



Wednesday, December 23, 2020

Max Trehus
Great Western Operating Company, LLC
4093 Specialty Place, Unit B
Longmont, CO 80504

Re: ALS Workorder: 2012023
Project Name: Raindance FD 20-322 HN
Project Number:

Dear Mr. Trehus:

Two water samples were received from Great Western Operating Company, LLC, on 12/2/2020. The samples were scheduled for the following analyses:

Dissolved Gasses

GC/MS Volatiles

Inorganics

Metals

Total Extractable Petroleum Hydrocarbons (Diesel)

Total Volatile Petroleum Hydrocarbons (Gasoline)

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

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

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

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

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

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
Alaska (AK)	17-003
Arizona (AZ)	AZ0742
California (CA)	2926
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO010992018-1
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	TN02976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



2012023

GC/MS Volatiles:

The sample was analyzed using GC/MS following the current revision of SOP 525 based on SW-846 Method 8260C.

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

Surrogate	Sample	Direction
Dibromofluoromethane	-1	Low

The low surrogate recovery is likely due to the high pH of the sample. No further action was taken.

All remaining acceptance criteria were met.

Dissolved Gasses:

The sample was prepared and analyzed according to method RSK-175 procedures and the current revision of SOP 449.

All acceptance criteria were met.

GRO:

The sample was analyzed following the current revision of SOP 425 generally based on SW-846 Methods 8000C and 8015D. TVPH is a multicomponent mixture and is quantitated by summing the entire carbon range, rather than individual peaks. The carbon range integrated in this test extends from C6 to C10.

All acceptance criteria were met.

DRO:

The sample was analyzed following the current revision of SOP 406 generally based on SW-846 Methods 8000C and 8015D. TEPH is a multicomponent mixture and is quantitated by summing the entire carbon range, rather than individual peaks. The carbon range integrated in this test extends from C10 to C28.

All acceptance criteria were met.

**Metals:**

The samples were analyzed following Methods for the Determination of Metals in Environmental Samples – Supplement 1 procedures. Analysis by ICPMS followed method 200.8 and the current revision of SOP 827.

Sample 2012023-2 was filtered through a 0.45 micron filter and preserved with nitric acid to a pH less than two prior to analysis.

All acceptance criteria were met.

Inorganics:

The sample was analyzed following EMSL and Standard Method procedures for the current revisions of the following SOPs and methods:

<u>Analyte</u>	<u>Method</u>	<u>SOP #</u>
Alkalinity	SM2320B	1106
Bicarbonate	SM2320B	1106
Carbonate	SM2320B	1106
TDS	SM2540C	1101
Chloride	300.0 Revision 2.1	1113
Sulfate	300.0 Revision 2.1	1113

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 2012023

Client Name: Great Western Operating Company, LLC

Client Project Name: Raindance FD 20-322 HN

Client Project Number:

Client PO Number:

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
20-322 HN A thru E, G	2012023-1		WATER	01-Dec-20	13:20
20-322 HN F	2012023-2		WATER	01-Dec-20	13:20



ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.
Turnaround time for samples received Saturday will be calculated beginning from the next business day.

