Form 3160-5
(August 2007)

RECEIVED
ELECTRONIC REPORT
MAY 15 2015
BUREAU OF LAND MANAGEMENT

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB NO. 1004-0135
Expires: July 31, 2010

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on reverse side.

5. Lease Serial No.
751141038

6. If Indian, Allottee or Tribe Name
UTE MOUNTAIN UTE

7. If Unit or CA/Agreement, Name and/or No.

1. Type of Well
☒ Oil Well ☐ Gas Well ☐ Other

8. Well Name and No.
PRAIRIE FALCON 19-1

2. Name of Operator
BRIDGECREEK RESOURCES COLO LLC
Contact: CARLA S GRAVES
E-Mail: cgraves@palomarnr.com

9. API Well No.
30-045-35628-00-S1

3a. Address
405 URBAN STREET, SUITE 400
LAKEWOOD, CO 80228

3b. Phone No. (include area code)
Ph: 303-945-2630

10. Field and Pool, or Exploratory
VERDE GALLUP

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 19 T31N R14W NWNE 666FNL 1971FEL
36.891898 N Lat, 108.348346 W Lon

11. County or Parish, and State
SAN JUAN COUNTY, NM

12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☐ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☒ Subsequent Report	☐ Alter Casing	☐ Fracture Treat	☒ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☐ Other
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

Bridgecreek Resources (CO) LLC submits this well pad soil sampling report for the Prairie Falcon 19-1 well as follow-up to the Interim Reclamation plan submitted on 2/27/15. The report provides specific test sample results for each of the well pad samples collected.

Upon examination of analytical results and mixing ratios for sample DT-01, we believe that mixing 2 parts clean (Spoil Pile) material to 1 part blow cuttings (DT-01) will result in a soil composition that is protective of human health and the environment. A mixing ratio of up to 3:1 is permitted in accordance with NMCOD 19.15.17. COGCC Rule 900 Series allows for in place burial of E&P waste so that the waste does not exceed COGCC Table 910-1 (the UMU table) standards.

Pit sample results will be submitted upon receipt.

ACCEPTED FOR RECORD
JUN 10 2015
By:
Tres Rios Field Office
Bureau of Land Management
OIL CONS. DIV DIST. 3
JUN 17 2015

14. I hereby certify that the foregoing is true and correct.
Electronic Submission #301871 verified by the BLM Well Information System
For BRIDGECREEK RESOURCES COLO LLC, sent to the Durango
Committed to AFMSS for processing by BARBARA TELECKY on 06/03/2015 (15BDT0265SE)

Name *(Printed/Typed)* CARLA S GRAVES — Title REGULATORY ASSISTANT

Signature (Electronic Submission) — Date 05/15/2015

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By _____ Title _____ Date _____

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon. Office

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

NMOCD

59

Adkins Consulting, Inc.
180 E. 12th Street, Suite #5 Durango, CO 81303
(505)793-1140

May 12, 2015

Mr. Ryan Joyner
Bureau of Land Management
Tres Rios Field Office
Land and Minerals
15 Burnett Court
Durango, CO 81301

RE: Well Pad Sampling. Bridgecreek Resources. Prairie Falcon 19-1. Sec. 19, T31N.R1.
Lease #751-14-1038.

Mr. Joyner:

On the behalf of Bridgecreek Resources (Bridgecreek), Adkins Consulting Inc. (ACI) is pleased to submit this report for Task II – Well Pad Sampling as outlined in the Reclamation Plan dated February 26, 2015.

Accidental spill and releases identified by Ryan Joyner of the BLM were sampled by Mr. Andrew Parker of ACI on March 31, 2015. Samples were collected for the analysis of constituents listed in the Utu Mountain Ute (UMU) Tribe's "Standards for Spill Clean-up and Reclamation". The UMU standards were adopted from the Colorado Oil and Gas Commission's (COGCCs) Table 910-1 located in COGCC's 900 Series Rule.

Sampling Methodology

Per the well pad sampling plan, sample locations SS-01 through SS-03 were sampled at approximately 6-inches below ground surface. The fourth sample, DT-01, was a composite of the air drill cuttings deposited on top of the western spoil pile. A fifth composite sample was collected from the two spoil piles along the eastern edge of the location. The southwestern spoil pile was omitted from the Spoil Pile sample to omit the mixing with air drill cuttings. The Spoil Pile sample is used as the "clean" sample for mixing ratio calculations; also commonly referred as the background sample.

Exhibit 1 shows the location of the sample locations. Appendix A contains photo documentation. Laboratory Certificate of Analysis is located in Appendix B.

Samples holes were hand dug using a common shovel until total depth - approximately 6-inches below ground surface. Using a hand trowel, representative material from the sidewalls of the hole was collected in a 5 gallon bucket until adequate sample material was obtained. The soil was gently folded into a homogenous mixture then placed into three 8-oz glass sampling jars.

The sampling equipment was decontaminated after each sample hole with deionized water and simple green, then rinsed and allowed to air dry.

No visual observations of hydrocarbon impacted soil were observed in SS-01 and SS-03. Hydrocarbon impact was observed in SS-02 from approximately 2 to 4 inches below ground surface. The thickness of the hydrocarbon impacted soil is estimated at 1-inch.

Sampling jars were provided by Hall Environmental Analysis Laboratory (HEAL) located in Albuquerque, NM. Samples were delivered to HEAL under preservation and strict chain-of-custody.

Analytical Results and Comparison to Soil Evaluation Values and Calculations

Analytical results are presented in Table 1. We compared the results to UMU standards table (December 2007) and to the Colorado Soil Evaluation Values, which are the basis of the values in the UMU table. Constituents exceeding the UMU table concentration levels (2007) are highlighted light red.

All well pad soil samples (SS-01 through SS-03) and the background sample (Spoil Pile) were below UMU table concentrations except for Arsenic. Arsenic is naturally occurring as exhibited in the background sample (Spoil Pile). Arsenic is not further evaluated.

The blow cuttings sample (DT-01) exhibit concentrations above UMU table standards for the constituents listed below. To the right of each constituent listed below is a short explanation demonstrating that constituents meeting the UMU standards, COGCC and NMOCD rules.

TPH	A mixing ratio of 1 part clean to 1 part DT-01 (1:1 mixing ratio) shows TPH concentrations below UMU table concentrations
pH	A mixing ratio of 2 part clean to 1 part DT-01 (2:1 mixing ratio) shows pH concentrations below UMU table concentrations
Benzo(A)pyrene	The concentration was below the CDHPE-HMWMD Table 1 for an industrial worker*. No mixing is necessary to protect human health and the environment.
Dibenzo(A,H)anthracene	The concentration was below the CDHPE-HMWMD Table 1 for an industrial worker*. No mixing is necessary to protect human health and the environment.
SAR	A mixing ratio of 3 parts clean to 1 part DT-01 (3:1 mixing ratio) shows SAR exceeds UMU table standards. We reviewed the SAR Calculation Worksheet (see Appendix C provided by HEAL) and conclude the high SAR is the result of the ratio of high sodium (Na) compared to magnesium (Mg) and calcium (Ca). High sodium is not surprising as drill cuttings were in contact with formation water and drilling fluid at the time of drilling. Furthermore, SAR is considered important for cropland and irrigation water as a high SAR ratio inhibits soil permeability. The observed SAR concentration in DT-01 is not a threat to human health or the environment as we propose to transfer the drill cuttings into the reserve pit for on-site closure according to the APD COAs.

* UMU table footnotes show that many constituent concentration levels were taken from the CDHPE-HMWMD Table 1 Colorado Soil Evaluation Values (December 2007). Because the

constituent levels in Table 910-1 are eight years out of date, we examined the CDPHE-HMWMD website to determine if the values had changed. The CDPHE website directs the user to EPA's Regional Screening Levels (RSLs). As stated on the CDPHE-HMWMD website, "The division uses the direct exposure levels for residential and industrial exposure scenarios listed in the EPA Regional Screening Levels (RSLs)". The SSL's listed in Table 1 assume direct soil dermal contact to an Industrial Worker. Per EPA's guidelines, a THQ=0.1 is commonly used if multiple constituents are being screened, which is the case for some PAHs at the Prairie Falcon 19-1 location. Constituents exceeding current EPA's RSLs for industrial direct exposure are highlighted orange in the attached Table 1.

To calculate the mixing ratio, we:

1. Multiplied the "Spoil Pile" (clean) concentration by the clean soil mixing ratio. For example, a mixing ratio of "2:1" has a multiplier of "2".
2. Added the clean soil result to the air drill cuttings (DT-01) concentration.
3. Divided by the number of concentrations added in the numerator (mixing ratio plus 1).
4. If the constituent of concentration exhibits non-detect, the laboratory reporting limit was used. This creates a *"worse-case"* scenario for the constituent of concern and is most protective of human health and the environment.

For a mixing ration of 2:1, the equation yields:

$$\frac{(clean\ soil\ X\ 2) + contituent\ of\ concern\ concentraion}{3}$$

Table 2 shows this mixing ratio of 1:1 will not exceed UMU table concentration levels for TPH. A 2:1 mixing ration will not exceed UMU table concentration levels for pH.

Conclusion

Examination of analytical results and mixing ratios for sample DT-01, we believe that mixing 2 parts clean (Spoil Pile) material to 1 part blow cuttings (DT-01) will result in a soil composition that is protective of human health and the environment. A mixing ratio of up to 3:1 is permitted in accordance with NMCOD 19.15.17. COGCC Rule 900 Series allows for in place burial of E&P waste so that the waste does not exceed COGCC Table 910-1 (the UMU table) standards.

We recommend mixing the air drill cuttings with the spoil pile in a ratio of 2 clean: 1 air drill cuttings. Then place the mixed material into the reserve pit for proper disposal according to the COA attached to the APD for reserve pit closure.

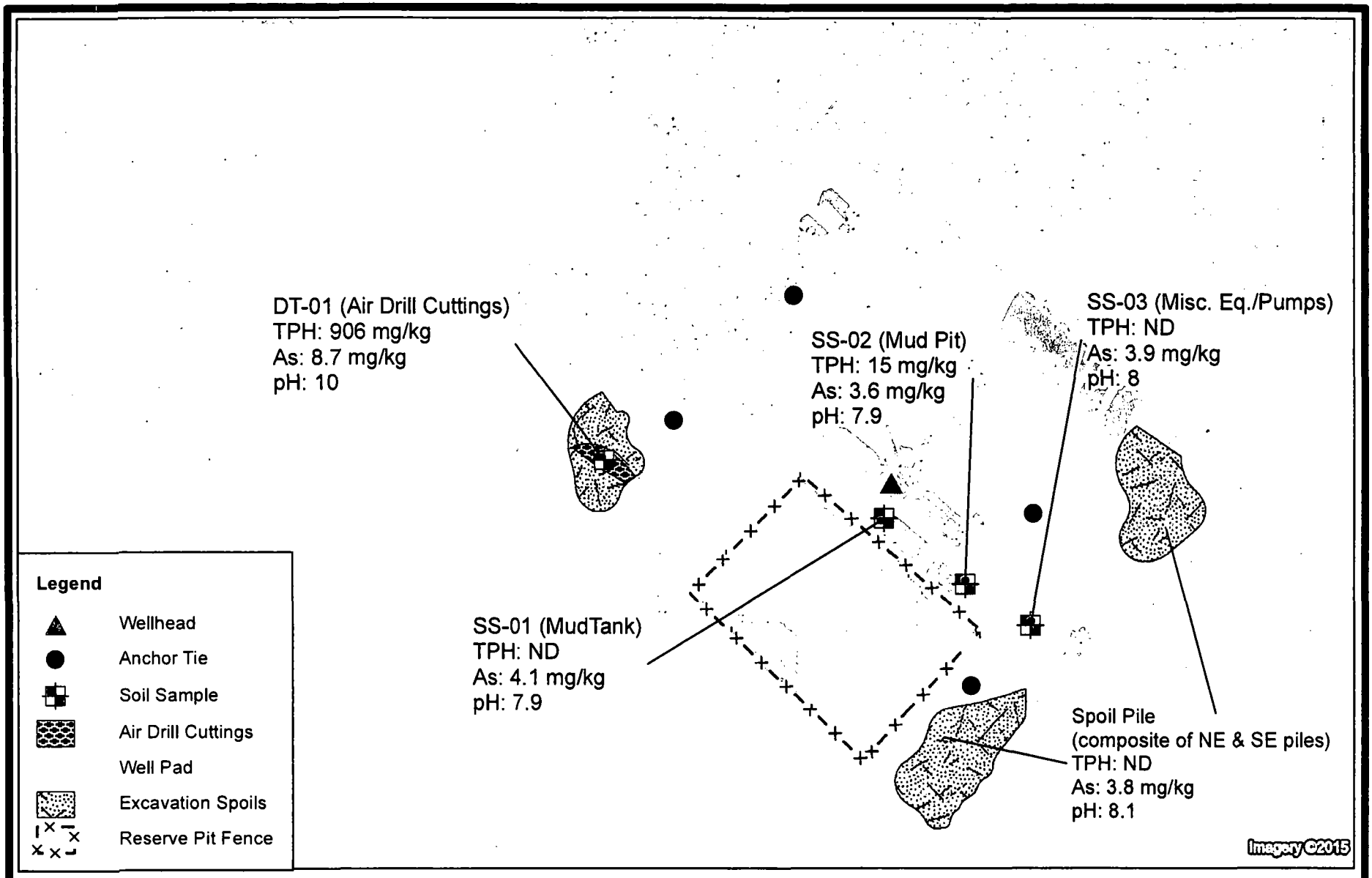
If you have any questions or comments please contact me at 970-570-9535.

