 16:23

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	0.0252	0.784	1.55	13.8	27.8	1	10.0-147		J3	65.7	30
(S) a,a,a-Trifluorotoluene(FID)					*97.7*	*96.6*		*77.0-120*				
(S) a,a,a-Trifluorotoluene(PID)					*101*	*101*		*75.0-128*				

Method Blank (MB)

(MB) R3232940-1 07/13/17 00:34

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
C10-C28 Diesel Range	U		1.61	4.00
C28-C40 Oil Range	U		0.274	4.00
(S) o-Terphenyl	*88.5*			*18.0-148*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3232940-2 07/13/17 00:48 • (LCSD) R3232940-3 07/13/17 01:03

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	%	%	%			%	%
C10-C28 Diesel Range	60.0	47.6	48.4	79.4	80.6	50.0-150			1.56	20
(S) o-Terphenyl				*99.3*	*99.6*	*18.0-148*				

L920545-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L920545-03 07/13/17 14:19 • (MS) R3233131-1 07/13/17 14:33 • (MSD) R3233131-2 07/13/17 14:48

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
C10-C28 Diesel Range	60.0	113	164	166	84.3	88.7	1	50.0-150			1.58	20
(S) o-Terphenyl					*79.2*	*79.1*		*18.0-148*				

ANALYTICAL REPORT

September 13, 2017

HRM Resources, LLC - Denver, CO

Sample Delivery Group:	L933618
Samples Received:	09/01/2017
Project Number:	
Description:	Challis Farms

Report To: Dave Nicholson
410 17th St., Ste. 1600
Denver, CO 80202

Entire Report Reviewed By:

Mark W. Beasley
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

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CHALLIS-EP-B-1 L933618-01 Solid

Collected by: DK Nicholason | Collected date/time: 08/28/17 10:35 | Received date/time: 09/01/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1016364	1	09/11/17 06:35	09/12/17 14:06	CCE
Wet Chemistry by Method 9045D	WG1018382	1	09/08/17 16:39	09/08/17 17:11	TH
Wet Chemistry by Method 9050AMod	WG1017006	1	09/07/17 16:13	09/07/17 16:13	MA
Volatile Organic Compounds (GC) by Method 8015/8021	WG1017161	1	09/05/17 08:20	09/07/17 16:17	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1018083	1	09/07/17 19:36	09/08/17 17:58	DMG

CHALLIS-EP-B-2 L933618-02 Solid

Collected by: DK Nicholason | Collected date/time: 08/28/17 10:40 | Received date/time: 09/01/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1016364	1	09/11/17 06:35	09/12/17 14:08	CCE
Wet Chemistry by Method 9045D	WG1018382	1	09/08/17 16:39	09/08/17 17:11	TH
Wet Chemistry by Method 9050AMod	WG1017006	1	09/07/17 16:13	09/07/17 16:13	MA
Volatile Organic Compounds (GC) by Method 8015/8021	WG1017161	1	09/05/17 08:20	09/07/17 16:40	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1018083	1	09/07/17 19:36	09/08/17 13:29	DMG

CHALLIS-EP-B-3 L933618-03 Solid

Collected by: DK Nicholason | Collected date/time: 08/28/17 10:50 | Received date/time: 09/01/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1016364	1	09/11/17 06:35	09/12/17 14:11	CCE
Wet Chemistry by Method 9045D	WG1018382	1	09/08/17 16:39	09/08/17 17:11	TH
Wet Chemistry by Method 9050AMod	WG1017006	1	09/07/17 16:13	09/07/17 16:13	MA
Volatile Organic Compounds (GC) by Method 8015/8021	WG1017161	1	09/05/17 08:20	09/07/17 17:21	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1018083	1	09/07/17 19:36	09/08/17 18:12	DMG

CHALLIS-EP-B-4 L933618-04 Solid

Collected by: DK Nicholason | Collected date/time: 08/28/17 11:00 | Received date/time: 09/01/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1016364	1	09/11/17 06:35	09/12/17 14:13	CCE
Wet Chemistry by Method 9045D	WG1018382	1	09/08/17 16:39	09/08/17 17:11	TH
Wet Chemistry by Method 9050AMod	WG1017006	1	09/07/17 16:13	09/07/17 16:13	MA
Volatile Organic Compounds (GC) by Method 8015/8021	WG1017161	1	09/05/17 08:20	09/07/17 17:45	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1018083	1	09/07/17 19:36	09/08/17 18:26	DMG