PROJECT NAME		PROJECT No.		TURNAROUND TIME		SITE ID		SAMPLER		PAGE		ALS WORKORDER #							
PROJECT No.		EED FORMAT		PURCHASE ORDER		BILL TO COMPANY		INVOICE ATTN TO		ADDRESS		CITY / STATE / ZIP		PHONE		FAX		E-MAIL	
COMPANY NAME		SEND REPORT TO		ADDRESS		CITY / STATE / ZIP		PHONE		FAX		E-MAIL		PARAMETER/METHOD REQUEST FOR ANALYSIS		DISPOSAL		BY LAB or RETURN	
Randance FD20-322HN		Great Western		Max Trems										A Dissolved Gases				2012023	
20-322HN A		20-322HN B		20-322HN C		20-322HN D		20-322HN E		20-322HN F		20-322HN G		A Niens, Alk, TDS					
20-322HN H		20-322HN I		20-322HN J		20-322HN K		20-322HN L		20-322HN M		20-322HN N		B BTEX					
20-322HN O		20-322HN P		20-322HN Q		20-322HN R		20-322HN S		20-322HN T		20-322HN U		C DRO					
20-322HN V		20-322HN W		20-322HN X		20-322HN Y		20-322HN Z		20-322HN AA		20-322HN AB		D GRO					
20-322HN AC		20-322HN AD		20-322HN AE		20-322HN AF		20-322HN AG		20-322HN AH		20-322HN AI		E Anions, Alk, TDS					
20-322HN AJ		20-322HN AK		20-322HN AL		20-322HN AM		20-322HN AN		20-322HN AO		20-322HN AP		F DS Metals					
20-322HN AQ		20-322HN AR		20-322HN AS		20-322HN AT		20-322HN AU		20-322HN AV		20-322HN AW		G TR Metals					
20-322HN AX		20-322HN AY		20-322HN AZ		20-322HN BA		20-322HN BB		20-322HN BC		20-322HN BD		H					
20-322HN BE		20-322HN BF		20-322HN BG		20-322HN BH		20-322HN BI		20-322HN BJ		20-322HN BK		I					
20-322HN BL		20-322HN BM		20-322HN BN		20-322HN BO		20-322HN BP		20-322HN BQ		20-322HN BR		J					
20-322HN BS		20-322HN BT		20-322HN BU		20-322HN BV		20-322HN BW		20-322HN BX		20-322HN BY		QC					
20-322HN BZ		20-322HN CA		20-322HN CB		20-322HN CC		20-322HN CD		20-322HN CE		20-322HN CF		PRESERVATIVE					
20-322HN CG		20-322HN CH		20-322HN CI		20-322HN CJ		20-322HN CK		20-322HN CL		20-322HN CM		# OF BOTTLES					
20-322HN CN		20-322HN CO		20-322HN CP		20-322HN CQ		20-322HN CR		20-322HN CS		20-322HN CT		SAMPLE TIME					
20-322HN CU		20-322HN CV		20-322HN CW		20-322HN CX		20-322HN CY		20-322HN CZ		20-322HN DA		SAMPLE DATE					
20-322HN DD		20-322HN DE		20-322HN DF		20-322HN DG		20-322HN DH		20-322HN DI		20-322HN DJ		MATRIX					
20-322HN DE		20-322HN DF		20-322HN DG		20-322HN DH		20-322HN DI		20-322HN DJ		20-322HN DK		W					
20-322HN DL		20-322HN DM		20-322HN DN		20-322HN DO		20-322HN DP		20-322HN DQ		20-322HN DR		12-1-20					
20-322HN DS		20-322HN DT		20-322HN DU		20-322HN DV		20-322HN DW		20-322HN DX		20-322HN DY		13:20					
20-322HN DT		20-322HN DU		20-322HN DV		20-322HN DW		20-322HN DX		20-322HN DY		20-322HN DZ		3					
20-322HN DU		20-322HN DV		20-322HN DW		20-322HN DX		20-322HN DY		20-322HN DZ		20-322HN EA		3					
20-322HN DV		20-322HN DW		20-322HN DX		20-322HN DY		20-322HN DZ		20-322HN EA		20-322HN EB		3					
20-322HN DW		20-322HN DX		20-322HN DY		20-322HN DZ		20-322HN EA		20-322HN EB		20-322HN EC		3					
20-322HN DX		20-322HN DY		20-322HN DZ		20-322HN EA		20-322HN EB		20-322HN EC		20-322HN ED		1					
20-322HN DY		20-322HN DZ		20-322HN EA		20-322HN EB		20-322HN EC		20-322HN ED		20-322HN EE		1					
20-322HN DZ		20-322HN EA		20-322HN EB		20-322HN EC		20-322HN ED		20-322HN EE		20-322HN EF		1					
20-322HN EA		20-322HN EB		20-322HN EC		20-322HN ED		20-322HN EE		20-322HN EF		20-322HN EG		1					
20-322HN EB		20-322HN EC		20-322HN ED		20-322HN EE		20-322HN EF		20-322HN EG		20-322HN EH		1					
20-322HN EC		20-322HN ED		20-322HN EE		20-322HN EF		20-322HN EG		20-322HN EH		20-322HN EI		1					
20-322HN ED		20-322HN EE		20-322HN EF		20-322HN EG		20-322HN EH		20-322HN EI		20-322HN EJ		1					
20-322HN EE		20-322HN EF		20-322HN EG		20-322HN EH		20-322HN EI		20-322HN EJ		20-322HN EK		1					
20-322HN EF		20-322HN EG		20-322HN EH		20-322HN EI		20-322HN EJ		20-322HN EK		20-322HN EL		1					
20-322HN EG		20-322HN EH		20-322HN EI		20-322HN EJ		20-322HN EK		20-322HN EL		20-322HN EM		1					
20-322HN EH		20-322HN EI		20-322HN EJ		20-322HN EK		20-322HN EL		20-322HN EM		20-322HN EN		1					
20-322HN EI		20-322HN EJ		20-322HN EK		20-322HN EL		20-322HN EM		20-322HN EN		20-322HN EO		1					
20-322HN EJ		20-322HN EK		20-322HN EL		20-322HN EM		20-322HN EN		20-322HN EO		20-322HN EP		1					
20-322HN EK		20-322HN EL		20-322HN EM		20-322HN EN		20-322HN EO		20-322HN EP		20-322HN EQ		1					
20-322HN EL		20-322HN EM		20-322HN EN		20-322HN EO		20-322HN EP		20-322HN EQ		20-322HN ER		1					
20-322HN EM		20-322HN EN		20-322HN EO		20-322HN EP		20-322HN EQ		20-322HN ER		20-322HN ES		1					