Andrew Parker

Andrew Parker
Adkins Consulting, Inc
Durango, CO
970-570-9535
andrew@adkinsenvironmental.com

Cc: Christine Campbell, Bridgecreek Resources
John Thompson, Walsh Engineering

Exhibits



Adkins Consulting Inc. 180 East 12th Street Durango, CO 81303 505-793-1140	Well Pad Sampling Locations - March 31, 2015 Showing TPH, Arsenic, and pH Concentrations	Exhibit 1
	Bridgecreek Resources Prairie Falcon 19-1	May 2015

Tables

Table 1: Summary of Analytical Results

Sample ID	Date	DRO (8015D)	MRO (8015D)	GRO (8015D)	TPH(EPA 8015)	Benzene	Toluene	Ethylbenzene	Xylenes (total)
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SS-01	3/31/2015	<10	<50	<4.7	<64.7	<0.047	<0.047	<0.047	<0.093
SS-02	3/31/2015	<10	<50	15	15	<0.048	<0.048	<0.048	<0.097
SS-03	3/31/2015	<10	<50	<4.6	<64.6	<0.046	<0.046	<0.046	<0.093
DT-01	3/31/2015	570	280	56	906	<0.049	0.22	0.15	0.78
Spoil Pile	3/31/2015	<10	<50	<5.0	<65	<0.050	<0.050	<0.050	<0.099
UMU Table (COGCC Table 910-1)					500	0.17	85	100	175
CDPHE-HMWMD/EPA SSLs						5.10	4,700	25	250

Notes:

exceeds guidelines

exceeds EPA SSL Standards

Table 1: Summary of Analytical Results

Sample ID	Date	Mercury	Arsenic	Barium	Boron	Cadmium	Chromium	Chromium VI	Copper	Lead	Nickel	Selenium	Silver
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SS-01	3/31/2015	<0.031	4.1	120	NS	<0.098	7.8	<2	8.3	3.9	8.3	<2.4	<0.24
SS-02	3/31/2015	<0.034	3.6	210	NS	<0.10	7.7	<2	7.3	3.4	8.1	<2.5	<0.25
SS-03	3/31/2015	<0.033	3.9	170	NS	<0.10	6.8	<2	6.4	3.6	7.5	<2.6	<0.26
DT-01	3/31/2015	<0.032	8.7	210	NS	0.54	8.4	<2	22	10	20	<2.4	<0.24
Spoil Pile	3/31/2015	<0.034	3.8	140	NS	<0.10	7.2	<2	6.2	3.4	7.8	<2.5	<0.25
UMU Table (COGCC Table 910-1)		23	0.39	15,000	4	70	120,000	23	3,100	400	1,600	390	390
CDPHE-HMWMD/EPA SSLs		35	3.00	22,400		98	180,000	6	4,700	800	2,200	580	580

Notes:

exceeds guidelines
exceeds EPA SSL Standards

Table 1: Summary of Analytical Results

Sample ID	Date	Zinc	pH	Naphthalene	Acenaphthene	Fluorene	Anthracene	Fluoranthene	Pyrene	Benzo(A)anthracene	Chrysene
		mg/kg	--	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SS-01	3/31/2015	29	7.9	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
SS-02	3/31/2015	28	7.9	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
SS-03	3/31/2015	27	8	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
DT-01	3/31/2015	92	10	1.1	<0.040	0.17	<0.040	0.042	<0.040	<0.040	<0.040
Spoil Pile	3/31/2015	27	8.1	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
UMU Table (COGCC Table 910-1)		23,000	6-9	23	1,000	1,000	1,000	1,000	1,000	0.22	22
CDPHE-HMWMD/EPA SSLs		35,000		17	4,500	3,000	23,000	3,000	2,300	2.90	290

Notes:

exceeds guidelines

exceeds EPA SSL Standards

Table 1: Summary of Analytical Results

Sample ID	Date	Benzo(B)fluoranthene	Benzo(K)floranthene	Benzo(A)pyrene	Dibenzo(A,H)anthracene
		mg/kg	mg/kg	mg/kg	mg/kg
SS-01	3/31/2015	<0.020	<0.020	<0.020	<0.020
SS-02	3/31/2015	<0.020	<0.020	<0.020	<0.020
SS-03	3/31/2015	<0.020	<0.020	<0.020	<0.020
DT-01	3/31/2015	0.047	<0.040	0.13	<0.040
Spoil Pile	3/31/2015	<0.020	<0.020	<0.020	<0.020
UMU Table (COGCC Table 910-1)		0.22	2.20	0.022	0.022
CDPHE-HMWMD/EPA SSLs		2.90	29.00	0.29	0.290

Notes:

exceeds guidelines

exceeds EPA SSL Standards

Table 1: Summary of Analytical Results

Sample ID	Date	Indeno(1,2,3-cd)pyrene	Sodium Absportion Ratio	Electrical Conductivity	ORP
		mg/kg	--	mmhos/cm	mV
SS-01	3/31/2015	<0.020	1.2	1.09	100
SS-02	3/31/2015	<0.020	4.1	1.03	96
SS-03	3/31/2015	<0.020	5.4	1.37	96
DT-01	3/31/2015	<0.040	66	1.54	28
Spoil Pile	3/31/2015	<0.020	5.4	1.32	82
UMU Table (COGCC Table 910-1)		0.22	<12	<4 or 2x background	
CDPHE-HMWMD/EPA SSLs		2.90			

Notes:

exceeds guidelines
exceeds EPA SSL Standards

Table 2: Mixing Ratio

Mixing Ratio	Sample ID	DRO (8015D)	MRO (8015D)	GRO (8015D)	TPH(EPA 8015)	Benzene	Toluene	Ethylbenzene	Xylenes (total)	Mercury	Arsenic	Barium
clean:actual		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1:1	DT-01	290.00	165.00	30.50	485.50	0.05	0.14	0.10	0.44	0.03	6.25	175.00
2:1	DT-01	196.67	126.67	22.00	345.33	0.05	0.11	0.08	0.33	0.03	5.43	163.33
3:1	DT-01	150.00	107.50	17.75	275.25	0.05	0.09	0.08	0.27	0.03	5.03	157.50
UMU Table (COGCC Table 910-1)					500	0.17	85	100	175	23	0.39	15,000
CDPHE-HMWMD/EPA SSLs						5.10	4,700	25	250	35	3	22,400

Notes:
exceeds guidelines
exceeds EPA SSL Standards

Table 2: Mixing Ratio

Mixing Ratio	Sample ID	Boron	Cadmium	Chromium	Chromium VI	Copper	Lead	Nickel	Selenium	Silver	Zinc	pH	Naphthalene	Acenaphthene
clean:actual		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	--	mg/kg	mg/kg
1:1	DT-01		0.32	7.80	2.00	14.10	6.70	13.90	2.40	0.25	59.50	9.05	0.56	0.03
2:1	DT-01		0.25	7.60	2.00	11.47	5.60	11.87	2.40	0.25	48.67	8.73	0.38	0.03
3:1	DT-01		0.21	7.50	2.00	10.15	5.05	10.85	2.40	0.25	43.25	8.58	0.29	0.03
UMU Table (COGCC Table 910-1)			70	120,000	23	3,100	400	1,600	390	390	23,000	6-9	23	1,000
CDPHE-HMWMD/EPA SSLs			98	180,000	6.30	4,700	800	2,200	580	580	35,000		17	4,500

Notes:
exceeds guidelines
exceeds EPA SSL Standards

Table 2: Mixing Ratio

Mixing Ratio	Sample ID	Fluorene	Anthracene	Fluoranthene	Pyrene	Benzo(A)anthracene	Chrysene	Benzo(B)fluoranthene	Benzo(K)floranthene	Benzo(A)pyrene
clean:actual		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1:1	DT-01	0.10	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.08
2:1	DT-01	0.07	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.06
3:1	DT-01	0.06	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.05

UMU Table (COGCC Table 910-1)	1,000	1,000	1,000	1,000	0.22	22	0.22	2.20	0.022
CDPHE-HMWMD/EPA SSLs	3,000	23,000	3,000	2,300	2.90	290	2.90	29	0.29

Notes:
exceeds guidelines
exceeds EPA SSL Standards

Table 2: Mixing Ratio

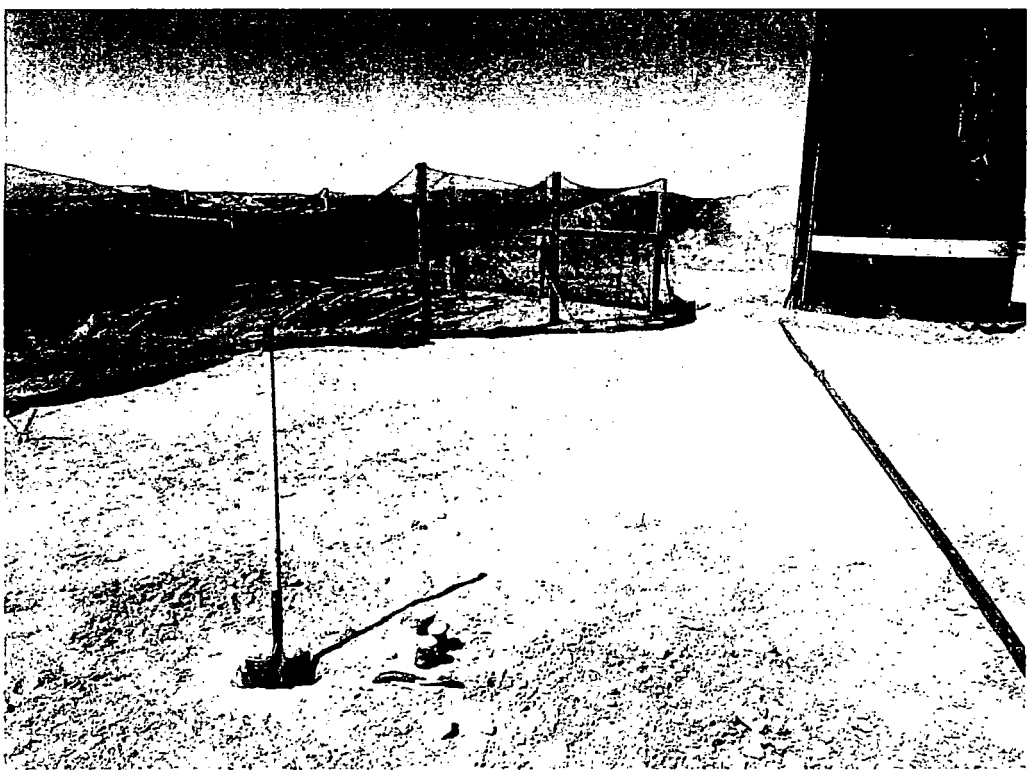
Mixing Ratio	Sample ID	Dibenzo(A,H)anthracene	Indeno(1,2,3-cd)pyrene	Sodium Absportion Ratio	Electrical Conductivity
clean:actual		mg/kg	mg/kg	--	mmhos/cm
1:1	DT-01	0.030	0.03	36	1.43
2:1	DT-01	0.027	0.03	26	1.39
3:1	DT-01	0.025	0.03	21	1.38

