

November 02, 2018

Report to:

Randall Miller

North Park Engineering & Consulting, Inc

P.O. Box 395

Walden, CO 80480

Bill to:

Randall Miller

North Park Engineering & Consulting, Inc

P.O. Box 395

Walden, CO 80480

Project ID: Marcus Production

ACZ Project ID: L47448

Randall Miller:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 09, 2018. This project has been assigned to ACZ's project number, L47448. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L47448. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after December 02, 2018. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.



Sue Webber has reviewed and
approved this report.



North Park Engineering & Consulting, Inc

Project ID: Marcus Production

Sample ID: STATE 1-36 PIT 2 BOTTOM

ACZ Sample ID: **L47448-01**

Date Sampled: 10/08/18 11:00

Date Received: 10/09/18

Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Arsenic, total (3050)	M6020B ICP-MS	505	3.7			mg/Kg	0.1	0.5	10/19/18 12:09	bsu
Barium, total (3050)	M6010D ICP	101	353			mg/Kg	0.3	2	10/20/18 0:48	dcm
Cadmium, total (3050)	M6010D ICP	101		U		mg/Kg	0.5	2	10/20/18 0:48	dcm
Calcium, soluble (Sat. Paste)	M6010D ICP	1	0.906			meq/L	0.005	0.025	10/24/18 11:08	aeH
Chromium, total (3050)	M6010D ICP	101	32			mg/Kg	1	5	10/20/18 0:48	dcm
Chromium, Trivalent	Calculation (Total - Hexavalent)		32			mg/Kg	1	5	11/02/18 0:00	calc
Copper, total (3050)	M6010D ICP	101	24		*	mg/Kg	1	5	10/20/18 0:48	dcm
Lead, total (3050)	M6010D ICP	101	12	B	*	mg/Kg	3	20	10/20/18 0:48	dcm
Magnesium, soluble (Sat. Paste)	M6010D ICP	1	0.189			meq/L	0.017	0.082	10/24/18 11:08	aeH
Mercury by Direct Combustion AA	M7473 CVAAS	1	33.3		*	ng/g	1.7	8.5	10/22/18 12:12	che
Nickel, total (3050)	M6010D ICP	101	20.1			mg/Kg	0.8	4	10/20/18 0:48	dcm
Selenium, total (3050)	M6010D ICP	101		U		mg/Kg	5	30	10/20/18 0:48	dcm
Silver, total (3050)	M6010D ICP	101		U		mg/Kg	1	3	10/20/18 0:48	dcm
Sodium Adsorption Ratio	Calculation		16						11/02/18 0:00	calc
Sodium, soluble (Sat. Paste)	M6010D ICP	1	12.1			meq/L	0.0087	0.0435	10/24/18 11:08	aeH
Zinc, total (3050)	M6010D ICP	101	64		*	mg/Kg	1	5	10/20/18 0:48	dcm

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Conductivity @25C	SM2510B									
Conductivity		1	1.50		*	mmhos/cm	0.001	0.01	10/23/18 0:00	gkh
Max Particle Size		1	250		*	um			10/23/18 0:00	gkh
Temperature		1	22.5		*	C	0.1	0.1	10/23/18 0:00	gkh
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	250		*	um			10/23/18 0:00	gkh
pH		1	8.0		*	units	0.1	0.1	10/23/18 0:00	gkh
Solids, Percent	D2216-80	1	87.7		*	%	0.1	0.5	10/12/18 11:40	ajm

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972				*				10/12/18 11:20	ajm
Crush and Pulverize	EPA-600/2-78-054 3.1.3				*				10/17/18 16:45	ajm
Digestion - Alkaline	M3060A								10/15/18 7:54	jlw
Digestion - Hot Plate	M3050B ICP								10/18/18 15:30	dbt
Digestion - Hot Plate	M3050B ICP-MS								10/18/18 15:30	dbt
Saturated Paste Extraction	USDA No. 60 (2)								10/22/18 15:57	gkh

North Park Engineering & Consulting, Inc

Project ID: Marcus Production

Sample ID: STATE 1-36 PIT 2 BOTTOM

ACZ Sample ID: **L47448-01**

Date Sampled: 10/08/18 11:00

Date Received: 10/09/18

Sample Matrix: Soil

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Chromium, Hexavalent (3060)	M7196A	230		U	*	mg/Kg	1	5	10/16/18 10:24	mh

Arizona license number: AZ0102


Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit unless omitted or equal to the PQL (see comment #5). Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit. Synonymous with the EPA term "minimum level".
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click:

<http://www.acz.com/public/extquallist.pdf>

North Park Engineering & Consulting, Inc

ACZ Project ID: **L47448**

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Arsenic, total (3050)

M6020B ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG458879													
WG458879ICV	ICV	10/19/18 11:11	MS180914-2	.05		.05066	mg/L	101	90	110			
WG458879ICB	ICB	10/19/18 11:12				U	mg/L		-0.0006	0.0006			
WG458785PBS	PBS	10/19/18 11:40				U	mg/Kg		-0.3	0.3			
WG458785LCSS1	LCSS	10/19/18 11:41	PCN56332	161		153.5	mg/Kg		134	188			
WG458785LCSSD1	LCSSD	10/19/18 11:43	PCN56332	161		149.5	mg/Kg		134	188	3	20	
L47392-01MS	MS	10/19/18 11:54	MS180911-2	25.551	1.3	20.38	mg/Kg	75	75	125			
L47392-01MSD	MSD	10/19/18 12:03	MS180911-2	25.551	1.3	23.35	mg/Kg	86	75	125	14	20	

Barium, total (3050)