20-322HN EN		20-322HN EO		20-322HN EP		20-322HN EQ		20-322HN ER		20-322HN ES		20-322HN ET		1					
20-322HN EO		20-322HN EP		20-322HN EQ		20-322HN ER		20-322HN ES		20-322HN ET		20-322HN EU		1					
20-322HN EP		20-322HN EQ		20-322HN ER		20-322HN ES		20-322HN ET		20-322HN EU		20-322HN EV		1					
20-322HN EQ		20-322HN ER		20-322HN ES		20-322HN ET		20-322HN EU		20-322HN EV		20-322HN EW		1					
20-322HN ER		20-322HN ES		20-322HN ET		20-322HN EU		20-322HN EV		20-322HN EW		20-322HN EX		1					
20-322HN ES		20-322HN ET		20-322HN EU		20-322HN EV		20-322HN EW		20-322HN EX		20-322HN EY		1					
20-322HN ET		20-322HN EU		20-322HN EV		20-322HN EW		20-322HN EX		20-322HN EY		20-322HN EZ		1					
20-322HN EU		20-322HN EV		20-322HN EW		20-322HN EX		20-322HN EY		20-322HN EZ		20-322HN FA		1					
20-322HN EV		20-322HN EW		20-322HN EX		20-322HN EY		20-322HN EZ		20-322HN FA		20-322HN FB		1					
20-322HN EW		20-322HN EX		20-322HN EY		20-322HN EZ		20-322HN FA		20-322HN FB		20-322HN FC		1					
20-322HN EX		20-322HN EY		20-322HN EZ		20-322HN FA		20-322HN FB		20-322HN FC		20-322HN FD		1					
20-322HN EY		20-322HN EZ		20-322HN FA		20-322HN FB		20-322HN FC		20-322HN FD		20-322HN FE		1					
20-322HN EZ		20-322HN FA		20-322HN FB		20-322HN FC		20-322HN FD		20-322HN FE		20-322HN FF		1					
20-322HN FA		20-322HN FB		20-322HN FC		20-322HN FD		20-322HN FE		20-322HN FF		20-322HN FG		1					
20-322HN FB		20-322HN FC		20-322HN FD		20-322HN FE		20-322HN FF		20-322HN FG		20-322HN FH		1					
20-322HN FC		20-322HN FD		20-322HN FE		20-322HN FF		20-322HN FG		20-322HN FH		20-322HN FI		1					
20-322HN FD		20-322HN FE		20-322HN FF		20-322HN FG		20-322HN FH		20-322HN FI		20-322HN FJ		1					
20-322HN FE		20-322HN FF		20-322HN FG		20-322HN FH		20-322HN FI		20-322HN FJ		20-322HN FK		1					
20-322HN FF		20-322HN FG		20-322HN FH		20-322HN FI		20-322HN FJ		20-322HN FK		20-322HN FL		1					
20-322HN FG		20-322HN FH		20-322HN FI		20-322HN FJ		20-322HN FK		20-322HN FL		20-322HN FM		1					
20-322HN FH		20-322HN FI		20-322HN FJ		20-322HN FK		20-322HN FL		20-322HN FM		20-322HN FN		1					
20-322HN FI		20-322HN FJ		20-322HN FK		20-322HN FL		20-322HN FM		20-322HN FN		20-322HN FO		1					
20-322HN FJ		20-322HN FK		20-322HN FL		20-322HN FM		20-322HN FN		20-322HN FO		20-322HN FP		1					
20-322HN FK		20-322HN FL		20-322HN FM		20-322HN FN		20-322HN FO		20-322HN FP		20-322HN FQ		1					
20-322HN FL		20-322HN FM		20-322HN FN		20-322HN FO		20-322HN FP		20-322HN FQ		20-322HN FR		1					
20-322HN FM		20-322HN FN		20-322HN FO		20-322HN FP		20-322HN FQ		20-322HN FR		20-322HN FS		1					
20-322HN FN		20-322HN FO		20-322HN FP		20-322HN FQ		20-322HN FR		20-322HN FS		20-322HN FT		1					
20-322HN FO		20-322HN FP		20-322HN FQ		20-322HN FR		20-322HN FS		20-322HN FT		20-322HN FU		1					
20-322HN FP		20-322HN FQ		20-322HN FR		20-322HN FS		20-322HN FT		20-322HN FU		20-322HN FV		1					
20-322HN FQ		20-322HN FR		20-322HN FS		20-322HN FT		20-322HN FU		20-322HN FV		20-322HN FW		1					
20-322HN FR		20-322HN FS		20-322HN FT		20-322HN FU		20-322HN FV		20-322HN FW		20-322HN FX		1					
20-322HN FS		20-322HN FT		20-322HN FU		20-322HN FV		20-322HN FW		20-322HN FX		20-322HN FY		1					
20-322HN FT		20-322HN FU		20-322HN FV		20-322HN FW		20-322HN FX		20-322HN FY		20-322HN FZ		1					
20-322HN FU		20-322HN FV		20-322HN FW		20-322HN FX		20-322HN FY		20-322HN FZ		20-322HN GA		1					
20-322HN FV		20-322HN FW		20-322HN FX		20-322HN FY		20-322HN FZ		20-322HN GA		20-322HN GB		1					
20-322HN FW		20-322HN FX		20-322HN FY		20-322HN FZ		20-322HN GA		20-322HN GB		20-322HN GC		1					
20-322HN FX		20-322HN FY		20-322HN FZ		20-322HN GA		20-322HN GB		20-322HN GC		20-322HN GD		1					
20-322HN FY		20-322HN FZ		20-322HN GA		20-322HN GB		20-322HN GC		20-322HN GD		20-322HN GE		1					
20-322HN FZ		20-322HN GA		20-322HN GB		20-322HN GC		20-322HN GD		20-322HN GE		20-322HN GF		1					
20-322HN GA		20-322HN GB		20-322HN GC		20-322HN GD		20-322HN GE		20-322HN GF		20-322HN GG		1					
20-322HN GB		20-322HN GC		20-322HN GD		20-322HN GE		20-322HN GF		20-322HN GG		20-322HN GH		1					
20-322HN GC		20-322HN GD		20-322HN GE		20-322HN GF		20-322HN GG		20-322HN GH		20-322HN GI		1					
20-322HN GD		20-322HN GE		20-322HN GF		20-322HN GG		20-322HN GH		20-322HN GI		20-322HN GJ		1					
20-322HN GE		20-322HN GF		20-322HN GG		20-322HN GH		20-322HN GI		20-322HN GJ		20-322HN GK		1					
20-322HN GF		20-322HN GG</																	