UMU Table (COGCC Table 910-1)	0.022	0.22	<12	<4 or 2x background
CDPHE-HMWMD/EPA SSLs	0.29	2.9		

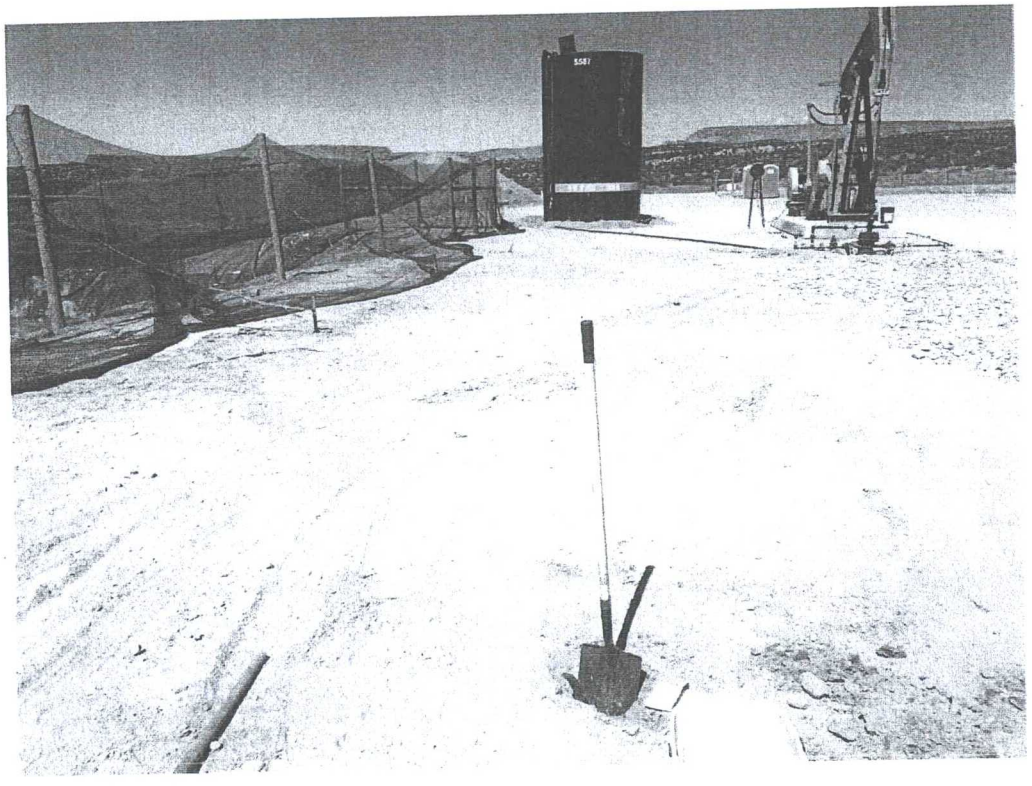
Notes:
exceeds guidelines
exceeds EPA SSL Standards

Appendix A

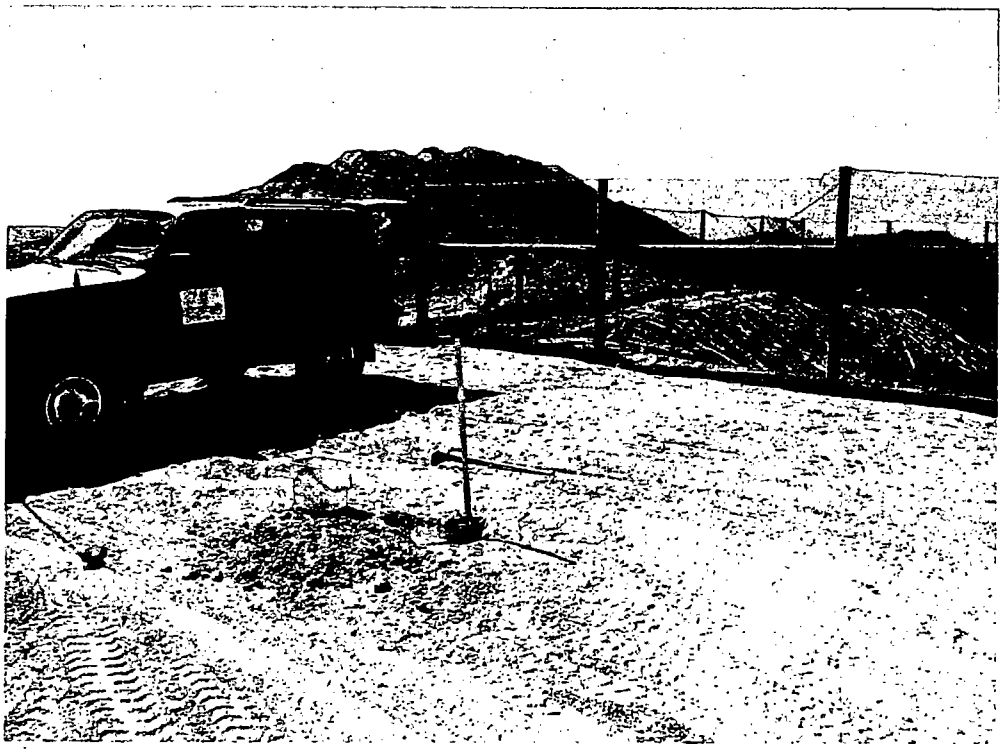
SS-01:



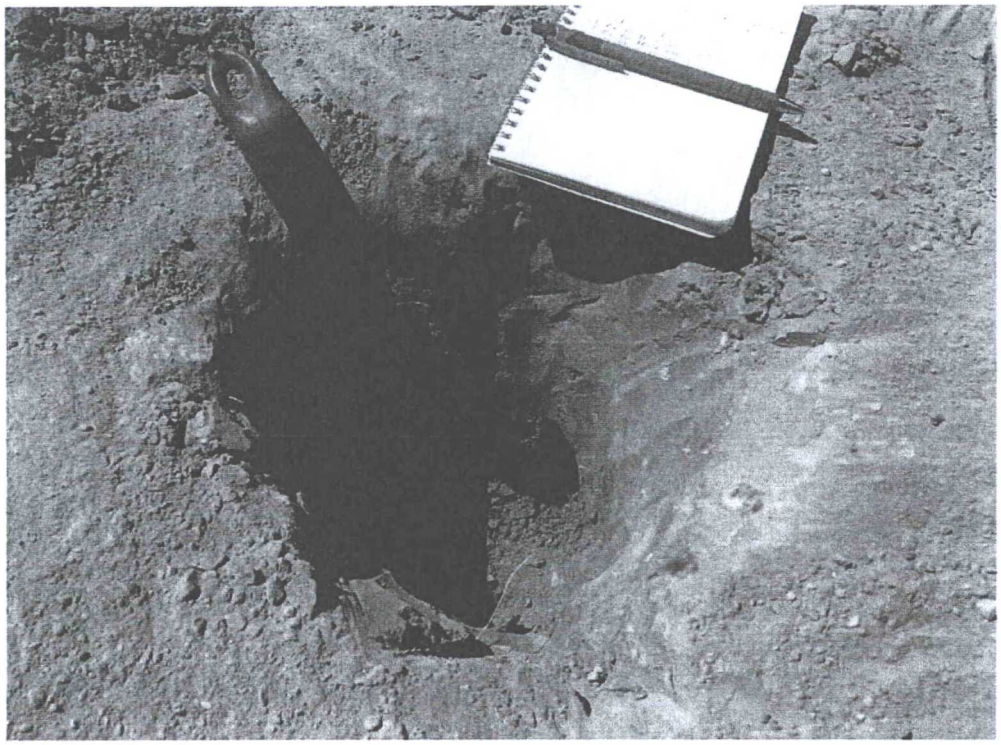
SS-02:

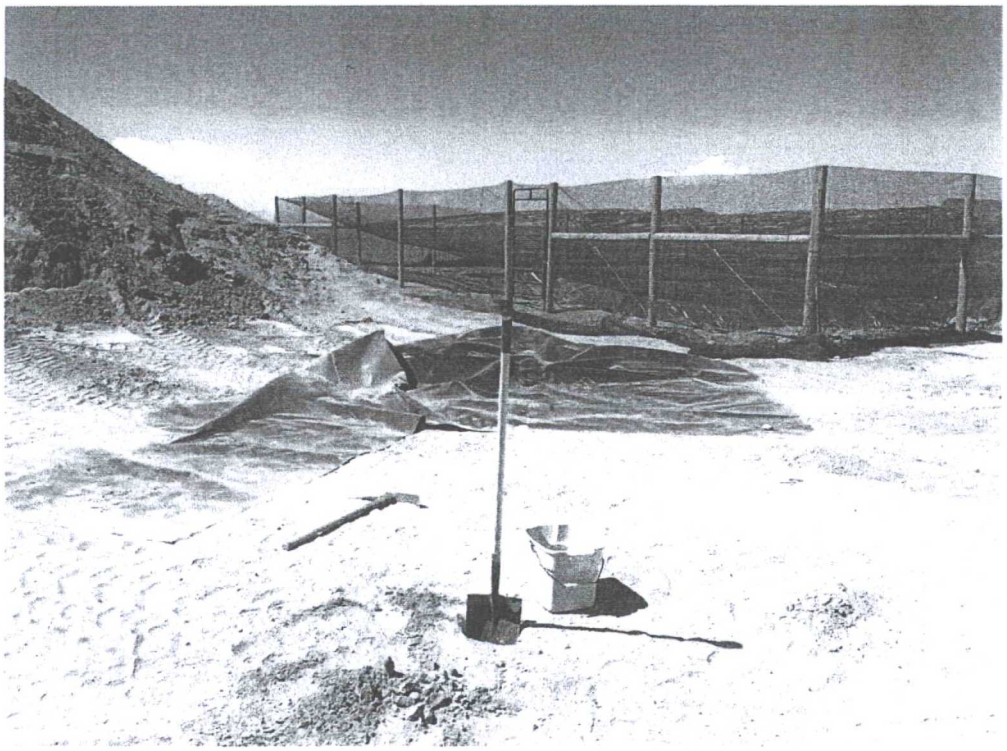


SS-02 Continued:

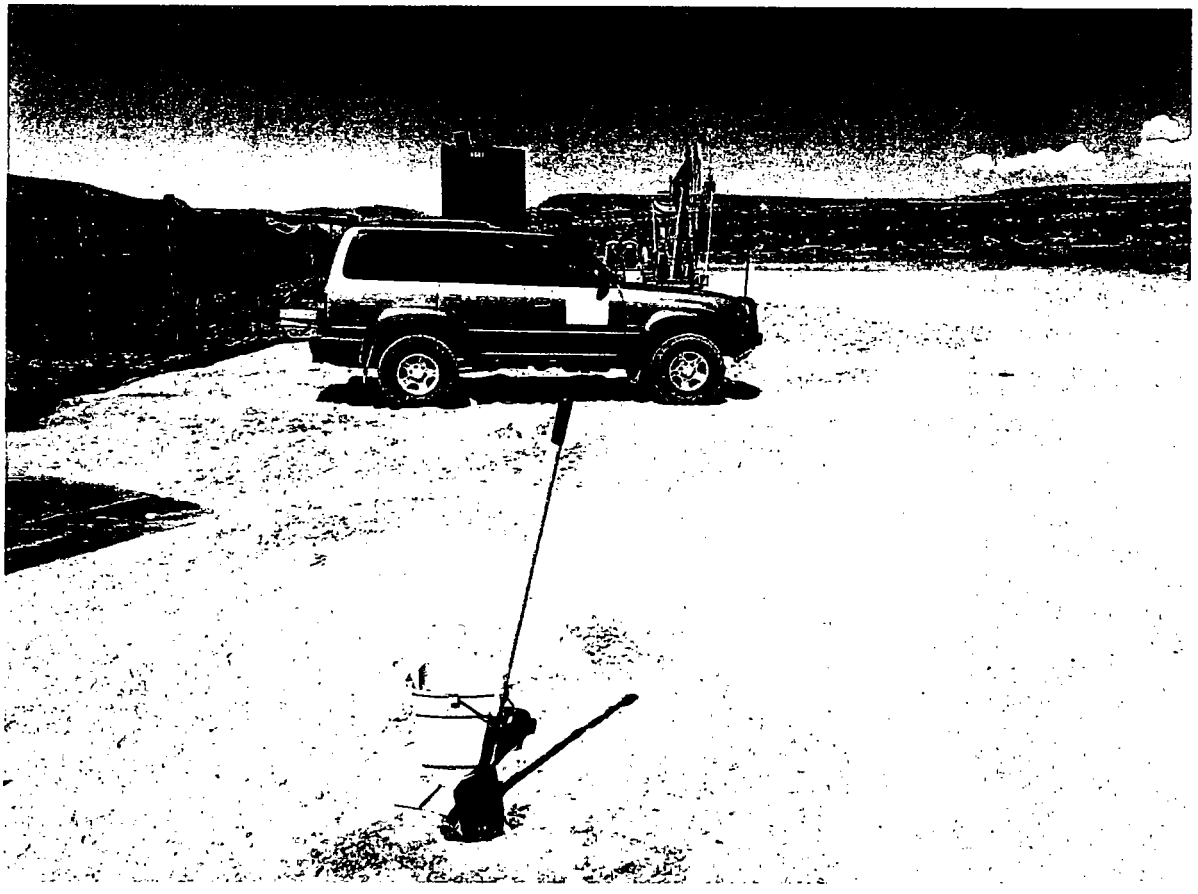


SS-03:

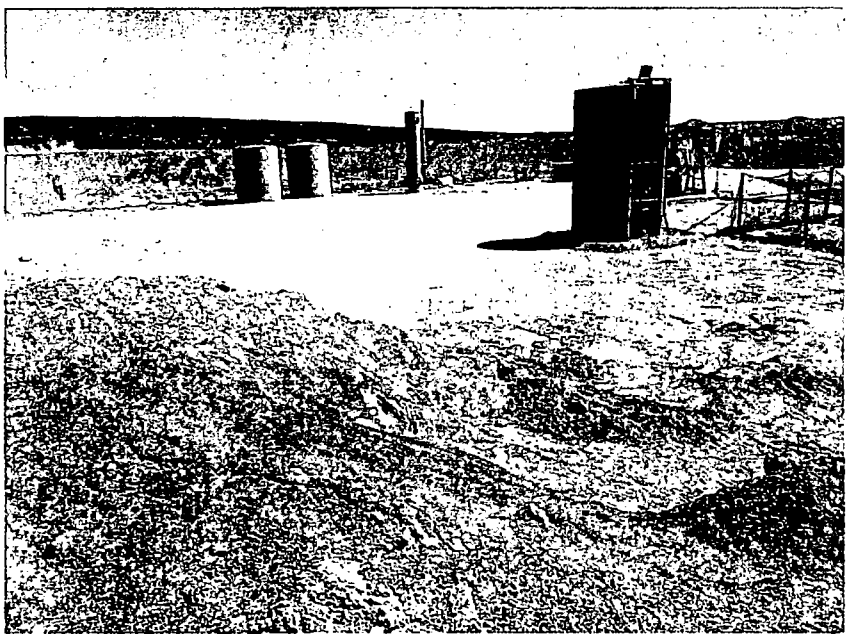




SS-03 Continued:



DT-01 (blow cuttings):



Appendix B

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

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

May 05, 2015

Andrew Parker
Adkins Consulting Inc
180 E. 12th Street #5
Durango, CO 81303
TEL: (505) 793-1140
FAX

RE: Prairie Falcon 19-1 OrderNo.: 1504025

Dear Andrew Parker:

Hall Environmental Analysis Laboratory received 5 sample(s) on 4/1/2015 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued April 21, 2015.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report
Lab Order **1504025**
Date Reported: **5/5/2015**

CLIENT: Adkins Consulting Inc
Project: Prairie Falcon 19-1
Lab ID: 1504025-001 **Matrix:** SOIL

Client Sample ID: SS-01
Collection Date: 3/31/2015 11:30:00 AM
Received Date: 4/1/2015 7:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	4/3/2015 2:16:32 PM	18480
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	4/3/2015 2:16:32 PM	18480
Surr: DNOP	134	63.5-128	S	%REC	1	4/3/2015 2:16:32 PM	18480
EPA METHOD 7471: MERCURY						Analyst: **MED**	
Mercury	ND	0.031		mg/Kg	1	4/8/2015 12:48:01 PM	18569
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**	
Arsenic	4.1	2.4		mg/Kg	1	4/8/2015 12:33:07 PM	18563
Barium	120	0.098		mg/Kg	1	4/8/2015 12:59:21 PM	18563
Cadmium	ND	0.098		mg/Kg	1	4/8/2015 12:33:07 PM	18563
Chromium	7.8	0.29		mg/Kg	1	4/8/2015 12:33:07 PM	18563
Copper	8.3	0.29		mg/Kg	1	4/8/2015 12:33:07 PM	18563
Lead	3.9	0.24		mg/Kg	1	4/8/2015 12:33:07 PM	18563
Nickel	8.3	0.49		mg/Kg	1	4/8/2015 12:33:07 PM	18563
Selenium	ND	2.4		mg/Kg	1	4/8/2015 12:33:07 PM	18563
Silver	ND	0.24		mg/Kg	1	4/8/2015 12:33:07 PM	18563
Zinc	29	2.4		mg/Kg	1	4/8/2015 12:33:07 PM	18563
SAR SOLUBLE CATIONS						Analyst: **ELS**	
Sodium Adsorption Ratio	1.2	0			1	4/16/2015 11:03:00 AM	18654
EPA METHOD 8270C: PAHS						Analyst: **DAM**	
Naphthalene	ND	0.020		mg/Kg	1	4/8/2015 5:41:56 PM	18557
Acenaphthene	ND	0.020		mg/Kg	1	4/8/2015 5:41:56 PM	18557
Fluorene	ND	0.020		mg/Kg	1	4/8/2015 5:41:56 PM	18557
Anthracene	ND	0.020		mg/Kg	1	4/8/2015 5:41:56 PM	18557
Fluoranthene	ND	0.020		mg/Kg	1	4/8/2015 5:41:56 PM	18557
Pyrene	ND	0.020		mg/Kg	1	4/8/2015 5:41:56 PM	18557
Benz(a)anthracene	ND	0.020		mg/Kg	1	4/8/2015 5:41:56 PM	18557
Chrysene	ND	0.020		mg/Kg	1	4/8/2015 5:41:56 PM	18557
Benzo(b)fluoranthene	ND	0.020		mg/Kg	1	4/8/2015 5:41:56 PM	18557
Benzo(k)fluoranthene	ND	0.020		mg/Kg	1	4/8/2015 5:41:56 PM	18557
Benzo(a)pyrene	ND	0.020		mg/Kg	1	4/8/2015 5:41:56 PM	18557
Dibenz(a,h)anthracene	ND	0.020		mg/Kg	1	4/8/2015 5:41:56 PM	18557
Indeno(1,2,3-cd)pyrene	ND	0.020		mg/Kg	1	4/8/2015 5:41:56 PM	18557
Surr: Benzo(e)pyrene	81.5	23.4-150		%REC	1	4/8/2015 5:41:56 PM	18557
Surr: N-hexadecane	64.8	36.2-152		%REC	1	4/8/2015 5:41:56 PM	18557
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **cadg**	
Benzene	ND	0.047		mg/Kg	1	4/3/2015 2:42:21 PM	18490
Toluene	ND	0.047		mg/Kg	1	4/3/2015 2:42:21 PM	18490

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

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Adkins Consulting Inc
Client Sample ID: SS-01
Project: Prairie Falcon 19-1
Collection Date: 3/31/2015 11:30:00 AM
Lab ID: 1504025-001 **Matrix:** SOIL **Received Date:** 4/1/2015 7:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **cadg**	
Ethylbenzene	ND	0.047		mg/Kg	1	4/3/2015 2:42:21 PM	18490
Xylenes, Total	ND	0.093		mg/Kg	1	4/3/2015 2:42:21 PM	18490
Surr: 1,2-Dichloroethane-d4	106	70-130		%REC	1	4/3/2015 2:42:21 PM	18490
Surr: 4-Bromofluorobenzene	100	70-130		%REC	1	4/3/2015 2:42:21 PM	18490
Surr: Dibromofluoromethane	114	70-130		%REC	1	4/3/2015 2:42:21 PM	18490
Surr: Toluene-d8	91.2	70-130		%REC	1	4/3/2015 2:42:21 PM	18490
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **cadg**	
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	4/3/2015 2:42:21 PM	18490
Surr: BFB	115	67.4-150		%REC	1	4/3/2015 2:42:21 PM	18490
RESISTIVITY AND EC SOIL						Analyst: **JRR**	
Conductivity	1090	1.00		µmhos/cm	1	4/7/2015 3:36:00 PM	18565

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Adkins Consulting Inc
Client Sample ID: SS-02
Project: Prairie Falcon 19-1
Collection Date: 3/31/2015 11:50:00 AM
Lab ID: 1504025-002
Matrix: SOIL
Received Date: 4/1/2015 7:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	4/3/2015 3:37:09 PM	18480
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	4/3/2015 3:37:09 PM	18480
Surr: DNOP	109	63.5-128		%REC	1	4/3/2015 3:37:09 PM	18480
EPA METHOD 7471: MERCURY						Analyst: **MED**	
Mercury	ND	0.034		mg/Kg	1	4/8/2015 12:53:19 PM	18569
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**	
Arsenic	3.6	2.5		mg/Kg	1	4/8/2015 12:44:28 PM	18563
Barium	210	0.10		mg/Kg	1	4/8/2015 12:44:28 PM	18563
Cadmium	ND	0.10		mg/Kg	1	4/8/2015 12:44:28 PM	18563
Chromium	7.7	0.30		mg/Kg	1	4/8/2015 12:44:28 PM	18563
Copper	7.3	0.30		mg/Kg	1	4/8/2015 12:44:28 PM	18563
Lead	3.4	0.25		mg/Kg	1	4/8/2015 12:44:28 PM	18563
Nickel	8.1	0.50		mg/Kg	1	4/8/2015 12:44:28 PM	18563
Selenium	ND	2.5		mg/Kg	1	4/8/2015 12:44:28 PM	18563
Silver	ND	0.25		mg/Kg	1	4/8/2015 12:44:28 PM	18563
Zinc	28	2.5		mg/Kg	1	4/8/2015 12:44:28 PM	18563
SAR SOLUBLE CATIONS						Analyst: **ELS**	
Sodium Adsorption Ratio	4.1	0			1	4/16/2015 11:03:00 AM	18654
EPA METHOD 8270C: PAHS						Analyst: **DAM**	
Naphthalene	ND	0.020		mg/Kg	1	4/8/2015 6:51:29 PM	18557
Acenaphthene	ND	0.020		mg/Kg	1	4/8/2015 6:51:29 PM	18557
Fluorene	ND	0.020		mg/Kg	1	4/8/2015 6:51:29 PM	18557
Anthracene	ND	0.020		mg/Kg	1	4/8/2015 6:51:29 PM	18557
Fluoranthene	ND	0.020		mg/Kg	1	4/8/2015 6:51:29 PM	18557
Pyrene	ND	0.020		mg/Kg	1	4/8/2015 6:51:29 PM	18557
Benz(a)anthracene	ND	0.020		mg/Kg	1	4/8/2015 6:51:29 PM	18557
Chrysene	ND	0.020		mg/Kg	1	4/8/2015 6:51:29 PM	18557
Benzo(b)fluoranthene	ND	0.020		mg/Kg	1	4/8/2015 6:51:29 PM	18557
Benzo(k)fluoranthene	ND	0.020		mg/Kg	1	4/8/2015 6:51:29 PM	18557
Benzo(a)pyrene	ND	0.020		mg/Kg	1	4/8/2015 6:51:29 PM	18557
Dibenz(a,h)anthracene	ND	0.020		mg/Kg	1	4/8/2015 6:51:29 PM	18557
Indeno(1,2,3-cd)pyrene	ND	0.020		mg/Kg	1	4/8/2015 6:51:29 PM	18557
Surr: Benzo(e)pyrene	86.9	23.4-150		%REC	1	4/8/2015 6:51:29 PM	18557
Surr: N-hexadecane	58.2	36.2-152		%REC	1	4/8/2015 6:51:29 PM	18557
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **cadg**	
Benzene	ND	0.048		mg/Kg	1	4/3/2015 4:08:26 PM	18490
Toluene	ND	0.048		mg/Kg	1	4/3/2015 4:08:26 PM	18490