M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG458911													
WG458911ICV	ICV	10/19/18 23:13	II181002-1	2		1.925	mg/L	96	90	110			
WG458911ICB	ICB	10/19/18 23:16				.0031	mg/L		-0.009	0.009			
WG458785PBS	PBS	10/19/18 23:41				.42	mg/Kg		-0.9	0.9			
WG458785LCSS1	LCSS	10/19/18 23:45	PCN56332	260		255.9	mg/Kg		215	305			
WG458785LCSSD1	LCSSD	10/19/18 23:49	PCN56332	260		251.2	mg/Kg		215	305	2	20	
L47291-01MS	MS	10/20/18 0:04	II181012-2	51.7575	95.8	158.21	mg/Kg	121	75	125			
L47291-01MSD	MSD	10/20/18 0:08	II181012-2	51.7575	95.8	157.28	mg/Kg	119	75	125	1	20	

Cadmium, total (3050)

M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG458911													
WG458911ICV	ICV	10/19/18 23:13	II181002-1	2		1.939	mg/L	97	90	110			
WG458911ICB	ICB	10/19/18 23:16				U	mg/L		-0.015	0.015			
WG458785PBS	PBS	10/19/18 23:41				U	mg/Kg		-1.5	1.5			
WG458785LCSS1	LCSS	10/19/18 23:45	PCN56332	211		207.9	mg/Kg		176	264			
WG458785LCSSD1	LCSSD	10/19/18 23:49	PCN56332	211		206.4	mg/Kg		176	264	1	20	
L47291-01MS	MS	10/20/18 0:04	II181012-2	51.706	U	47.22	mg/Kg	91	75	125			
L47291-01MSD	MSD	10/20/18 0:08	II181012-2	51.706	U	47.04	mg/Kg	91	75	125	0	20	

Calcium, soluble (Sat. Paste)

M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG459143													
WG459143ICV	ICV	10/24/18 10:28	II181009-1	100		97.4	mg/L	97	90	110			
WG459143ICB	ICB	10/24/18 10:32				U	mg/L		-0.3	0.3			
L47448-01DUP	DUP	10/24/18 11:12			0.906	.864	meq/L				5	20	

Chromium, Hexavalent (3060)

M7196A

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG458597													
WG458597ICV	ICV	10/16/18 9:00	WC180912-2	.05		.0502	mg/L	100	90	110			
WG458597ICB	ICB	10/16/18 9:09				U	mg/L		-0.005	0.005			
L47392-02MS1	MS	10/16/18 9:56	SI181012-	48.01944	U	37.3	mg/Kg	78	75	125			
L47448-01DUP	DUP	10/16/18 11:02			U	U	mg/Kg				0	20	RA
WG458504LCSS	LCSS	10/16/18 11:11	PCN53452	148		140	mg/Kg		83.8	211			
WG458504PBS	PBS	10/16/18 11:21				U	mg/Kg		-1	1			

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ACZ Project ID: **L47448**

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Chromium, total (3050)

M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG458911													
WG458911ICV	ICV	10/19/18 23:13	II181002-1	2		1.983	mg/L	99	90	110			
WG458911ICB	ICB	10/19/18 23:16				U	mg/L		-0.03	0.03			
WG458785PBS	PBS	10/19/18 23:41				U	mg/Kg		-3	3			
WG458785LCSS1	LCSS	10/19/18 23:45	PCN56332	136		138.7	mg/Kg		112	160			
WG458785LCSSD1	LCSSD	10/19/18 23:49	PCN56332	136		139.3	mg/Kg		112	160	0	20	
L47291-01MS	MS	10/20/18 0:04	II181012-2	51.5	11	65.1	mg/Kg	105	75	125			
L47291-01MSD	MSD	10/20/18 0:08	II181012-2	51.5	11	64.8	mg/Kg	104	75	125	0	20	

Conductivity @25C

SM2510B

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG459036													
L47448-01DUP	DUP	10/23/18 13:49			1.5	1.502	mmhos/cm				0	20	

Copper, total (3050)

M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG458911													
WG458911ICV	ICV	10/19/18 23:13	II181002-1	2		1.933	mg/L	97	90	110			
WG458911ICB	ICB	10/19/18 23:16				U	mg/L		-0.03	0.03			
WG458785PBS	PBS	10/19/18 23:41				U	mg/Kg		-3	3			
WG458785LCSS1	LCSS	10/19/18 23:45	PCN56332	166		165.8	mg/Kg		139	192			
WG458785LCSSD1	LCSSD	10/19/18 23:49	PCN56332	166		161.7	mg/Kg		139	192	3	20	
L47291-01MS	MS	10/20/18 0:04	II181012-2	51.6545	9	59	mg/Kg	97	75	125			
L47291-01MSD	MSD	10/20/18 0:08	II181012-2	51.6545	9	58.9	mg/Kg	97	75	125	0	20	

Lead, total (3050)

M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG458911													
WG458911ICV	ICV	10/19/18 23:13	II181002-1	4		3.914	mg/L	98	90	110			
WG458911ICB	ICB	10/19/18 23:16				U	mg/L		-0.09	0.09			
WG458785PBS	PBS	10/19/18 23:41				U	mg/Kg		-9	9			
WG458785LCSS1	LCSS	10/19/18 23:45	PCN56332	111		112.2	mg/Kg		92.1	130			
WG458785LCSSD1	LCSSD	10/19/18 23:49	PCN56332	111		110.7	mg/Kg		92.1	130	1	20	
L47291-01MS	MS	10/20/18 0:04	II181012-2	103.1751	8	108.7	mg/Kg	98	75	125			
L47291-01MSD	MSD	10/20/18 0:08	II181012-2	103.1751	8	108.5	mg/Kg	97	75	125	0	20	

Magnesium, soluble (Sat. Paste)