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client Name/ID: Great Western

Workorder No: 2012023

Project Manager: KMO

Initials: RGA

Date: 12/02/2020

1. Are airbills / shipping documents present and/or removable?	<input checked="" type="checkbox"/> Drop Off	<input type="checkbox"/> YES	<input type="checkbox"/> NO
2. Are custody seals on shipping containers intact?	<input checked="" type="checkbox"/> NONE	<input type="checkbox"/> YES	<input type="checkbox"/> NO*
3. Are custody seals on sample containers intact?	<input checked="" type="checkbox"/> NONE	<input type="checkbox"/> YES	<input type="checkbox"/> NO*
4. Is there a COC (chain-of-custody) present?		<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO*
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO*
6. Are short-hold samples present?		<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
7. Are all samples within holding times for the requested analyses?		<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO*
8. Were all sample containers received intact? (not broken or leaking)		<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO*
9. Is there sufficient sample for the requested analyses?		<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO*
10. Are samples in proper containers for requested analyses? (form 250, Sample Handling Guidelines)		<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO*
11. Are all aqueous samples preserved correctly, if required?	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO*
12. Were unpreserved samples pH checked, if required?	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm in diameter?	<input type="checkbox"/> N/A	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
14. Were the samples shipped on ice?		<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
15. Were cooler temperatures measured at 0.1 - 6.0°C?	IR gun used: <input type="checkbox"/> #3 <input checked="" type="checkbox"/> #5	<input type="checkbox"/> Rad Only	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO

Cooler #: 1
Temperature (°C): 1.4
of custody seals on cooler: 0
External mR/hr reading: -
Background mR/hr reading: 9
Were external mR/hr readings ≤ two times background and within DOT acceptance criteria? (If no, see Form 008) ☒ N/A ☐ YES ☐ NO

* Please provide details below for 'NO' responses in gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

11) Sample 2012023-1-14 had a pH of 14, 0.5 ml of HNO₃ was added, the final pH was 14.