CHALLIS-TA-1 L933618-05 Solid

Collected by: DK Nicholason | Collected date/time: 08/28/17 11:10 | Received date/time: 09/01/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1016364	1	09/11/17 06:35	09/12/17 14:16	CCE
Wet Chemistry by Method 9045D	WG1018382	1	09/08/17 16:39	09/08/17 17:11	TH
Wet Chemistry by Method 9050AMod	WG1017006	1	09/07/17 16:13	09/07/17 16:13	MA
Volatile Organic Compounds (GC) by Method 8015/8021	WG1017441	1	09/05/17 08:20	09/06/17 20:35	ACG
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1018083	10	09/07/17 19:36	09/08/17 16:12	DMG

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
Technical Service Representative

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.84		1	09/12/2017 14:06	WG1016364

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.99	T8	1	09/08/2017 17:11	WG1018382

Sample Narrative:

L933618-01 WG1018382: 8.99 at 21.0c

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	279		1	09/07/2017 16:13	WG1017006

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.000585	B	0.000500	1	09/07/2017 16:17	WG1017161
Toluene	ND		0.00500	1	09/07/2017 16:17	WG1017161
Ethylbenzene	ND		0.000500	1	09/07/2017 16:17	WG1017161
Total Xylene	ND		0.00150	1	09/07/2017 16:17	WG1017161
TPH (GC/FID) Low Fraction	ND		0.100	1	09/07/2017 16:17	WG1017161
(S) a,a,a-Trifluorotoluene(FID)	*97.8*		*77.0-120*		*09/07/2017 16:17*	WG1017161
(S) a,a,a-Trifluorotoluene(PID)	*105*		*75.0-128*		*09/07/2017 16:17*	WG1017161

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	ND		4.00	1	09/08/2017 17:58	WG1018083
C28-C40 Oil Range	ND		4.00	1	09/08/2017 17:58	WG1018083
(S) o-Terphenyl	*82.2*		*18.0-148*		*09/08/2017 17:58*	WG1018083

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.09		1	09/12/2017 14:08	WG1016364

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.44	T8	1	09/08/2017 17:11	WG1018382

Sample Narrative:

L933618-02 WG1018382: 8.44 at 20.6c

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	166		1	09/07/2017 16:13	WG1017006

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.000500	1	09/07/2017 16:40	WG1017161
Toluene	ND		0.00500	1	09/07/2017 16:40	WG1017161
Ethylbenzene	ND		0.000500	1	09/07/2017 16:40	WG1017161
Total Xylene	ND		0.00150	1	09/07/2017 16:40	WG1017161
TPH (GC/FID) Low Fraction	ND		0.100	1	09/07/2017 16:40	WG1017161
(S) a,a,a-Trifluorotoluene(FID)	*97.8*		*77.0-120*		*09/07/2017 16:40*	WG1017161
(S) a,a,a-Trifluorotoluene(PID)	*105*		*75.0-128*		*09/07/2017 16:40*	WG1017161

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	ND		4.00	1	09/08/2017 13:29	WG1018083
C28-C40 Oil Range	ND		4.00	1	09/08/2017 13:29	WG1018083
(S) o-Terphenyl	*82.7*		*18.0-148*		*09/08/2017 13:29*	WG1018083

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.52		1	09/12/2017 14:11	WG1016364

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	7.95	T8	1	09/08/2017 17:11	WG1018382

Sample Narrative:

L933618-03 WG1018382: 7.95 at 20.0c

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	199		1	09/07/2017 16:13	WG1017006

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.000500	1	09/07/2017 17:21	WG1017161
Toluene	ND		0.00500	1	09/07/2017 17:21	WG1017161
Ethylbenzene	ND		0.000500	1	09/07/2017 17:21	WG1017161
Total Xylene	ND		0.00150	1	09/07/2017 17:21	WG1017161
TPH (GC/FID) Low Fraction	ND		0.100	1	09/07/2017 17:21	WG1017161
(S) a,a,a-Trifluorotoluene(FID)	*97.9*		*77.0-120*		*09/07/2017 17:21*	WG1017161
(S) a,a,a-Trifluorotoluene(PID)	*105*		*75.0-128*		*09/07/2017 17:21*	WG1017161