M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG459143													
WG459143ICV	ICV	10/24/18 10:28	II181009-1	100		98.7	mg/L	99	90	110			
WG459143ICB	ICB	10/24/18 10:32				U	mg/L		-0.6	0.6			
L47448-01DUP	DUP	10/24/18 11:12			0.189	.174	meq/L				8	20	

North Park Engineering & Consulting, Inc

ACZ Project ID: **L47448**

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Mercury by Direct Combustion AA

M7473 CVAAS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG458989													
WG458989ICV1	ICV	10/22/18 8:50	HG181018-5	100		96	ng/g	96	90	110			
WG458989ICV2	ICV	10/22/18 9:04	HG181018-3	100		105	ng/g	105	90	110			
WG458989ICV3	ICV	10/22/18 9:28	HG181018-4	1000		1020	ng/g	102	90	110			
WG458989ICV4	ICV	10/22/18 9:38	HG181018-4	1000		996	ng/g	100	90	110			
WG458989PBS	PBS	10/22/18 10:54				U	ng/g		-6	6			
WG458989LCSS	LCSS	10/22/18 11:01	PCN56164	80		69.8	ng/g		80	120			
WG458989LCSSD	LCSSD	10/22/18 11:07	PCN56164	80		69.2	ng/g		80	120	1	20	
L47448-01MS	MS	10/22/18 12:19	PCN56164				ng/g	37	80	120			M2
L47459-21DUP	DUP	10/22/18 12:32			33.5	33.2	ng/g				1	20	

Nickel, total (3050)

M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG458911													
WG458911ICV	ICV	10/19/18 23:13	II181002-1	2.004		1.97	mg/L	98	90	110			
WG458911ICB	ICB	10/19/18 23:16				U	mg/L		-0.024	0.024			
WG458785PBS	PBS	10/19/18 23:41				U	mg/Kg		-2.4	2.4			
WG458785LCSS1	LCSS	10/19/18 23:45	PCN56332	91.9		93.79	mg/Kg		76.2	108			
WG458785LCSSD1	LCSSD	10/19/18 23:49	PCN56332	91.9		92.37	mg/Kg		76.2	108	2	20	
L47291-01MS	MS	10/20/18 0:04	II181012-2	51.5	10	57.62	mg/Kg	92	75	125			
L47291-01MSD	MSD	10/20/18 0:08	II181012-2	51.5	10	57.76	mg/Kg	93	75	125	0	20	

pH, Saturated Paste

EPA 600/2-78-054 section 3.2.2

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG459036													
WG459036ICV	ICV	10/23/18 12:47	PCN56119	4		4	units	100	3.9	4.1			
L47448-01DUP	DUP	10/23/18 13:49			8	8.01	units				0	20	

Selenium, total (3050)

M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG458911													
WG458911ICV	ICV	10/19/18 23:13	II181002-1	4		3.982	mg/L	100	90	110			
WG458911ICB	ICB	10/19/18 23:16				U	mg/L		-0.15	0.15			
WG458785PBS	PBS	10/19/18 23:41				U	mg/Kg		-15	15			
WG458785LCSS1	LCSS	10/19/18 23:45	PCN56332	191		197.3	mg/Kg		152	231			
WG458785LCSSD1	LCSSD	10/19/18 23:49	PCN56332	191		193.1	mg/Kg		152	231	2	20	
L47291-01MS	MS	10/20/18 0:04	II181012-2	103.1751	U	107.7	mg/Kg	104	75	125			
L47291-01MSD	MSD	10/20/18 0:08	II181012-2	103.1751	U	111.8	mg/Kg	108	75	125	4	20	

Silver, total (3050)

M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG458911													
WG458911ICV	ICV	10/19/18 23:13	II181002-1	1.001		1.008	mg/L	101	90	110			
WG458911ICB	ICB	10/19/18 23:16				U	mg/L		-0.03	0.03			
WG458785PBS	PBS	10/19/18 23:41				U	mg/Kg		-3	3			
WG458785LCSS1	LCSS	10/19/18 23:45	PCN56332	43.3		41.7	mg/Kg		34.6	51.9			
WG458785LCSSD1	LCSSD	10/19/18 23:49	PCN56332	43.3		42.4	mg/Kg		34.6	51.9	2	20	
L47291-01MS	MS	10/20/18 0:04	II181012-2	51.5	U	49.6	mg/Kg	96	75	125			
L47291-01MSD	MSD	10/20/18 0:08	II181012-2	51.5	U	49.4	mg/Kg	96	75	125	0	20	

North Park Engineering & Consulting, Inc

ACZ Project ID: **L47448**

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Sodium, soluble (Sat. Paste)

M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG459143													
WG459143ICV	ICV	10/24/18 10:28	II181009-1	100		99.1	mg/L	99	90	110			
WG459143ICB	ICB	10/24/18 10:32				U	mg/L		-0.6	0.6			
L47448-01DUP	DUP	10/24/18 11:12			12.1	11.8	meq/L				3	20	

Solids, Percent

D2216-80

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG458453													
L47391-01DUP	DUP	10/12/18 11:40			77.7	77.85	%				0	20	
WG458453PBS	PBS	10/12/18 11:40				U	%		-0.1	0.1			

Zinc, total (3050)

M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG458911													
WG458911ICV	ICV	10/19/18 23:13	II181002-1	2		1.99	mg/L	100	90	110			
WG458911ICB	ICB	10/19/18 23:16				U	mg/L		-0.03	0.03			
WG458785PBS	PBS	10/19/18 23:41				U	mg/Kg		-3	3			
WG458785LCSS1	LCSS	10/19/18 23:45	PCN56332	199		200.4	mg/Kg		162	237			
WG458785LCSSD1	LCSSD	10/19/18 23:49	PCN56332	199		198.3	mg/Kg		162	237	1	20	
L47291-01MS	MS	10/20/18 0:04	II181012-2	50.9026	38	89.5	mg/Kg	101	75	125			
L47291-01MSD	MSD	10/20/18 0:08	II181012-2	50.9026	38	94.3	mg/Kg	111	75	125	5	20	