All client bottle ID's vs ALS lab ID's double-checked by: RGA

If applicable, was the client contacted? ☐ YES ☐ N/A Contact Name

Date:

Project Manager Signature / Date:

 12/2/20

Client: Great Western Operating Company, LLC

Date: 23-Dec-20

Project: Raindance FD 20-322 HN

Work Order: 2012023

Sample ID: 20-322 HN A thru E, G

Lab ID: 2012023-1

Legal Location:

Matrix: WATER

Collection Date: 12/1/2020 13:20

Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Alkalinity as Calcium Carbonate		SM2320B			Prep Date: 12/11/2020	PrepBy: LMC
BICARBONATE AS CaCO3	ND		500	MG/L	1	12/11/2020
CARBONATE AS CaCO3	970		500	MG/L	1	12/11/2020
TOTAL ALKALINITY AS CaCO3	9600		500	MG/L	1	12/11/2020
Diesel Range Organics		SW8015M			Prep Date: 12/9/2020	PrepBy: ASZ
Diesel Range Organics	6.3		1	MG/L	1	12/13/2020 20:30
Surr: O-TERPHENYL	117		69-120	%REC	1	12/13/2020 20:30
Dissolved Gasses		RSK175			Prep Date: 12/7/2020	PrepBy: ASZ
METHANE	200		1	UG/L	1	12/7/2020 11:31
ETHANE	190		2	UG/L	1	12/7/2020 11:31
PROPANE	170		1	UG/L	1	12/7/2020 11:31
Gasoline Range Organics		SW8015			Prep Date: 12/14/2020	PrepBy: ASZ
GASOLINE RANGE ORGANICS	1.8		0.1	MG/L	1	12/14/2020 19:01
Surr: 2,3,4-TRIFLUOROTOLUENE	100		80-120	%REC	1	12/14/2020 19:01
GC/MS Volatiles		SW8260_25			Prep Date: 12/7/2020	PrepBy: AEW
BENZENE	92		5	UG/L	5	12/7/2020 21:08
TOLUENE	130		5	UG/L	5	12/7/2020 21:08
ETHYLBENZENE	29		5	UG/L	5	12/7/2020 21:08
M+P-XYLENE	110		5	UG/L	5	12/7/2020 21:08
O-XYLENE	65		5	UG/L	5	12/7/2020 21:08
TOTAL XYLENES	180		1	UG/L	1	12/7/2020 21:08
Surr: 4-BROMOFLUOROBENZENE	98		80-120	%REC	5	12/7/2020 21:08
Surr: DIBROMOFLUOROMETHANE	41	*	80-120	%REC	5	12/7/2020 21:08
Surr: TOLUENE-D8	98		80-120	%REC	5	12/7/2020 21:08
Ion Chromatography		EPA300.0			Prep Date: 12/4/2020	PrepBy: KJS
CHLORIDE	600		10	MG/L	50	12/4/2020 16:24
SULFATE	410		5	MG/L	5	12/4/2020 16:37
Total Recoverable Metals by 200.8		EPA200.8			Prep Date: 12/7/2020	PrepBy: JML
CALCIUM	160000		1000	UG/L	10	12/8/2020 16:19
POTASSIUM	4800000		10000	UG/L	100	12/9/2020 13:01
MAGNESIUM	ND		100	UG/L	10	12/8/2020 16:19
SODIUM	1600000		1000	UG/L	10	12/8/2020 16:19
Total Dissolved Solids		SM2540C			Prep Date: 12/7/2020	PrepBy: LMC
TOTAL DISSOLVED SOLIDS	2700		1000	MG/L	1	12/10/2020

Client: Great Western Operating Company, LLC

Date: 23-Dec-20

Project: Raindance FD 20-322 HN

Work Order: 2012023

Sample ID: 20-322 HN F

Lab ID: 2012023-2

Legal Location:

Matrix: WATER

Collection Date: 12/1/2020 13:20

Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
----------	--------	------	-----------------	-------	--------------------	---------------

Dissolved Metals by 200.8**EPA200.8**

Prep Date: 12/7/2020

PrepBy: JML

CALCIUM	160000		1000	UG/L	10	12/8/2020 16:22
POTASSIUM	4800000		10000	UG/L	100	12/9/2020 13:04
MAGNESIUM	ND		100	UG/L	10	12/8/2020 16:22
SODIUM	1600000		1000	UG/L	10	12/8/2020 16:22

Client: Great Western Operating Company, LLC
Project: Raindance FD 20-322 HN
Sample ID: 20-322 HN F
Legal Location:
Collection Date: 12/1/2020 13:20