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

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Adkins Consulting Inc
Client Sample ID: SS-02
Project: Prairie Falcon 19-1
Collection Date: 3/31/2015 11:50:00 AM
Lab ID: 1504025-002
Matrix: SOIL
Received Date: 4/1/2015 7:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **cadg**	
Ethylbenzene	ND	0.048		mg/Kg	1	4/3/2015 4:08:26 PM	18490
Xylenes, Total	ND	0.097		mg/Kg	1	4/3/2015 4:08:26 PM	18490
Surr: 1,2-Dichloroethane-d4	107	70-130		%REC	1	4/3/2015 4:08:26 PM	18490
Surr: 4-Bromofluorobenzene	97.4	70-130		%REC	1	4/3/2015 4:08:26 PM	18490
Surr: Dibromofluoromethane	108	70-130		%REC	1	4/3/2015 4:08:26 PM	18490
Surr: Toluene-d8	93.1	70-130		%REC	1	4/3/2015 4:08:26 PM	18490
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **cadg**	
Gasoline Range Organics (GRO)	15	4.8		mg/Kg	1	4/3/2015 4:08:26 PM	18490
Surr: BFB	120	67.4-150		%REC	1	4/3/2015 4:08:26 PM	18490
RESISTIVITY AND EC SOIL						Analyst: **JRR**	
Conductivity	1030	1.00		µmhos/cm	1	4/7/2015 3:36:00 PM	18565

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Adkins Consulting Inc
Client Sample ID: SS-03
Project: Prairie Falcon 19-1
Collection Date: 3/31/2015 12:10:00 PM
Lab ID: 1504025-003
Matrix: SOIL
Received Date: 4/1/2015 7:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	4/3/2015 4:03:59 PM	18480
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	4/3/2015 4:03:59 PM	18480
Surr: DNOP	105	63.5-128		%REC	1	4/3/2015 4:03:59 PM	18480
EPA METHOD 7471: MERCURY						Analyst: **MED**	
Mercury	ND	0.033		mg/Kg	1	4/8/2015 12:55:06 PM	18569
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**	
Arsenic	3.9	2.6		mg/Kg	1	4/8/2015 12:46:57 PM	18563
Barium	170	0.10		mg/Kg	1	4/8/2015 12:46:57 PM	18563
Cadmium	ND	0.10		mg/Kg	1	4/8/2015 12:46:57 PM	18563
Chromium	6.8	0.31		mg/Kg	1	4/8/2015 12:46:57 PM	18563
Copper	6.4	0.31		mg/Kg	1	4/8/2015 12:46:57 PM	18563
Lead	3.6	0.26		mg/Kg	1	4/8/2015 12:46:57 PM	18563
Nickel	7.5	0.51		mg/Kg	1	4/8/2015 12:46:57 PM	18563
Selenium	ND	2.6		mg/Kg	1	4/8/2015 12:46:57 PM	18563
Silver	ND	0.26		mg/Kg	1	4/8/2015 12:46:57 PM	18563
Zinc	27	2.6		mg/Kg	1	4/8/2015 12:46:57 PM	18563
SAR SOLUBLE CATIONS						Analyst: **ELS**	
Sodium Adsorption Ratio	5.4	0			1	4/16/2015 11:03:00 AM	18654
EPA METHOD 8270C: PAHS						Analyst: **DAM**	
Naphthalene	ND	0.020		mg/Kg	1	4/8/2015 7:14:42 PM	18557
Acenaphthene	ND	0.020		mg/Kg	1	4/8/2015 7:14:42 PM	18557
Fluorene	ND	0.020		mg/Kg	1	4/8/2015 7:14:42 PM	18557
Anthracene	ND	0.020		mg/Kg	1	4/8/2015 7:14:42 PM	18557
Fluoranthene	ND	0.020		mg/Kg	1	4/8/2015 7:14:42 PM	18557
Pyrene	ND	0.020		mg/Kg	1	4/8/2015 7:14:42 PM	18557
Benz(a)anthracene	ND	0.020		mg/Kg	1	4/8/2015 7:14:42 PM	18557
Chrysene	ND	0.020		mg/Kg	1	4/8/2015 7:14:42 PM	18557
Benzo(b)fluoranthene	ND	0.020		mg/Kg	1	4/8/2015 7:14:42 PM	18557
Benzo(k)fluoranthene	ND	0.020		mg/Kg	1	4/8/2015 7:14:42 PM	18557
Benzo(a)pyrene	ND	0.020		mg/Kg	1	4/8/2015 7:14:42 PM	18557
Dibenz(a,h)anthracene	ND	0.020		mg/Kg	1	4/8/2015 7:14:42 PM	18557
Indeno(1,2,3-cd)pyrene	ND	0.020		mg/Kg	1	4/8/2015 7:14:42 PM	18557
Surr: Benzo(e)pyrene	85.5	23.4-150		%REC	1	4/8/2015 7:14:42 PM	18557
Surr: N-hexadecane	65.0	36.2-152		%REC	1	4/8/2015 7:14:42 PM	18557
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **cadg**	
Benzene	ND	0.046		mg/Kg	1	4/3/2015 4:37:13 PM	18490
Toluene	ND	0.046		mg/Kg	1	4/3/2015 4:37:13 PM	18490

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Adkins Consulting Inc
Client Sample ID: SS-03
Project: Prairie Falcon 19-1
Collection Date: 3/31/2015 12:10:00 PM
Lab ID: 1504025-003 **Matrix:** SOIL **Received Date:** 4/1/2015 7:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **cadg**	
Ethylbenzene	ND	0.046		mg/Kg	1	4/3/2015 4:37:13 PM	18490
Xylenes, Total	ND	0.093		mg/Kg	1	4/3/2015 4:37:13 PM	18490
Surr: 1,2-Dichloroethane-d4	106	70-130		%REC	1	4/3/2015 4:37:13 PM	18490
Surr: 4-Bromofluorobenzene	102	70-130		%REC	1	4/3/2015 4:37:13 PM	18490
Surr: Dibromofluoromethane	110	70-130		%REC	1	4/3/2015 4:37:13 PM	18490
Surr: Toluene-d8	91.8	70-130		%REC	1	4/3/2015 4:37:13 PM	18490
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **cadg**	
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	4/3/2015 4:37:13 PM	18490
Surr: BFB	112	67.4-150		%REC	1	4/3/2015 4:37:13 PM	18490
RESISTIVITY AND EC SOIL						Analyst: **JRR**	
Conductivity	1370	1.00		µmhos/cm	1	4/7/2015 3:36:00 PM	18565

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Adkins Consulting Inc
Project: Prairie Falcon 19-1
Lab ID: 1504025-004 **Matrix:** SOIL

Client Sample ID: DT-01
Collection Date: 3/31/2015 12:25:00 PM
Received Date: 4/1/2015 7:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	570	10		mg/Kg	1	4/3/2015 4:31:02 PM	18480
Motor Oil Range Organics (MRO)	280	50		mg/Kg	1	4/3/2015 4:31:02 PM	18480
Surr: DNOP	93.6	63.5-128		%REC	1	4/3/2015 4:31:02 PM	18480
EPA METHOD 7471: MERCURY						Analyst: **MED**	
Mercury	ND	0.032		mg/Kg	1	4/8/2015 12:56:54 PM	18569
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**	
Arsenic	8.7	2.4		mg/Kg	1	4/8/2015 12:49:29 PM	18563
Barium	210	0.098		mg/Kg	1	4/8/2015 12:49:29 PM	18563
Cadmium	0.54	0.098		mg/Kg	1	4/8/2015 12:49:29 PM	18563
Chromium	8.4	0.29		mg/Kg	1	4/8/2015 12:49:29 PM	18563
Copper	22	0.29		mg/Kg	1	4/8/2015 12:49:29 PM	18563
Lead	10	0.24		mg/Kg	1	4/8/2015 12:49:29 PM	18563
Nickel	20	0.49		mg/Kg	1	4/8/2015 12:49:29 PM	18563
Selenium	ND	2.4		mg/Kg	1	4/8/2015 12:49:29 PM	18563
Silver	ND	0.24		mg/Kg	1	4/8/2015 12:49:29 PM	18563
Zinc	92	2.4		mg/Kg	1	4/8/2015 12:49:29 PM	18563
SAR SOLUBLE CATIONS						Analyst: **JLF**	
Sodium Adsorption Ratio	66	0			1	4/20/2015 11:57:00 AM	18748
EPA METHOD 8270C: PAHS						Analyst: **DAM**	
Naphthalene	1.1	0.040		mg/Kg	1	4/8/2015 7:37:57 PM	18557
Acenaphthene	ND	0.040		mg/Kg	1	4/8/2015 7:37:57 PM	18557
Fluorene	0.17	0.040		mg/Kg	1	4/8/2015 7:37:57 PM	18557
Anthracene	ND	0.040		mg/Kg	1	4/8/2015 7:37:57 PM	18557
Fluoranthene	0.042	0.040		mg/Kg	1	4/8/2015 7:37:57 PM	18557
Pyrene	ND	0.040		mg/Kg	1	4/8/2015 7:37:57 PM	18557
Benz(a)anthracene	ND	0.040		mg/Kg	1	4/8/2015 7:37:57 PM	18557
Chrysene	ND	0.040		mg/Kg	1	4/8/2015 7:37:57 PM	18557
Benzo(b)fluoranthene	0.047	0.040		mg/Kg	1	4/8/2015 7:37:57 PM	18557
Benzo(k)fluoranthene	ND	0.040		mg/Kg	1	4/8/2015 7:37:57 PM	18557
Benzo(a)pyrene	0.13	0.040		mg/Kg	1	4/8/2015 7:37:57 PM	18557
Dibenz(a,h)anthracene	ND	0.040		mg/Kg	1	4/8/2015 7:37:57 PM	18557
Indeno(1,2,3-cd)pyrene	ND	0.040		mg/Kg	1	4/8/2015 7:37:57 PM	18557
Surr: Benzo(e)pyrene	92.7	23.4-150		%REC	1	4/8/2015 7:37:57 PM	18557
Surr: N-hexadecane	348	36.2-152	S	%REC	1	4/8/2015 7:37:57 PM	18557
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **cadg**	
Benzene	ND	0.049		mg/Kg	1	4/3/2015 5:06:09 PM	18490
Toluene	0.22	0.049		mg/Kg	1	4/3/2015 5:06:09 PM	18490