North Park Engineering & Consulting, Inc

ACZ Project ID: **L47448**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L47448-01	WG458597	Chromium, Hexavalent (3060)	M7196A	DA	Sample required dilution due to reactivity.
			M7196A	Q6	Sample was received above recommended temperature.
			M7196A	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG458911	Copper, total (3050)	M6010D ICP	ZG	The ICP or ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
		Lead, total (3050)	M6010D ICP	ZG	The ICP or ICP-MS Serial Dilution was not used for data validation because the sample concentration was less than 50 times the MDL.
	WG458989	Mercury by Direct Combustion AA	M7473 CVAAS	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M7473 CVAAS	Q6	Sample was received above recommended temperature.
	WG458911	Zinc, total (3050)	M6010D ICP	ZH	Serial Dilution exceeded the acceptance criteria. Matrix interference [physical or chemical] is suspected.

North Park Engineering & Consulting, Inc
Project ID: Marcus Production
Sample ID: STATE 1-36 PIT 2 BOTTOM

ACZ Sample ID: **L47448-01**
Date Sampled: 10/08/18 11:00
Date Received: 10/09/18
Sample Matrix: Soil

BTEX/Gasoline Range Organics (C6-C10)

Analysis Method: **M8021B/8015D GC/PID/FID**
Extract Method: **5035A**

Workgroup: WG458170

Analyst: itm
Extract Date: 10/11/18 2:08
Analysis Date: 10/11/18 0:09

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Benzene	71-43-2		U	5	*	ug/Kg	5	5
Ethylbenzene	100-41-4	191		5	*	ug/Kg	5	5
m p Xylene	1330-20-7	620		5	*	ug/Kg	10	10
o Xylene	95-47-6	568		5	*	ug/Kg	5	5
Toluene	108-88-3		U	5	*	ug/Kg	5	5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
Bromofluorobenzene	460-00-4	119.8		5	*	%	70	130

Workgroup: WG458170

Analyst: itm
Extract Date: 10/11/18 2:08
Analysis Date: 10/11/18 2:08

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TVH C6 to C10	TVH	42		50	*	mg/Kg	3	3
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
Bromofluorobenzene (TVH)	460-00-4	137.9		50	*	%	70	130

Arizona license number: AZ0102

North Park Engineering & Consulting, Inc
Project ID: Marcus Production
Sample ID: STATE 1-36 PIT 2 BOTTOM

ACZ Sample ID: **L47448-01**
Date Sampled: 10/08/18 11:00
Date Received: 10/09/18
Sample Matrix: Soil

Diesel Range Organics (C10-C28)

Analysis Method: **M8015D GC/FID**
Extract Method: **M3540**

Workgroup: WG458397

Analyst: kfm
Extract Date: 10/10/18 21:25
Analysis Date: 10/11/18 21:55

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		1300		1.97	*	mg/Kg	197	984
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	74.82		1.97	*	%	60	115

Arizona license number: AZ0102

North Park Engineering & Consulting, Inc
 Project ID: Marcus Production
 Sample ID: STATE 1-36 PIT 2 BOTTOM

ACZ Sample ID: **L47448-01**
 Date Sampled: 10/08/18 11:00
 Date Received: 10/09/18
 Sample Matrix: Soil

Polynuclear Aromatic Hydrocarbons GC/M

Analysis Method: **M8270C GC/MS**
 Extract Method: **M3540**

Workgroup: WG458974

Analyst: jmm
 Extract Date: 10/17/18 16:07
 Analysis Date: 10/19/18 13:12

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
2-Methylnaphthalene	91-57-6	1200	J	402	*	ug/Kg	800	4000
Acenaphthene	83-32-9		U	402	*	ug/Kg	800	4000
Acenaphthylene	208-96-8		U	402	*	ug/Kg	800	4000
Anthracene	120-12-7		U	402	*	ug/Kg	800	4000
Benzo(a)anthracene	56-55-3		U	402	*	ug/Kg	800	4000
Benzo(a)pyrene	50-32-8		U	402	*	ug/Kg	800	4000
Benzo(b)fluoranthene	205-99-2		U	402	*	ug/Kg	800	4000
Benzo(g,h,i)perylene	191-24-2		U	402	*	ug/Kg	800	4000
Benzo(k)fluoranthene	207-08-9		U	402	*	ug/Kg	800	4000
Chrysene	218-01-9		U	402	*	ug/Kg	800	4000
Dibenzo(a,h)anthracene	53-70-3		U	402	*	ug/Kg	800	4000
Fluoranthene	206-44-0		U	402	*	ug/Kg	800	4000
Fluorene	86-73-7		U	402	*	ug/Kg	800	4000
Indeno(1,2,3-cd)pyrene	193-39-5		U	402	*	ug/Kg	800	4000
Naphthalene	91-20-3		U	402	*	ug/Kg	800	4000
Phenanthrene	85-01-8		U	402	*	ug/Kg	800	4000
Pyrene	129-00-0		U	402	*	ug/Kg	800	4000
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
2-Fluorobiphenyl	321-60-8	91.3		402	*	%	45	105
Nitrobenzene-d5	4165-60-0	73.8		402	*	%	35	100
Terphenyl-d14	1718-51-0	106		402	*	%	30	125