Date: 23-Dec-20
Work Order: 2012023
Lab ID: 2012023-2
Matrix: WATER
Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
----------	--------	------	--------------	-------	-----------------	---------------

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC
 U or ND - Result is less than the sample specific MDC.
 Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
 Y2 - Chemical Yield outside default limits.
 W - DER is greater than Warning Limit of 1.42
 * - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
 # - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
 G - Sample density differs by more than 15% of LCS density.
 D - DER is greater than Control Limit
 M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
 L - LCS Recovery below lower control limit.
 H - LCS Recovery above upper control limit.
 P - LCS, Matrix Spike Recovery within control limits.
 N - Matrix Spike Recovery outside control limits
 NC - Not Calculated for duplicate results less than 5 times MDC
 B - Analyte concentration greater than MDC.
 B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).
 U or ND - Indicates that the compound was analyzed for but not detected.
 E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
 M - Duplicate injection precision was not met.
 N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
 Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
 * - Duplicate analysis (relative percent difference) not within control limits.
 S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.
 B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
 E - Analyte concentration exceeds the upper level of the calibration range.
 J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
 A - A tentatively identified compound is a suspected aldol-condensation product.
 X - The analyte was diluted below an accurate quantitation level.
 * - The spike recovery is equal to or outside the control criteria used.
 + - The relative percent difference (RPD) equals or exceeds the control criteria.
 G - A pattern resembling gasoline was detected in this sample.
 D - A pattern resembling diesel was detected in this sample.
 M - A pattern resembling motor oil was detected in this sample.
 C - A pattern resembling crude oil was detected in this sample.
 4 - A pattern resembling JP-4 was detected in this sample.
 5 - A pattern resembling JP-5 was detected in this sample.
 H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.
 L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.
 Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
 - gasoline
 - JP-8
 - diesel
 - mineral spirits
 - motor oil
 - Stoddard solvent
 - bunker C

ALS -- Fort Collins

Date: 12/23/2020 10:2

Client: Great Western Operating Company, LLC

QC BATCH REPORT

Work Order: 2012023

Project: Raindance FD 20-322 HN

Batch ID: HC201207-91-1

Instrument ID: MEE-1

Method: RSK175

LCS	Sample ID: HC201207-91	Units: UG/L				Analysis Date: 12/7/2020 10:14						
Client ID:	Run ID: HC201207-91A				Prep Date: 12/7/2020				DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual	
METHANE	166	1	142		117	76-125				25		
ETHANE	297	2	267		111	70-120				25		
PROPANE	438	1	391		112	72-120				25		

LCSD	Sample ID: HC201207-91	Units: UG/L				Analysis Date: 12/7/2020 10:57						
Client ID:	Run ID: HC201207-91A				Prep Date: 12/7/2020				DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual	
METHANE	155	1	142		109	76-125		166	7	25		
ETHANE	271	2	267		102	70-120		297	9	25		
PROPANE	393	1	391		100	72-120		438	11	25		

MB	Sample ID: HC201207-91			Units: UG/L		Analysis Date: 12/7/2020 10:18		
Client ID:	Run ID: HC201207-91A			Prep Date: 12/7/2020		DF: 1		
Analyte	Result	ReportLimit					Qual	
METHANE	ND	1						
ETHANE	ND	2						
PROPANE	ND	1						

The following samples were analyzed in this batch:

2012023-1

Client: Great Western Operating Company, LLC
Work Order: 2012023
Project: Raindance FD 20-322 HN

QC BATCH REPORT

Batch ID: **HC201209-81-1** Instrument ID: **FUELS-1** Method: **SW8015M**

LCS	Sample ID: HC201209-81				Units: MG/L		Analysis Date: 12/13/2020 19:07				
Client ID:		Run ID: HC201213-81A				Prep Date: 12/9/2020			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
Diesel Range Organics	7.04	1.07	8.33		85	53-120				20	
Surr: O-TERPHENYL	1.58		1.67		95	69-120					

LCSD		Sample ID: HC201209-81			Units: MG/L		Analysis Date: 12/13/2020 19:28				
Client ID:		Run ID: HC201213-81A			Prep Date: 12/9/2020			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
Diesel Range Organics	6.88	1.07	8.33		83	53-120		7.04	2	20	
Surr: O-TERPHENYL	1.57		1.67		94	69-120			1		

MB		Sample ID: HC201209-81		Units: MG/L		Analysis Date: 12/13/2020 14:14	
Client ID:		Run ID: HC201213-81A		Prep Date: 12/9/2020		DF: 1	
Analyte		Result	ReportLimit	Qual			
Diesel Range Organics		ND	1.1				
Surr: O-TERPHENYL		1.71		102	69-120		