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Adkins Consulting Inc
Client Sample ID: DT-01
Project: Prairie Falcon 19-1
Collection Date: 3/31/2015 12:25:00 PM
Lab ID: 1504025-004 **Matrix:** SOIL **Received Date:** 4/1/2015 7:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **cadg**	
Ethylbenzene	0.15	0.049		mg/Kg	1	4/3/2015 5:06:09 PM	18490
Xylenes, Total	0.78	0.098		mg/Kg	1	4/3/2015 5:06:09 PM	18490
Surr: 1,2-Dichloroethane-d4	106	70-130		%REC	1	4/3/2015 5:06:09 PM	18490
Surr: 4-Bromofluorobenzene	91.6	70-130		%REC	1	4/3/2015 5:06:09 PM	18490
Surr: Dibromofluoromethane	105	70-130		%REC	1	4/3/2015 5:06:09 PM	18490
Surr: Toluene-d8	94.5	70-130		%REC	1	4/3/2015 5:06:09 PM	18490
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **cadg**	
Gasoline Range Organics (GRO)	56	4.9		mg/Kg	1	4/3/2015 5:06:09 PM	18490
Surr: BFB	126	67.4-150		%REC	1	4/3/2015 5:06:09 PM	18490
RESISTIVITY AND EC SOIL						Analyst: **JRR**	
Conductivity	1540	1.00		µmhos/cm	1	4/7/2015 3:36:00 PM	18565

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Adkins Consulting Inc
Client Sample ID: Spoil Pile
Project: Prairie Falcon 19-1
Collection Date: 3/31/2015 12:40:00 PM
Lab ID: 1504025-005
Matrix: SOIL
Received Date: 4/1/2015 7:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	4/3/2015 5:25:12 PM	18480
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	4/3/2015 5:25:12 PM	18480
Surr: DNOP	114	57.9-140		%REC	1	4/3/2015 5:25:12 PM	18480
EPA METHOD 7471: MERCURY						Analyst: **MED**	
Mercury	ND	0.034		mg/Kg	1	4/8/2015 12:58:42 PM	18569
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**	
Arsenic	3.8	2.5		mg/Kg	1	4/8/2015 12:52:02 PM	18563
Barium	140	0.10		mg/Kg	1	4/8/2015 12:52:02 PM	18563
Cadmium	ND	0.10		mg/Kg	1	4/8/2015 12:52:02 PM	18563
Chromium	7.2	0.30		mg/Kg	1	4/8/2015 12:52:02 PM	18563
Copper	6.2	0.30		mg/Kg	1	4/8/2015 12:52:02 PM	18563
Lead	3.4	0.25		mg/Kg	1	4/8/2015 12:52:02 PM	18563
Nickel	7.8	0.50		mg/Kg	1	4/8/2015 12:52:02 PM	18563
Selenium	ND	2.5		mg/Kg	1	4/8/2015 12:52:02 PM	18563
Silver	ND	0.25		mg/Kg	1	4/8/2015 12:52:02 PM	18563
Zinc	27	2.5		mg/Kg	1	4/8/2015 12:52:02 PM	18563
SAR SOLUBLE CATIONS						Analyst: **ELS**	
Sodium Adsorption Ratio	5.4	0			1	4/16/2015 11:03:00 AM	18654
EPA METHOD 8270C: PAHS						Analyst: **DAM**	
Naphthalene	ND	0.020		mg/Kg	1	4/8/2015 8:01:12 PM	18557
Acenaphthene	ND	0.020		mg/Kg	1	4/8/2015 8:01:12 PM	18557
Fluorene	ND	0.020		mg/Kg	1	4/8/2015 8:01:12 PM	18557
Anthracene	ND	0.020		mg/Kg	1	4/8/2015 8:01:12 PM	18557
Fluoranthene	ND	0.020		mg/Kg	1	4/8/2015 8:01:12 PM	18557
Pyrene	ND	0.020		mg/Kg	1	4/8/2015 8:01:12 PM	18557
Benz(a)anthracene	ND	0.020		mg/Kg	1	4/8/2015 8:01:12 PM	18557
Chrysene	ND	0.020		mg/Kg	1	4/8/2015 8:01:12 PM	18557
Benzo(b)fluoranthene	ND	0.020		mg/Kg	1	4/8/2015 8:01:12 PM	18557
Benzo(k)fluoranthene	ND	0.020		mg/Kg	1	4/8/2015 8:01:12 PM	18557
Benzo(a)pyrene	ND	0.020		mg/Kg	1	4/8/2015 8:01:12 PM	18557
Dibenz(a,h)anthracene	ND	0.020		mg/Kg	1	4/8/2015 8:01:12 PM	18557
Indeno(1,2,3-cd)pyrene	ND	0.020		mg/Kg	1	4/8/2015 8:01:12 PM	18557
Surr: Benzo(e)pyrene	100	23.4-150		%REC	1	4/8/2015 8:01:12 PM	18557
Surr: N-hexadecane	74.8	36.2-152		%REC	1	4/8/2015 8:01:12 PM	18557
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **cadg**	
Benzene	ND	0.050		mg/Kg	1	4/3/2015 5:34:55 PM	18490
Toluene	ND	0.050		mg/Kg	1	4/3/2015 5:34:55 PM	18490

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Adkins Consulting Inc
Client Sample ID: Spoil Pile
Project: Prairie Falcon 19-1
Collection Date: 3/31/2015 12:40:00 PM
Lab ID: 1504025-005
Matrix: SOIL
Received Date: 4/1/2015 7:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **cadg**	
Ethylbenzene	ND	0.050		mg/Kg	1	4/3/2015 5:34:55 PM	18490
Xylenes, Total	ND	0.099		mg/Kg	1	4/3/2015 5:34:55 PM	18490
Surr: 1,2-Dichloroethane-d4	106	70-130		%REC	1	4/3/2015 5:34:55 PM	18490
Surr: 4-Bromofluorobenzene	96.0	70-130		%REC	1	4/3/2015 5:34:55 PM	18490
Surr: Dibromofluoromethane	108	70-130		%REC	1	4/3/2015 5:34:55 PM	18490
Surr: Toluene-d8	92.1	70-130		%REC	1	4/3/2015 5:34:55 PM	18490
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **cadg**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	4/3/2015 5:34:55 PM	18490
Surr: BFB	105	67.4-150		%REC	1	4/3/2015 5:34:55 PM	18490
RESISTIVITY AND EC SOIL						Analyst: **JRR**	
Conductivity	1320	1.00		µmhos/cm	1	4/7/2015 3:36:00 PM	18565

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

et Chemistry by Method 2580 B-2011

	Result	Qualifier	Dilution	Analysis	Batch
ılyte	mV			date / time	
	100		1	04/08/2015 02:45	WG780458

et Chemistry by Method 3060A/7196A

	Result	Qualifier	RDL	Dilution	Analysis	Batch
ılyte	mg/kg		mg/kg		date / time	
omium,Hexavalent	ND		2.00	1	04/09/2015 03:39	WG780207

et Chemistry by Method 9045D

	Result	Qualifier	Dilution	Analysis	Batch
ılyte	su			date / time	
	7.90		1	04/04/2015 15:45	WG780208

nple Narrative:
9045D L757369-01 WG780208: 7.9 AT 19.1 C

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

Wet Chemistry by Method 2580 B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	mV				
ORP	96		1	04/08/2015 02:45	WG780458

Wet Chemistry by Method 3060A/7196A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Chromium,Hexavalent	ND		2.00	1	04/09/2015 03:42	WG780207

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	su				
pH	7.90		1	04/04/2015 15:45	WG780208

Sample Narrative:

9045D L757369-02 WG780208: 7.9 AT 18.6 C

:t Chemistry by Method 2580 B-2011

	Result	Qualifier	Dilution	Analysis	Batch
yte	mV			date / time	
	96		1	04/08/2015 02:45	WG780458

:t Chemistry by Method 3060A/7196A

	Result	Qualifier	RDL	Dilution	Analysis	Batch
lyte	mg/kg		mg/kg		date / time	
mium,Hexavalent	ND		2.00	1	04/09/2015 03:42	WG780207

:t Chemistry by Method 9045D

	Result	Qualifier	Dilution	Analysis	Batch
lyte	su			date / time	
	8.00		1	04/04/2015 15:45	WG780208

ıple Narrative:
)045D L757369-03 WG780208: 8.0 AT 18.9 C

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

Wet Chemistry by Method 2580 B-2011

	Result	Qualifier	Dilution	Analysis	Batch
Analyte	mV			date / time	
ORP	28		1	04/08/2015 02:45	WG780458

Wet Chemistry by Method 3060A/7196A

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg		date / time	
Chromium,Hexavalent	ND		2.00	1	04/09/2015 03:43	WG780207

Wet Chemistry by Method 9045D

	Result	Qualifier	Dilution	Analysis	Batch
Analyte	su			date / time	
pH	10.0		1	04/04/2015 15:45	WG780208

Sample Narrative:

9045D L757369-04 WG780208: 10 AT 19.0 C

et Chemistry by Method 2580 B-2011

	Result	Qualifier	Dilution	Analysis	Batch
ılyte	mV			date / time	
	82		1	04/08/2015 02:45	WG780458

et Chemistry by Method 3060A/7196A

	Result	Qualifier	RDL	Dilution	Analysis	Batch
ılyte	mg/kg		mg/kg		date / time	
omium,Hexavalent	ND		2.00	1	04/09/2015 03:43	WG780207

et Chemistry by Method 9045D

	Result	Qualifier	Dilution	Analysis	Batch
ılyte	su			date / time	
	8.10		1	04/04/2015 15:45	WG780208

nple Narrative:
9045D L757369-05 WG780208: 8.1 AT 18.7 C

L757021-04 Original Sample (OS) • Duplicate (DUP)

(OS) 04/08/15 02:45 • (DUP) 04/08/15 02:45

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mV	mV		%		%
ORP	100	104	1	3.9		20

L757353-06 Original Sample (OS) • Duplicate (DUP)

(OS) 04/08/15 02:45 • (DUP) 04/08/15 02:45

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mV	mV		%		%
ORP	110	108	1	1.8		20

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

(LCS) 04/08/15 02:45 • (LCSD) 04/08/15 02:45

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mV	mV	mV	%	%	%			%	%
ORP	100	110	108	110	108	90.0-110			1.83	20

Method Blank (MB)

(MB) 04/09/15 03:35

Analyte	MB Result	MB Qualifier	MB RDL
	mg/kg		mg/kg
Chromium,Hexavalent	ND		2.00

L757369-01 Original Sample (OS) • Duplicate (DUP)

(OS) 04/09/15 03:39 • (DUP) 04/09/15 03:39

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Chromium,Hexavalent	ND	ND	1	0.00		20

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

(LCS) 04/09/15 03:36 • (LCSD) 04/09/15 03:36

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	%	%	%			%	%
Chromium,Hexavalent	59.8	52.8	53.8	88.3	90.0	80.0-120			1.88	20

L757369-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 04/09/15 03:39 • (MS) 04/09/15 03:40 • (MSD) 04/09/15 03:40

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	%	%		%			%	%
Chromium,Hexavalent	20.0	ND	18.3	18.4	91.5	92.0	1	75.0-125			0.545	20

L757353-01 Original Sample (OS) • Duplicate (DUP)

(OS) 04/04/15 15:45 • (DUP) 04/04/15 15:45

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.6	8.7	1	0.81		1

L757382-08 Original Sample (OS) • Duplicate (DUP)

(OS) 04/04/15 15:45 • (DUP) 04/04/15 15:45

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.2	6.2	1	0.49		1

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

(LCS) 04/04/15 15:45 • (LCSD) 04/04/15 15:45

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	su	su	su	%	%	%			%	%
pH	7.84	7.78	7.78	99.2	132	98.3-102			0.000	20

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1504025**

05-May-15

Client: Adkins Consulting Inc

Project: Prairie Falcon 19-1

Sample ID	MB-18480	SampType:	MBLK		TestCode:	EPA Method 8015D: Diesel Range Organics				
Client ID:	PBS	Batch ID:	18480		RunNo:	25271				
Prep Date:	4/2/2015	Analysis Date:	4/3/2015		SeqNo:	747704	Units:	mg/Kg		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	8.9		10.00		88.9	63.5	128			