Arizona license number: AZ0102

North Park Engineering & Consulting, Inc

Project ID: Marcus Production
Sample ID: STATE 1-36 PIT 2 W

ACZ Sample ID: **L47448-02**
Date Sampled: 10/08/18 11:05
Date Received: 10/09/18
Sample Matrix: Soil

Benzene, Toluene, Ethylbenzene & Xylene

Analysis Method: **M8021B GC/PID**
Extract Method: **5035A**

Workgroup: WG458170

Analyst: itm
Extract Date: 10/11/18 15:43
Analysis Date: 10/11/18 15:43

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
Benzene	71-43-2		U	5	*	ug/Kg	5	5
Ethylbenzene	100-41-4	33		5	*	ug/Kg	5	5
m p Xylene	1330-20-7	60		5	*	ug/Kg	10	10
o Xylene	95-47-6	71		5	*	ug/Kg	5	5
Toluene	108-88-3		U	5	*	ug/Kg	5	5
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
Bromofluorobenzene	460-00-4	117.3		5	*	%	70	130

Arizona license number: AZ0102

North Park Engineering & Consulting, Inc

Project ID: Marcus Production
Sample ID: STATE 1-36 PIT 2 W

ACZ Sample ID: **L47448-02**
Date Sampled: 10/08/18 11:05
Date Received: 10/09/18
Sample Matrix: Soil

Diesel Range Organics (C10-C28)

Analysis Method: **M8015D GC/FID**
Extract Method: **M3540**

Workgroup: WG458397

Analyst: kfm
Extract Date: 10/10/18 22:03
Analysis Date: 10/11/18 22:19

Compound	CAS	Result	QUAL	Dilution	XQ	Units	MDL	PQL
TPH C10 to C28		1000		2	*	mg/Kg	200	998
Surrogate Recoveries	CAS	% Recovery		Dilution	XQ	Units	LCL	UCL
OTP	84-15-1	79.59		2	*	%	60	115

Arizona license number: AZ0102


Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>LCL</i>	Lower Control Limit
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit unless omitted or equal to the PQL (see comment #4) Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit. Synonymous with the EPA term "minimum level".
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>UCL</i>	Upper Control Limit
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>SURR</i>	Surrogate	<i>LFM</i>	Laboratory Fortified Matrix
<i>INTS</i>	Internal Standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>MS/MSD</i>	Matrix Spike/Matrix Spike Duplicate
<i>LCSW</i>	Laboratory Control Sample - Water	<i>PBS</i>	Prep Blank - Soil
<i>LFB</i>	Laboratory Fortified Blank	<i>PBW</i>	Prep Blank - Water

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
O	Analyte concentration is estimated due to result exceeding calibration range.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
J	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/4-90/020. Methods for the Determination of Organic Compounds in Drinking Water (I), July 1990.
- (3) EPA 600/R-92/129. Methods for the Determination of Organic Compounds in Drinking Water (II), July 1990.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Excluding Oil & Grease, solid & biological matrices for organic analyses are reported on a wet weight basis.
- (3) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (4) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click:

<http://www.acz.com/public/extquallist.pdf>

North Park Engineering & Consulting, Inc

ACZ Project ID: **L47448**

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Benzene, Toluene, Ethylbenzene & Xylenes

M8021B GC/PID

WG458170

AS	Sample ID: L47392-01AS		PCN/SCN: B180822-2-ICV				Analyzed:		10/10/18 21:11	
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
BENZENE	125.5	U	124.2	ug/Kg	99.0	70	130			
ETHYLBENZENE	125	U	120.6	ug/Kg	96.0	70	130			
M P XYLENE	251.8	U	240	ug/Kg	95.0	70	130			
O XYLENE	251.3	U	243.5	ug/Kg	97.0	70	130			
TOLUENE	376.5	U	354.4	ug/Kg	94.0	70	130			
TVH C6 TO C10	2.3	U	2.15	mg/Kg	95.0	70	130			
BROMOFLUOROBENZENE (surr)				%	106.3	70	130			
BROMOFLUOROBENZENE (TVH) (surr)				%	107.0	70	130			

ASD	Sample ID: L47392-01ASD		PCN/SCN: B180822-2-ICV				Analyzed:		10/10/18 21:41	
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
BENZENE	125.5	U	126.1	ug/Kg	100.0	70	130	2	20	
ETHYLBENZENE	125	U	120.8	ug/Kg	97.0	70	130	0	20	
M P XYLENE	251.8	U	241	ug/Kg	96.0	70	130	0	20	
O XYLENE	251.3	U	245.9	ug/Kg	98.0	70	130	1	20	
TOLUENE	376.5	U	357.2	ug/Kg	95.0	70	130	1	20	
TVH C6 TO C10	2.3	U	2.12	mg/Kg	94.0	70	130	1	20	
BROMOFLUOROBENZENE (surr)				%	106.7	70	130			
BROMOFLUOROBENZENE (TVH) (surr)				%	107.2	70	130			

LCSS	Sample ID: WG458170LCSS		PCN/SCN: B180822-2-ICV				Analyzed:		10/10/18 18:43	
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
BENZENE	25.1		24.3	ug/Kg	97.0	70	130			
ETHYLBENZENE	25		24.8	ug/Kg	99.0	70	130			
M P XYLENE	50.4		49.2	ug/Kg	98.0	70	130			
O XYLENE	50.3		48.8	ug/Kg	97.0	70	130			
TOLUENE	75.3		71.7	ug/Kg	95.0	70	130			
TVH C6 TO C10	.5		.44	mg/Kg	98.0	70	130			
BROMOFLUOROBENZENE (surr)				%	111.2	70	130			
BROMOFLUOROBENZENE (TVH) (surr)				%	111.4	70	130			
BENZENE	25.1		27.1	ug/Kg	108.0	70	130			
ETHYLBENZENE	25		27.2	ug/Kg	109.0	70	130			
M P XYLENE	50.4		54	ug/Kg	107.0	70	130			
O XYLENE	50.3		53.6	ug/Kg	107.0	70	130			
TOLUENE	75.3		79.8	ug/Kg	106.0	70	130			
TVH C6 TO C10	.5		.442	mg/Kg	98.0	70	130			
BROMOFLUOROBENZENE (surr)				%	112.3	70	130			
BROMOFLUOROBENZENE (TVH) (surr)				%	113.0	70	130			