The following samples were analyzed in this batch:

2012023-1

Client: Great Western Operating Company, LLC
Work Order: 2012023
Project: Raindance FD 20-322 HN

QC BATCH REPORT

Batch ID: **HC201214-61-1** Instrument ID: **FUELS-1** Method: **SW8015**

LCS	Sample ID: HC201214-61				Units: MG/L		Analysis Date: 12/15/2020 01:45				
Client ID:		Run ID: HC201214-61A				Prep Date: 12/14/2020			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
GASOLINE RANGE ORGANICS	0.501	0.1	0.5		100	80-120				20	
Surr: 2,3,4-TRIFLUOROTOLUENE	0.106		0.1		106	80-120					

MB		Sample ID: HC201214-61			Units: MG/L		Analysis Date: 12/14/2020 17:23		
Client ID:		Run ID: HC201214-61A			Prep Date: 12/14/2020			DF: 1	
Analyte		Result	ReportLimit		Qual				
GASOLINE RANGE ORGANICS		ND	0.1						
Surr: 2,3,4-TRIFLUOROTOLUENE		0.105			105	80-120			

The following samples were analyzed in this batch:

2012023-1

Client: Great Western Operating Company, LLC
Work Order: 2012023
Project: Raindance FD 20-322 HN

QC BATCH REPORT

Batch ID: **IP201207-5-1** Instrument ID: **ICPMS2** Method: **EPA200.8**

LCS	Sample ID: IM201207-5			Units: UG/L			Analysis Date: 12/8/2020 16:01				
Client ID:		Run ID: IM201208-10A7			Prep Date: 12/7/2020			DF: 10			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
CALCIUM	10800	1000	10000		108	85-115				20	
MAGNESIUM	10300	100	10000		103	85-115				20	
POTASSIUM	4990	1000	5000		100	85-115				20	
SODIUM	11200	1000	10000		112	85-115				20	

MB		Sample ID: FP201204-5		Units: UG/L		Analysis Date: 12/8/2020 15:55	
Client ID:		Run ID: IM201208-10A7		Prep Date: 12/7/2020		DF: 10	
Analyte		Result	ReportLimit	Qual			
CALCIUM		ND	1000				
MAGNESIUM		ND	100				
POTASSIUM		ND	1000				
SODIUM		ND	1000				

MB		Sample ID: IP201207-5		Units: UG/L		Analysis Date: 12/8/2020 15:58	
Client ID:		Run ID: IM201208-10A7		Prep Date: 12/7/2020		DF: 10	
Analyte		Result	ReportLimit	Qual			
CALCIUM		ND	1000				
MAGNESIUM		ND	100				
POTASSIUM		ND	1000				
SODIUM		ND	1000				

The following samples were analyzed in this batch:

2012023-1 2012023-2

Client: Great Western Operating Company, LLC
 Work Order: 2012023
 Project: Raindance FD 20-322 HN

QC BATCH REPORT

Batch ID: **VL201207-3-4** Instrument ID: **HPV3** Method: **SW8260_25**

LCS		Sample ID: VL201207-3			Units: %REC		Analysis Date: 12/7/2020 13:26				
Client ID:		Run ID: VL201207-33A			Prep Date: 12/7/2020			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
Surr: 4-BROMOFLUOROBENZENE	24.9		25		100	80-120					
Surr: DIBROMOFLUOROMETHANE	25.3		25		101	80-120					
Surr: TOLUENE-D8	24.7		25		99	80-120					
BENZENE	9.48	1	10		95	80-120				20	
TOLUENE	9.4	1	10		94	80-120				20	
ETHYLBENZENE	9.76	1	10		98	80-120				20	
M+P-XYLENE	19.4	1	20		97	80-120				20	
O-XYLENE	9.38	1	10		94	80-120				20	

LCSD	Sample ID: VL201207-3			Units: %REC			Analysis Date: 12/7/2020 15:48				
Client ID:	Run ID: VL201207-33A			Prep Date: 12/7/2020			DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
Surr: 4-BROMOFLUOROBENZENE	24.8		25		99	80-120			0		
Surr: DIBROMOFLUOROMETHANE	25.4		25		102	80-120			1		
Surr: TOLUENE-D8	25		25		100	80-120			1		
BENZENE	11.1	1	10		111	80-120		9.48	16	20	
TOLUENE	10.7	1	10		107	80-120		9.4	13	20	
ETHYLBENZENE	11	1	10		110	80-120		9.76	12	20	
M+P-XYLENE	21.8	1	20		109	80-120		19.4	12	20	
O-XYLENE	10.9	1	10		109	80-120		9.38	15	20	