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	ND		4.00	1	09/08/2017 18:12	WG1018083
C28-C40 Oil Range	ND		4.00	1	09/08/2017 18:12	WG1018083
(S) o-Terphenyl	*84.0*		*18.0-148*		*09/08/2017 18:12*	WG1018083

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	3.21		1	09/12/2017 14:13	WG1016364

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	9.32	T8	1	09/08/2017 17:11	WG1018382

Sample Narrative:

L933618-04 WG1018382: 9.32 at 19.7c

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	255		1	09/07/2017 16:13	WG1017006

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.000500	1	09/07/2017 17:45	WG1017161
Toluene	ND		0.00500	1	09/07/2017 17:45	WG1017161
Ethylbenzene	ND		0.000500	1	09/07/2017 17:45	WG1017161
Total Xylene	ND		0.00150	1	09/07/2017 17:45	WG1017161
TPH (GC/FID) Low Fraction	ND		0.100	1	09/07/2017 17:45	WG1017161
(S) a,a,a-Trifluorotoluene(FID)	*97.6*		*77.0-120*		*09/07/2017 17:45*	WG1017161
(S) a,a,a-Trifluorotoluene(PID)	*105*		*75.0-128*		*09/07/2017 17:45*	WG1017161

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	4.96		4.00	1	09/08/2017 18:26	WG1018083
C28-C40 Oil Range	ND		4.00	1	09/08/2017 18:26	WG1018083
(S) o-Terphenyl	*80.2*		*18.0-148*		*09/08/2017 18:26*	WG1018083

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	3.39		1	09/12/2017 14:16	WG1016364

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.88	T8	1	09/08/2017 17:11	WG1018382

Sample Narrative:

L933618-05 WG1018382: 8.88 at 19.4c

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	186		1	09/07/2017 16:13	WG1017006

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.000500	1	09/06/2017 20:35	WG1017441
Toluene	ND		0.00500	1	09/06/2017 20:35	WG1017441
Ethylbenzene	ND		0.000500	1	09/06/2017 20:35	WG1017441
Total Xylene	ND		0.00150	1	09/06/2017 20:35	WG1017441
TPH (GC/FID) Low Fraction	ND		0.100	1	09/06/2017 20:35	WG1017441
(S) a,a,a-Trifluorotoluene(FID)	*95.4*		*77.0-120*		*09/06/2017 20:35*	WG1017441
(S) a,a,a-Trifluorotoluene(PID)	*101*		*75.0-128*		*09/06/2017 20:35*	WG1017441

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	246		40.0	10	09/08/2017 16:12	WG1018083
C28-C40 Oil Range	144		40.0	10	09/08/2017 16:12	WG1018083
(S) o-Terphenyl	*84.5*		*18.0-148*		*09/08/2017 16:12*	WG1018083

L934207-02 Original Sample (OS) • Duplicate (DUP)

(OS) L934207-02 09/08/17 17:11 • (DUP) WG1018382-3 09/08/17 17:11

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	8.73	8.73	1	0.000	T8	1

Sample Narrative:

OS: 8.73 at 19.1c

DUP: 8.73 at 19.1c

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG1018382-1 09/08/17 17:11 • (LCSD) WG1018382-2 09/08/17 17:11

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
pH	10.0	10.0	10.0	100	100	98.4-102			0.000	1

Sample Narrative:

LCS: 10.04 at 19.8c

LCSD: 10.04 at 19.9c

Method Blank (MB)

(MB) WG1017006-1 09/07/17 16:13

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	3.05			

L933535-04 Original Sample (OS) • Duplicate (DUP)

(OS) L933535-04 09/07/17 16:13 • (DUP) WG1017006-4 09/07/17 16:13

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	2210	2210	1	0.136		20

L933535-14 Original Sample (OS) • Duplicate (DUP)

(OS) L933535-14 09/07/17 16:13 • (DUP) WG1017006-5 09/07/17 16:13

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	5740	5750	1	0.174		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG1017006-2 09/07/17 16:13 • (LCSD) WG1017006-3 09/07/17 16:13

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCSD Result umhos/cm	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Specific Conductance	559	561	560	100	100	90.0-110			0.178	20

Method Blank (MB)