LCSSD	Sample ID: WG458170LCSSD		PCN/SCN: B180822-2-ICV				Analyzed: 10/10/18 19:12			
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
BENZENE	25.1		24.9	ug/Kg	99.0	70	130	2	20	
ETHYLBENZENE	25		25.1	ug/Kg	100.0	70	130	1	20	
M P XYLENE	50.4		49.9	ug/Kg	99.0	70	130	1	20	

North Park Engineering & Consulting, Inc

ACZ Project ID: **L47448**

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

O XYLENE	50.3	50.1	ug/Kg	100.0	70	130	3	20
TOLUENE	75.3	73.2	ug/Kg	97.0	70	130	2	20
TVH C6 TO C10	.5	.439	mg/Kg	97.0	70	130	0	20
BROMOFLUOROBENZENE (surr)			%	110.8	70	130		
BROMOFLUOROBENZENE (TVH) (surr)			%	110.9	70	130		
BENZENE	25.1	27.8	ug/Kg	111.0	70	130	3	20
ETHYLBENZENE	25	27.9	ug/Kg	112.0	70	130	3	20
M P XYLENE	50.4	55.2	ug/Kg	110.0	70	130	2	20
O XYLENE	50.3	54.8	ug/Kg	109.0	70	130	2	20
TOLUENE	75.3	81.9	ug/Kg	109.0	70	130	3	20
TVH C6 TO C10	.5	.454	mg/Kg	101.0	70	130	3	20
BROMOFLUOROBENZENE (surr)			%	112.5	70	130		
BROMOFLUOROBENZENE (TVH) (surr)			%	112.7	70	130		

PBS		Sample ID: WG458170PBS				Analyzed: 10/10/18 20:12				
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
BENZENE			U	ug/Kg		-1	1			
ETHYLBENZENE			U	ug/Kg		-1	1			
M P XYLENE			U	ug/Kg		-2	2			
O XYLENE			U	ug/Kg		-1	1			
TOLUENE			U	ug/Kg		-1	1			
TVH C6 TO C10			U	mg/Kg		-.05	.05			
BROMOFLUOROBENZENE (surr)				%	101.7	70	130			
BROMOFLUOROBENZENE (TVH) (surr)				%	101.0	70	130			
BENZENE			U	ug/Kg		-1	1			
ETHYLBENZENE			U	ug/Kg		-1	1			
M P XYLENE			U	ug/Kg		-2	2			
O XYLENE			U	ug/Kg		-1	1			
TOLUENE			U	ug/Kg		-1	1			
TVH C6 TO C10			U	mg/Kg		-.05	.05			
BROMOFLUOROBENZENE (surr)				%	112.1	70	130			
BROMOFLUOROBENZENE (TVH) (surr)				%	110.8	70	130			

North Park Engineering & Consulting, Inc

ACZ Project ID: **L47448**

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

BTEX/Gasoline Range Organics (C6-C10)

M8021B/8015D GC/PID/FID

WG458170

AS	Sample ID: L47392-01AS		PCN/SCN: B180822-2-ICV				Analyzed:		10/10/18 21:11	
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
BENZENE	125.5	U	124.2	ug/Kg	99.0	70	130			
ETHYLBENZENE	125	U	120.6	ug/Kg	96.0	70	130			
M P XYLENE	251.8	U	240	ug/Kg	95.0	70	130			
O XYLENE	251.3	U	243.5	ug/Kg	97.0	70	130			
TOLUENE	376.5	U	354.4	ug/Kg	94.0	70	130			
TVH C6 TO C10	2.3	U	2.15	mg/Kg	95.0	70	130			
BROMOFLUOROBENZENE (surr)				%	106.3	70	130			
BROMOFLUOROBENZENE (TVH) (surr)				%	107.0	70	130			

ASD	Sample ID: L47392-01ASD		PCN/SCN: B180822-2-ICV				Analyzed:		10/10/18 21:41	
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
BENZENE	125.5	U	126.1	ug/Kg	100.0	70	130	2	20	
ETHYLBENZENE	125	U	120.8	ug/Kg	97.0	70	130	0	20	
M P XYLENE	251.8	U	241	ug/Kg	96.0	70	130	0	20	
O XYLENE	251.3	U	245.9	ug/Kg	98.0	70	130	1	20	
TOLUENE	376.5	U	357.2	ug/Kg	95.0	70	130	1	20	
TVH C6 TO C10	2.3	U	2.12	mg/Kg	94.0	70	130	1	20	
BROMOFLUOROBENZENE (surr)				%	106.7	70	130			
BROMOFLUOROBENZENE (TVH) (surr)				%	107.2	70	130			