Sample ID	1504025-001AMS	SampType:	MS		TestCode:	EPA Method 8015D: Diesel Range Organics				
Client ID:	SS-01	Batch ID:	18480		RunNo:	25267				
Prep Date:	4/2/2015	Analysis Date:	4/3/2015		SeqNo:	748429	Units:	mg/Kg		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	51	10	50.00	0	102	29.2	176			
Surr: DNOP	5.1		5.000		101	63.5	128			

Sample ID	1504025-001AMSD	SampType:	MSD		TestCode:	EPA Method 8015D: Diesel Range Organics				
Client ID:	SS-01	Batch ID:	18480		RunNo:	25267				
Prep Date:	4/2/2015	Analysis Date:	4/3/2015		SeqNo:	748430	Units:	mg/Kg		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	51	9.9	49.55	0	104	29.2	176	0.762	23	
Surr: DNOP	4.9		4.955		98.1	63.5	128	0	0	

Sample ID	LCS-18480	SampType:	LCS		TestCode:	EPA Method 8015D: Diesel Range Organics				
Client ID:	LCSS	Batch ID:	18480		RunNo:	25271				
Prep Date:	4/2/2015	Analysis Date:	4/3/2015		SeqNo:	748609	Units:	mg/Kg		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	44	10	50.00	0	88.8	67.8	130			
Surr: DNOP	4.8		5.000		96.4	63.5	128			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1504025**

05-May-15

Client: Adkins Consulting Inc

Project: Prairie Falcon 19-1

Sample ID **mb-18490**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS**	Batch ID: **18490**	RunNo: **25283**
Prep Date: **4/2/2015**	Analysis Date: **4/3/2015**	SeqNo: **747675** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.050								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.56		0.5000		111	70	130			
Surr: 4-Bromofluorobenzene	0.48		0.5000		96.9	70	130			
Surr: Dibromofluoromethane	0.56		0.5000		113	70	130			
Surr: Toluene-d8	0.45		0.5000		89.5	70	130			

Sample ID **lcs-18490**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS**	Batch ID: **18490**	RunNo: **25283**
Prep Date: **4/2/2015**	Analysis Date: **4/3/2015**	SeqNo: **747676** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.99	0.050	1.000	0	98.5	70	130			
Toluene	0.87	0.050	1.000	0	87.1	70	130			
Surr: 1,2-Dichloroethane-d4	0.54		0.5000		107	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		100	70	130			
Surr: Dibromofluoromethane	0.55		0.5000		109	70	130			
Surr: Toluene-d8	0.46		0.5000		91.1	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1504025**

05-May-15

Client: Adkins Consulting Inc

Project: Prairie Falcon 19-1

Sample ID **mb-18557**	SampType: **MBLK**	TestCode: **EPA Method 8270C: PAHs**
Client ID: **PBS**	Batch ID: **18557**	RunNo: **25381**
Prep Date: **4/7/2015**	Analysis Date: **4/8/2015**	SeqNo: **751145** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	ND	0.020								
Acenaphthene	ND	0.020								
Fluorene	ND	0.020								
Anthracene	ND	0.020								
Fluoranthene	ND	0.020								
Pyrene	ND	0.020								
Benz(a)anthracene	ND	0.020								
Chrysene	ND	0.020								
Benzo(b)fluoranthene	ND	0.020								
Benzo(k)fluoranthene	ND	0.020								
Benzo(a)pyrene	ND	0.020								
Dibenz(a,h)anthracene	ND	0.020								
Indeno(1,2,3-cd)pyrene	ND	0.020								
Surr: N-hexadecane	1.1		1.460		78.0	36.2	152			
Surr: Benzo(e)pyrene	0.37		0.3300		113	23.4	150			

Sample ID **lcs-18557**	SampType: **LCS**	TestCode: **EPA Method 8270C: PAHs**
Client ID: **LCSS**	Batch ID: **18557**	RunNo: **25381**
Prep Date: **4/7/2015**	Analysis Date: **4/8/2015**	SeqNo: **751146** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	0.24	0.020	0.3300	0	72.6	40.7	111			
Acenaphthene	0.26	0.020	0.3300	0	78.7	41.4	120			
Fluorene	0.27	0.020	0.3300	0	81.7	47	116			
Anthracene	0.27	0.020	0.3300	0	80.6	49.3	114			
Fluoranthene	0.31	0.020	0.3300	0	93.3	54.3	113			
Pyrene	0.33	0.020	0.3300	0	101	43.7	118			
Benz(a)anthracene	0.35	0.020	0.3300	0	105	43.7	118			
Chrysene	0.32	0.020	0.3300	0	97.8	43.8	108			
Benzo(b)fluoranthene	0.40	0.020	0.3300	0	121	46.5	120			S
Benzo(k)fluoranthene	0.39	0.020	0.3300	0	120	50	111			S
Benzo(a)pyrene	0.31	0.020	0.3300	0	95.2	47.8	109			
Dibenz(a,h)anthracene	0.37	0.020	0.3300	0	112	57.8	117			
Indeno(1,2,3-cd)pyrene	0.36	0.020	0.3300	0	110	46.4	121			
Surr: N-hexadecane	1.1		1.460		73.3	36.2	152			
Surr: Benzo(e)pyrene	0.31		0.3300		94.6	23.4	150			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1504025**

05-May-15

Client: Adkins Consulting Inc

Project: Prairie Falcon 19-1

Sample ID **1504025-001ams**	SampType: **MS**	TestCode: **EPA Method 8270C: PAHs**
Client ID: **SS-01**	Batch ID: **18557**	RunNo: **25381**
Prep Date: **4/7/2015**	Analysis Date: **4/8/2015**	SeqNo: **751152** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	0.21	0.020	0.3293	0	62.5	45.3	111			
Acenaphthene	0.24	0.020	0.3293	0	71.6	39.8	114			
Fluorene	0.24	0.020	0.3293	0	74.2	43.4	119			
Anthracene	0.25	0.020	0.3293	0	77.4	41.9	129			
Fluoranthene	0.26	0.020	0.3293	0	80.2	42.8	134			
Pyrene	0.32	0.020	0.3293	0	98.0	39.2	134			
Benz(a)anthracene	0.33	0.020	0.3293	0	101	45	126			
Chrysene	0.32	0.020	0.3293	0	97.4	30.6	124			
Benzo(b)fluoranthene	0.36	0.020	0.3293	0	110	49	124			
Benzo(k)fluoranthene	0.34	0.020	0.3293	0	102	43.8	121			
Benzo(a)pyrene	0.34	0.020	0.3293	0	102	56.8	102			S
Dibenz(a,h)anthracene	0.36	0.020	0.3293	0	109	43.5	151			
Indeno(1,2,3-cd)pyrene	0.35	0.020	0.3293	0	107	45.3	130			
Surr: N-hexadecane	0.88		1.457		60.6	36.2	152			
Surr: Benzo(e)pyrene	0.28		0.3293		84.5	23.4	150			

Sample ID **1504025-001amsd**	SampType: **MSD**	TestCode: **EPA Method 8270C: PAHs**
Client ID: **SS-01**	Batch ID: **18557**	RunNo: **25381**
Prep Date: **4/7/2015**	Analysis Date: **4/8/2015**	SeqNo: **751153** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	0.23	0.020	0.3288	0	69.3	45.3	111	10.1	26.5	
Acenaphthene	0.24	0.020	0.3288	0	71.6	39.8	114	0.166	32.5	
Fluorene	0.25	0.020	0.3288	0	75.3	43.4	119	1.19	30.6	
Anthracene	0.26	0.020	0.3288	0	77.7	41.9	129	0.225	31.1	
Fluoranthene	0.27	0.020	0.3288	0	83.6	42.8	134	4.03	36.1	
Pyrene	0.33	0.020	0.3288	0	100	39.2	134	2.08	31.6	
Benz(a)anthracene	0.34	0.020	0.3288	0	103	45	126	1.71	32.5	
Chrysene	0.32	0.020	0.3288	0	96.6	30.6	124	1.00	33.6	
Benzo(b)fluoranthene	0.38	0.020	0.3288	0	117	49	124	5.45	33	
Benzo(k)fluoranthene	0.39	0.020	0.3288	0	119	43.8	121	14.6	30.8	
Benzo(a)pyrene	0.36	0.020	0.3288	0	110	56.8	102	6.80	34.3	S
Dibenz(a,h)anthracene	0.37	0.020	0.3288	0	111	43.5	151	2.04	27.9	
Indeno(1,2,3-cd)pyrene	0.37	0.020	0.3288	0	113	45.3	130	4.87	30.9	
Surr: N-hexadecane	0.94		1.455		64.5	36.2	152	0	0	
Surr: Benzo(e)pyrene	0.30		0.3288		91.6	23.4	150	0	0	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1504025**

05-May-15

Client: Adkins Consulting Inc

Project: Prairie Falcon 19-1

Sample ID	MB-18569	SampType:	MBLK		TestCode:	EPA Method 7471: Mercury				
Client ID:	PBS	Batch ID:	18569		RunNo:	25359				
Prep Date:	4/8/2015	Analysis Date:	4/8/2015		SeqNo:	750546	Units:	mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.033								

Sample ID	LCS-18569	SampType:	LCS		TestCode:	EPA Method 7471: Mercury				
Client ID:	LCSS	Batch ID:	18569		RunNo:	25359				
Prep Date:	4/8/2015	Analysis Date:	4/8/2015		SeqNo:	750547	Units:	mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.16	0.033	0.1667	0	98.0	80	120			

Sample ID	1504025-001AMS	SampType:	MS		TestCode:	EPA Method 7471: Mercury				
Client ID:	SS-01	Batch ID:	18569		RunNo:	25359				
Prep Date:	4/8/2015	Analysis Date:	4/8/2015		SeqNo:	750549	Units:	mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.17	0.033	0.1687	0.01147	95.5	75	125			

Sample ID	1504025-001AMSD	SampType:	MSD		TestCode:	EPA Method 7471: Mercury				
Client ID:	SS-01	Batch ID:	18569		RunNo:	25359				
Prep Date:	4/8/2015	Analysis Date:	4/8/2015		SeqNo:	750550	Units:	mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.17	0.034	0.1699	0.01147	95.2	75	125	0.467	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1504025**

05-May-15

Client: Adkins Consulting Inc

Project: Prairie Falcon 19-1

Sample ID	MB-18563	SampType:	MBLK	TestCode:	EPA Method 6010B: Soil Metals					
Client ID:	PBS	Batch ID:	18563	RunNo:	25363					
Prep Date:	4/7/2015	Analysis Date:	4/8/2015	SeqNo:	750666	Units:	mg/Kg			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	2.5								
Barium	ND	0.10								
Cadmium	ND	0.10								
Chromium	ND	0.30								
Copper	ND	0.30								
Lead	ND	0.25								
Nickel	ND	0.50								
Selenium	ND	2.5								
Silver	ND	0.25								
Zinc	ND	2.5								

Sample ID	LCS-18563	SampType:	LCS	TestCode:	EPA Method 6010B: Soil Metals					
Client ID:	LCSS	Batch ID:	18563	RunNo:	25363					
Prep Date:	4/7/2015	Analysis Date:	4/8/2015	SeqNo:	750667	Units:	mg/Kg			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	26	2.5	25.00	0	102	80	120			
Barium	25	0.10	25.00	0	99.2	80	120			
Cadmium	25	0.10	25.00	0	101	80	120			
Chromium	25	0.30	25.00	0	100	80	120			
Copper	26	0.30	25.00	0	104	80	120			
Lead	25	0.25	25.00	0	98.8	80	120			
Nickel	25	0.50	25.00	0	98.6	80	120			
Selenium	25	2.5	25.00	0	99.7	80	120			
Silver	5.4	0.25	5.000	0	107	80	120			
Zinc	25	2.5	25.00	0	99.7	80	120			