MB		Sample ID: VL201207-3		Units: %REC		Analysis Date: 12/7/2020 16:08	
Client ID:		Run ID: VL201207-33A		Prep Date: 12/7/2020		DF: 1	
Analyte	Result	ReportLimit					Qual
Surr: 4-BROMOFLUOROBENZENE	24.8		99	80-120			
Surr: DIBROMOFLUOROMETHANE	25.4		102	80-120			
Surr: TOLUENE-D8	25		100	80-120			
BENZENE	ND	1					
TOLUENE	ND	1					
ETHYLBENZENE	ND	1					
M+P-XYLENE	ND	1					
O-XYLENE	ND	1					
TOTAL XYLENES	ND	1					

The following samples were analyzed in this batch:

2012023-1

Client: Great Western Operating Company, LLC
Work Order: 2012023
Project: Raindance FD 20-322 HN

QC BATCH REPORT

Batch ID: **AK201211-1-1** Instrument ID: **NONE** Method: **SM2320B**

LCS	Sample ID: AK201211-1				Units: MG/L		Analysis Date: 12/11/2020				
Client ID:	Run ID: AK201211-1A1				Prep Date: 12/11/2020			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
TOTAL ALKALINITY AS CaCO3	96	5	100		96	85-115				15	

LCSD		Sample ID: AK201211-1			Units: MG/L		Analysis Date: 12/11/2020				
Client ID:		Run ID: AK201211-1A1			Prep Date: 12/11/2020			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
TOTAL ALKALINITY AS CaCO3	95.8	5	100		96	85-115		96	0	15	

MB		Sample ID: AK201211-1		Units: MG/L		Analysis Date: 12/11/2020	
Client ID:		Run ID: AK201211-1A1		Prep Date: 12/11/2020		DF: 1	
Analyte		Result	ReportLimit	Qual			
BICARBONATE AS CaCO3		ND	5				
CARBONATE AS CaCO3		ND	5				
TOTAL ALKALINITY AS CaCO3		ND	5				

The following samples were analyzed in this batch:

2012023-1

Client: Great Western Operating Company, LLC
Work Order: 2012023
Project: Raindance FD 20-322 HN

QC BATCH REPORT

Batch ID: **IC201204-1-1** Instrument ID: **IC3** Method: **EPA300.0**

LCS	Sample ID: IC201204-1				Units: MG/L		Analysis Date: 12/4/2020 07:32				
Client ID:		Run ID: IC201204-1A1				Prep Date: 12/4/2020			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
CHLORIDE	9.73	0.2	10		97	90-110				15	
SULFATE	48.1	1	50		96	90-110				15	

LCSD	Sample ID: IC201204-1				Units: MG/L		Analysis Date: 12/4/2020 10:10				
Client ID:	Run ID: IC201204-1A1				Prep Date: 12/4/2020			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
CHLORIDE	9.76	0.2	10		98	90-110		9.73	0	15	
SULFATE	48.1	1	50		96	90-110		48.1	0	15	

MB		Sample ID: IC201204-1		Units: MG/L		Analysis Date: 12/4/2020 07:45	
Client ID:		Run ID: IC201204-1A1		Prep Date: 12/4/2020		DF: 1	
Analyte		Result	ReportLimit	Qual			
CHLORIDE		ND	0.2				
SULFATE		ND	1				

The following samples were analyzed in this batch:

2012023-1

Client: Great Western Operating Company, LLC
Work Order: 2012023
Project: Raindance FD 20-322 HN

QC BATCH REPORT

Batch ID: **TD201207-1-1** Instrument ID: **Balance** Method: **SM2540C**

LCS		Sample ID: TD201207-1			Units: MG/L		Analysis Date: 12/10/2020				
Client ID:		Run ID: AK201210-1A1			Prep Date: 12/7/2020			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
TOTAL DISSOLVED SOLIDS	400	20	400		100	85-115				14	

LCSD		Sample ID: TD201207-1			Units: MG/L		Analysis Date: 12/10/2020				
Client ID:		Run ID: AK201210-1A1			Prep Date: 12/7/2020			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
TOTAL DISSOLVED SOLIDS	406	20	400		101	85-115		400	1	14	

MB		Sample ID: TD201207-1			Units: MG/L		Analysis Date: 12/10/2020	
Client ID:		Run ID: AK201210-1A1			Prep Date: 12/7/2020		DF: 1	
Analyte		Result	ReportLimit					
TOTAL DISSOLVED SOLIDS		ND	20					

The following samples were analyzed in this batch:

2012023-1