LCSS	Sample ID: WG458170LCSS		PCN/SCN: B180822-2-ICV				Analyzed:		10/10/18 18:43	
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
BENZENE	25.1		24.3	ug/Kg	97.0	70	130			
ETHYLBENZENE	25		24.8	ug/Kg	99.0	70	130			
M P XYLENE	50.4		49.2	ug/Kg	98.0	70	130			
O XYLENE	50.3		48.8	ug/Kg	97.0	70	130			
TOLUENE	75.3		71.7	ug/Kg	95.0	70	130			
TVH C6 TO C10	.5		.44	mg/Kg	98.0	70	130			
BROMOFLUOROBENZENE (surr)				%	111.2	70	130			
BROMOFLUOROBENZENE (TVH) (surr)				%	111.4	70	130			
BENZENE	25.1		27.1	ug/Kg	108.0	70	130			
ETHYLBENZENE	25		27.2	ug/Kg	109.0	70	130			
M P XYLENE	50.4		54	ug/Kg	107.0	70	130			
O XYLENE	50.3		53.6	ug/Kg	107.0	70	130			
TOLUENE	75.3		79.8	ug/Kg	106.0	70	130			
TVH C6 TO C10	.5		.442	mg/Kg	98.0	70	130			
BROMOFLUOROBENZENE (surr)				%	112.3	70	130			
BROMOFLUOROBENZENE (TVH) (surr)				%	113.0	70	130			

LCSSD	Sample ID: WG458170LCSSD		PCN/SCN: B180822-2-ICV				Analyzed: 10/10/18 19:12			
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
BENZENE	25.1		24.9	ug/Kg	99.0	70	130	2	20	
ETHYLBENZENE	25		25.1	ug/Kg	100.0	70	130	1	20	
M P XYLENE	50.4		49.9	ug/Kg	99.0	70	130	1	20	

North Park Engineering & Consulting, Inc

ACZ Project ID: **L47448**

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

O XYLENE	50.3	50.1	ug/Kg	100.0	70	130	3	20
TOLUENE	75.3	73.2	ug/Kg	97.0	70	130	2	20
TVH C6 TO C10	.5	.439	mg/Kg	97.0	70	130	0	20
BROMOFLUOROBENZENE (surr)			%	110.8	70	130		
BROMOFLUOROBENZENE (TVH) (surr)			%	110.9	70	130		
BENZENE	25.1	27.8	ug/Kg	111.0	70	130	3	20
ETHYLBENZENE	25	27.9	ug/Kg	112.0	70	130	3	20
M P XYLENE	50.4	55.2	ug/Kg	110.0	70	130	2	20
O XYLENE	50.3	54.8	ug/Kg	109.0	70	130	2	20
TOLUENE	75.3	81.9	ug/Kg	109.0	70	130	3	20
TVH C6 TO C10	.5	.454	mg/Kg	101.0	70	130	3	20
BROMOFLUOROBENZENE (surr)			%	112.5	70	130		
BROMOFLUOROBENZENE (TVH) (surr)			%	112.7	70	130		

PBS		Sample ID: WG458170PBS				Analyzed: 10/10/18 20:12				
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
BENZENE			U	ug/Kg		-1	1			
ETHYLBENZENE			U	ug/Kg		-1	1			
M P XYLENE			U	ug/Kg		-2	2			
O XYLENE			U	ug/Kg		-1	1			
TOLUENE			U	ug/Kg		-1	1			
TVH C6 TO C10			U	mg/Kg		-.05	.05			
BROMOFLUOROBENZENE (surr)				%	101.7	70	130			
BROMOFLUOROBENZENE (TVH) (surr)				%	101.0	70	130			
BENZENE			U	ug/Kg		-1	1			
ETHYLBENZENE			U	ug/Kg		-1	1			
M P XYLENE			U	ug/Kg		-2	2			
O XYLENE			U	ug/Kg		-1	1			
TOLUENE			U	ug/Kg		-1	1			
TVH C6 TO C10			U	mg/Kg		-.05	.05			
BROMOFLUOROBENZENE (surr)				%	112.1	70	130			
BROMOFLUOROBENZENE (TVH) (surr)				%	110.8	70	130			

North Park Engineering & Consulting, Inc

ACZ Project ID: **L47448**

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Diesel Range Organics (C10-C28)

M8015D GC/FID

WG458397

MS		Sample ID: L47392-01MS		PCN/SCN: OPTPH180927-1				Analyzed: 10/11/18 18:01		
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28	2500	U	185.696	mg/Kg	77.0					
OTP (surr)				%	79.8	60	115			

MSD		Sample ID: L47392-01MSD		PCN/SCN: OPTPH180927-1				Analyzed: 10/11/18 18:24		
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28	2500	U	192.722	mg/Kg	80.0	70	130	4	20	
OTP (surr)				%	84.1	60	115			

DUP		Sample ID: L47392-02DUP						Analyzed: 10/11/18 19:11		
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28		3300	3088.25	mg/Kg				7	20	
OTP (surr)				%	83.2	60	115			

LCSS		Sample ID: WG458227LCSS		PCN/SCN: OPTPH180927-1				Analyzed: 10/11/18 16:50		
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28	2500		75.826	mg/Kg	91.0	70	130			
OTP (surr)				%	89.5	60	115			

LCSSD		Sample ID: WG458227LCSSD		PCN/SCN: OPTPH180927-1				Analyzed: 10/11/18 17:14		
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
TPH C10 TO C28	2500		73.331	mg/Kg	88.0	70	130	3	20	
OTP (surr)				%	88.8	60	115			

PBS		Sample ID: WG458227PBS						Analyzed: 10/11/18 16:27			
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual	
TPH C10 TO C28			U	mg/Kg		-16.7	16.7				
OTP (surr)				%	83.3	60	115				

North Park Engineering & Consulting, Inc

ACZ Project ID: **L47448**

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Polynuclear Aromatic Hydrocarbons GC/MS