Sample ID	1504025-001AMS	SampType:	MS	TestCode:	EPA Method 6010B: Soil Metals					
Client ID:	SS-01	Batch ID:	18563	RunNo:	25363					
Prep Date:	4/7/2015	Analysis Date:	4/8/2015	SeqNo:	750685	Units:	mg/Kg			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	25	2.5	25.17	4.142	83.0	75	125			
Cadmium	21	0.10	25.17	0	83.9	75	125			
Chromium	29	0.30	25.17	7.775	85.9	75	125			
Copper	32	0.30	25.17	8.328	93.4	75	125			
Lead	23	0.25	25.17	3.943	75.7	75	125			
Nickel	28	0.50	25.17	8.336	77.3	75	125			
Selenium	20	2.5	25.17	0	77.7	75	125			
Silver	4.4	0.25	5.035	0	87.8	75	125			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1504025**

05-May-15

Client: Adkins Consulting Inc

Project: Prairie Falcon 19-1

Sample ID **1504025-001AMS** SampType: **MS** TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **SS-01** Batch ID: **18563** RunNo: **25363**
Prep Date: **4/7/2015** Analysis Date: **4/8/2015** SeqNo: **750685** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Zinc	50	2.5	25.17	29.32	82.0	75	125			

Sample ID **1504025-001AMSD** SampType: **MSD** TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **SS-01** Batch ID: **18563** RunNo: **25363**
Prep Date: **4/7/2015** Analysis Date: **4/8/2015** SeqNo: **750686** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	25	2.5	25.39	4.142	83.4	75	125	1.19	20	
Cadmium	21	0.10	25.39	0	83.9	75	125	0.922	20	
Chromium	29	0.30	25.39	7.775	84.4	75	125	0.707	20	
Copper	32	0.30	25.39	8.328	92.6	75	125	0.0473	20	
Lead	23	0.25	25.39	3.943	76.7	75	125	1.83	20	
Nickel	28	0.51	25.39	8.336	77.5	75	125	0.781	20	
Selenium	19	2.5	25.39	0	75.8	75	125	1.60	20	
Silver	4.5	0.25	5.079	0	88.6	75	125	1.80	20	
Zinc	52	2.5	25.39	29.32	89.1	75	125	3.89	20	

Sample ID **1504025-001AMS** SampType: **MS** TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **SS-01** Batch ID: **18563** RunNo: **25363**
Prep Date: **4/7/2015** Analysis Date: **4/8/2015** SeqNo: **750705** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	250	0.10	25.17	118.9	530	75	125			ES

Sample ID **1504025-001AMSD** SampType: **MSD** TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **SS-01** Batch ID: **18563** RunNo: **25363**
Prep Date: **4/7/2015** Analysis Date: **4/8/2015** SeqNo: **750706** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	140	0.10	25.39	118.9	72.1	75	125	59.1	20	RS

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1504025**

05-May-15

Client: Adkins Consulting Inc

Project: Prairie Falcon 19-1

Sample ID	mb-18490	SampType:	MBLK		TestCode:	EPA Method 8015D Mod: Gasoline Range				
Client ID:	PBS	Batch ID:	18490		RunNo:	25283				
Prep Date:	4/2/2015	Analysis Date:	4/3/2015		SeqNo:	747683	Units:	mg/Kg		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	580		500.0		116	67.4	150			

Sample ID	lcs-18490	SampType:	LCS		TestCode:	EPA Method 8015D Mod: Gasoline Range				
Client ID:	LCSS	Batch ID:	18490		RunNo:	25283				
Prep Date:	4/2/2015	Analysis Date:	4/3/2015		SeqNo:	747684	Units:	mg/Kg		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27	5.0	25.00	0	106	79.9	135			
Surr: BFB	570		500.0		114	67.4	150			

Sample ID	1504025-001ams	SampType:	MS		TestCode:	EPA Method 8015D Mod: Gasoline Range				
Client ID:	SS-01	Batch ID:	18490		RunNo:	25283				
Prep Date:	4/2/2015	Analysis Date:	4/3/2015		SeqNo:	748406	Units:	mg/Kg		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	28	4.7	23.39	0	118	65.2	156			
Surr: BFB	540		467.7		115	67.4	150			

Sample ID	1504025-001amsd	SampType:	MSD		TestCode:	EPA Method 8015D Mod: Gasoline Range				
Client ID:	SS-01	Batch ID:	18490		RunNo:	25283				
Prep Date:	4/2/2015	Analysis Date:	4/3/2015		SeqNo:	748407	Units:	mg/Kg		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	4.7	23.39	0	110	65.2	156	7.61	20	
Surr: BFB	530		467.7		114	67.4	150	0	0	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: **ADKINS CONSULTING I** Work Order Number: **1504025** RcptNo: 1

Received by/date: AG 04/01/15

Logged By: **Ashley Gallegos** **4/1/2015 7:55:00 AM** AG

Completed By: **Ashley Gallegos** **4/1/2015 12:26:27 PM** AG

Reviewed By: CS 04/02/15

Chain of Custody

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

Log In

4. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
6. Sample(s) in proper container(s)?	Yes ☑	No ☐	
7. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
9. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
11. Were any sample containers received broken?	Yes ☐	No ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	# of preserved bottles checked for pH: (<2 or >12 unless noted)
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	Adjusted?
14. Is it clear what analyses were requested?	Yes ☑	No ☐	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	Checked by:

Special Handling (if applicable)

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

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

17. Additional remarks:

18. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.0	Good	Yes			

Chain-of-Custody Record

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

Client:	Atkins Consulting, Inc
Mailing Address:	130 E. 12th Street #5 Durango, Co 81303
Phone #:	505-793-1140
email or Fax#:	andrew@oilfieldenvironmental.com
QA/QC Package:	☒ Standard ☐ Level 4 (Full Validation)
Accreditation:	☐ NELAP ☐ Other:
☐ EDD (Type)	
Turn-Around Time:	☒ Standard ☐ Rush
Project Name:	Prairie Falcon 19-1
Project #:	
Project Manager:	Andrew Parker
Sampler:	Andrew Parker
On Ice:	☒ Yes ☐ No
Sample Temperature:	0

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1504025	BTEX + MTBE + TMB's (8021)	BTEX + MTBE - TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1)	EDB (Method 504.1)	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	UMU Soil Table (Cobee Table 910-1)			Air Bubbles (Y or N)
3/31	11:30	Soil	SS-01	8oz-3	Ice	-001												X			
	11:50		SS-02			-002												X			
	12:10		SS-03			-003												X			
	12:25		DT-01			-004												X			
3/31	12:40		Spoil Pile	4oz-4		-005			X									X			

Date	Time	Relinquished by	Received by	Date	Time
3/31	1415	Andrew Parker	Michelle Walde	3/31/15	1415
3/31/15	057	Michelle Walde	AM Granger	04/01/15	0755

Remarks: will Provide Cobee Table 910-1 via email to Andy Freeman

Call Andrew at 970-570-9535 w/ Questions

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

Appendix C

SAR Calculation Sheet

Date: 4/16/15

	Sample ID	Cations	Raw ICP Results (mg/L)	Dil Factor	Result (mg/L)	meq/L	SAR
1	1504025-001A	Ca	30.417	10	304.17	15.18	
		Mg	11.065	10	110.65	9.11	1.225
		Na	9.8161	10	98.161	4.27	
2	1504025-002A	Ca	24.261	10	242.61	12.11	
		Mg	15.14	10	151.4	12.46	4.105
		Na	11.348	10	113.48	4.94	
3	1504025-003A	Ca	48.191	10	481.91	24.05	
		Mg	34.335	10	343.35	28.25	5.381
		Na	26.859	10	268.59	11.68	
4	1504025-005A	Ca	47.854	10	478.54	23.88	
		Mg	34.254	10	342.54	28.19	5.42
		Na	24.517	10	245.17	10.66	
5	[redacted]	Ca	8.9662	10	89.662	4.47	
		Mg	0.68104	10	6.8104	0.56	7.86
		Na	0.20254	10	2.0254	0.09	
6	[redacted]	Ca	5.5568	10	55.568	2.77	
		Mg	0.57117	10	5.7117	0.47	0.73
		Na	65.972	10	659.72	28.70	
7	[redacted]	Ca	4.7187	10	47.187	2.35	
		Mg	0.84393	10	8.4393	0.69	0.85
		Na	33.874	10	338.74	14.74	
8	[redacted]	Ca	9.6857	10	96.857	4.83	
		Mg	1.5711	10	15.711	1.29	4.37
		Na	2.6422	10	26.422	1.15	
9	[redacted]	Ca	6.8915	10	68.915	3.44	
		Mg	0.7382	10	7.382	0.61	5.92
		Na	0.15428	10	1.5428	0.07	
10		Ca			0	0.00	
		Mg			0	0.00	#DIV/0!
		Na			0	0.00	

$$SAR = \frac{\text{Na Raw Res ult} \times \text{Dil Factor} \times 0.0435}{\sqrt{\left[\frac{(\text{Ca Raw Res ult} \times \text{Dil Factor} \times 0.0499) + (\text{Mg Raw Resul t} \times \text{Dil Factor} \times 0.08229)}{2}\right]}}$$

Hand Calculation

Sample ID	Na Final Result	Ca Final Result	Mg Final Result	SAR
1504025-001A	98.161	304.17	110.65	1.225493

4/14/15

EL 4/16/15

This Document Has Been Approved For Use at HEAL on 4/14/2015 by: AF and CMS

SAR Calculation Sheet

Date: 4/20/15

	Sample ID	Cations	Raw ICP Results (mg/L)	Dil Factor	Result (mg/L)	meq/L	SAR
1	1504025-004A	Ca	4.1879	10	41.879	2.09	
		Mg	0.27734	10	2.7734	0.23	65.731
		Na	32.535	50	1626.75	70.76	
2	[redacted]	Ca	4.3784	20	87.568	4.37	
		Mg	2.2717	20	45.434	3.74	1.004
		Na	39.287	20	785.74	34.18	
3	[redacted]	Ca	2.873	20	57.46	2.87	
		Mg	1.6404	20	32.808	2.70	0.594
		Na	50.531	20	1010.62	43.96	
4	[redacted]	Ca	1.5796	100	157.96	7.88	
		Mg	0.5484	100	54.84	4.51	1.65
		Na	9.4146	100	941.46	40.95	
5	[redacted]	Ca	2.7294	20	54.588	2.72	
		Mg	0.54164	20	10.8328	0.89	0.47
		Na	74.81	20	1496.2	65.08	
6	[redacted]	Ca	9.6954	20	193.908	9.68	
		Mg	9.4847	20	189.694	15.61	2.12
		Na	29.805	20	596.1	25.93	
7	[redacted]	Ca	3.1522	100	315.22	15.73	
		Mg	0.70606	100	70.606	5.81	5.09
		Na	3.0582	100	305.82	13.30	
8		Ca			0	0.00	
		Mg			0	0.00	#DIV/0!
		Na			0	0.00	
9		Ca			0	0.00	
		Mg			0	0.00	#DIV/0!
		Na			0	0.00	
10		Ca			0	0.00	
		Mg			0	0.00	#DIV/0!
		Na			0	0.00	

$$SAR = \frac{\text{Na Raw Res ult} \times \text{Dil Factor} \times 0.0435}{\sqrt{\left[\frac{(\text{Ca Raw Res ult} \times \text{Dil Factor} \times 0.0499) + (\text{Mg Raw Resul t} \times \text{Dil Factor} \times 0.08229)}{2}\right]}}$$

✓ 4/20/15

Hand Calculation

Sample ID	Na Final Result	Ca Final Result	Mg Final Result	SAR
1504025-004A	1626.75	41.879	2.7734	65.731

$$SAR = \frac{70.763625}{\sqrt{\frac{2.897621 + 0.825223}{2}}} = \frac{70.7636}{\sqrt{1.158599}} = \frac{70.7636}{1.076556} = 65.731$$

This Document Has Been Approved For Use at HEAL on 4/14/2015 by: AF and CMS