(MB) R3247769-5 09/07/17 01:48

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	0.000232	J	0.000120	0.000500
Toluene	0.000316	J	0.000150	0.00500
Ethylbenzene	0.000155	J	0.000110	0.000500
Total Xylene	U		0.000460	0.00150
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	*98.5*			*77.0-120*
(S) a,a,a-Trifluorotoluene(PID)	*106*			*75.0-128*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3247769-1 09/06/17 23:09 • (LCSD) R3247769-2 09/06/17 23:33

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.0500	0.0460	0.0451	92.1	90.2	71.0-121			2.09	20
Toluene	0.0500	0.0481	0.0469	96.3	93.8	72.0-120			2.62	20
Ethylbenzene	0.0500	0.0490	0.0484	98.1	96.9	76.0-121			1.25	20
Total Xylene	0.150	0.149	0.147	99.1	97.9	75.0-124			1.22	20
(S) a,a,a-Trifluorotoluene(FID)				*98.9*	*98.3*	*77.0-120*				
(S) a,a,a-Trifluorotoluene(PID)				*105*	*104*	*75.0-128*				

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3247769-3 09/07/17 00:21 • (LCSD) R3247769-4 09/07/17 00:44

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	5.71	5.90	104	107	70.0-136			3.16	20
(S) a,a,a-Trifluorotoluene(FID)				*106*	*105*	*77.0-120*				
(S) a,a,a-Trifluorotoluene(PID)				*125*	*124*	*75.0-128*				

Method Blank (MB)

(MB) R3247410-5 09/06/17 17:53

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	0.000243	J	0.000150	0.00500
Ethylbenzene	0.000167	J	0.000110	0.000500
Total Xylene	U		0.000460	0.00150
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	*99.5*			*77.0-120*
(S) a,a,a-Trifluorotoluene(PID)	*106*			*75.0-128*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3247410-1 09/06/17 16:01 • (LCSD) R3247410-2 09/06/17 16:23

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.0500	0.0452	0.0458	90.4	91.6	71.0-121			1.29	20
Toluene	0.0500	0.0474	0.0467	94.7	93.3	72.0-120			1.46	20
Ethylbenzene	0.0500	0.0492	0.0485	98.4	97.0	76.0-121			1.42	20
Total Xylene	0.150	0.151	0.146	100	97.4	75.0-124			3.03	20
(S) a,a,a-Trifluorotoluene(FID)				*98.8*	*99.2*	*77.0-120*				
(S) a,a,a-Trifluorotoluene(PID)				*104*	*104*	*75.0-128*				

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3247410-3 09/06/17 16:46 • (LCSD) R3247410-4 09/06/17 17:08

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	6.87	6.71	125	122	70.0-136			2.30	20
(S) a,a,a-Trifluorotoluene(FID)				*104*	*104*	*77.0-120*				
(S) a,a,a-Trifluorotoluene(PID)				*116*	*115*	*75.0-128*				

L933797-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L933797-08 09/07/17 01:23 • (MS) R3247410-6 09/07/17 02:30 • (MSD) R3247410-7 09/07/17 02:53

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	ND	112	104	81.6	75.8	25	10.0-147			7.33	30
(S) a,a,a-Trifluorotoluene(FID)					*102*	*99.9*		*77.0-120*				
(S) a,a,a-Trifluorotoluene(PID)					*110*	*110*		*75.0-128*				

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Method Blank (MB)

(MB) R3247831-1 09/08/17 10:03

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
C10-C28 Diesel Range	U		1.61	4.00
C28-C40 Oil Range	U		0.274	4.00
(S) o-Terphenyl	*76.1*			*18.0-148*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3247831-2 09/08/17 10:16 • (LCSD) R3247831-3 09/08/17 10:29

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
C10-C28 Diesel Range	60.0	47.2	50.5	78.6	84.2	50.0-150			6.81	20
(S) o-Terphenyl				*78.5*	*84.7*	*18.0-148*				

L933618-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L933618-02 09/08/17 13:29 • (MS) R3247831-4 09/08/17 13:43 • (MSD) R3247831-5 09/08/17 15:43

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
C10-C28 Diesel Range	60.0	ND	49.5	52.8	82.5	88.0	1	50.0-150			6.50	20
(S) o-Terphenyl					*73.0*	*82.1*		*18.0-148*				