M8270C GC/MS

WG458974

MS	Sample ID: L47448-01MS		PCN/SCN: OPBNA180924-1				Analyzed: 10/19/18 13:45			
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
ACENAPHTHENE	49648	U	9400	ug/Kg	93.0	40	123			
PYRENE	50428	U	8620	ug/Kg	84.0	47	127			
2,4,6-TRIBROMOPHENOL (surr)				%	85.9	35	125			
2-FLUOROBIPHENYL (surr)				%	87.6	45	105			
2-FLUOROPHENOL (surr)				%	57.5	35	105			
NITROBENZENE-D5 (surr)				%	69.0	35	100			
PHENOL-D6 (surr)				%	72.9	40	100			
TERPHENYL-D14 (surr)				%	104.2	30	125			

MSD	Sample ID: L47448-01MSD		PCN/SCN: OPBNA180924-1				Analyzed: 10/19/18 14:19			
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
ACENAPHTHENE	49648	U	7750	ug/Kg	77.0	40	123	19	20	
PYRENE	50428	U	7050	ug/Kg	69.0	47	127	20	20	
2,4,6-TRIBROMOPHENOL (surr)				%	70.1	35	125			
2-FLUOROBIPHENYL (surr)				%	72.7	45	105			
2-FLUOROPHENOL (surr)				%	43.9	35	105			
NITROBENZENE-D5 (surr)				%	55.6	35	100			
PHENOL-D6 (surr)				%	61.0	40	100			
TERPHENYL-D14 (surr)				%	83.9	30	125			

LCSS	Sample ID: WG458691LCSS		PCN/SCN: OPBNA180924-1				Analyzed: 10/19/18 12:05			
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
ACENAPHTHENE	49648		1439	ug/Kg	87.0	40	123			
PYRENE	50428		1494	ug/Kg	89.0	47	127			
2,4,6-TRIBROMOPHENOL (surr)				%	84.6	35	125			
2-FLUOROBIPHENYL (surr)				%	85.3	45	105			
2-FLUOROPHENOL (surr)				%	79.9	35	105			
NITROBENZENE-D5 (surr)				%	89.5	35	100			
PHENOL-D6 (surr)				%	80.1	40	100			
TERPHENYL-D14 (surr)				%	108.3	30	125			

LCSSD	Sample ID: WG458691LCSSD		PCN/SCN: OPBNA180924-1				Analyzed: 10/19/18 12:38			
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
ACENAPHTHENE	49648		1339	ug/Kg	81.0	40	123	7	20	
PYRENE	50428		1354	ug/Kg	81.0	47	127	10	20	
2,4,6-TRIBROMOPHENOL (surr)				%	79.4	35	125			
2-FLUOROBIPHENYL (surr)				%	76.7	45	105			
2-FLUOROPHENOL (surr)				%	72.9	35	105			
NITROBENZENE-D5 (surr)				%	82.4	35	100			
PHENOL-D6 (surr)				%	74.3	40	100			
TERPHENYL-D14 (surr)				%	97.2	30	125			

North Park Engineering & Consulting, Inc

ACZ Project ID: **L47448**

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

PBS		Sample ID: WG458691PBS					Analyzed: 10/19/18 11:31			
Compound	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
2-METHYLNAPHTHALENE			U	ug/Kg		-300	300			
ACENAPHTHENE			U	ug/Kg		-300	300			
ACENAPHTHYLENE			U	ug/Kg		-300	300			
ANTHRACENE			U	ug/Kg		-300	300			
BENZO(A)ANTHRACENE			U	ug/Kg		-300	300			
BENZO(A)PYRENE			U	ug/Kg		-300	300			
BENZO(B)FLUORANTHENE			U	ug/Kg		-300	300			
BENZO(G,H,I)PERYLENE			U	ug/Kg		-300	300			
BENZO(K)FLUORANTHENE			U	ug/Kg		-300	300			
CHRYSENE			U	ug/Kg		-300	300			
DIBENZO(A,H)ANTHRACENE			U	ug/Kg		-300	300			
FLUORANTHENE			U	ug/Kg		-300	300			
FLUORENE			U	ug/Kg		-300	300			
INDENO(1,2,3-CD)PYRENE			U	ug/Kg		-300	300			
NAPHTHALENE			U	ug/Kg		-300	300			
PHENANTHRENE			U	ug/Kg		-300	300			
PYRENE			U	ug/Kg		-300	300			
2,4,6-TRIBROMOPHENOL (surr)				%	72.6	35	125			
2-FLUOROBIPHENYL (surr)				%	76.3	45	105			
2-FLUOROPHENOL (surr)				%	71.0	35	105			
NITROBENZENE-D5 (surr)				%	79.1	35	100			
PHENOL-D6 (surr)				%	70.9	40	100			
TERPHENYL-D14 (surr)				%	98.1	30	125			

ACZ Project ID: **L47448**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L47448-01	WG458170	*All Compounds*	M8021B/8015D GC/PID/FID	Q6	Sample was received above recommended temperature.
		Benzene	M8021B/8015D GC/PID/FID	D1	Sample required dilution due to matrix.
			M8021B/8015D GC/PID/FID	ZM	Data is estimated because result is below 200 ug/Kg; ACZ does not have a closed-system purge and trap as described in method 5035.
		Bromofluorobenzene (TVH)	M8021B/8015D GC/PID/FID	SA	Surrogate recovery was outside acceptance limits due to matrix interference.
		Ethylbenzene	M8021B/8015D GC/PID/FID	ZM	Data is estimated because result is below 200 ug/Kg; ACZ does not have a closed-system purge and trap as described in method 5035.
				D1	Sample required dilution due to matrix.
		Toluene	M8021B/8015D GC/PID/FID	ZM	Data is estimated because result is below 200 ug/Kg; ACZ does not have a closed-system purge and trap as described in method 5035.
			M8021B/8015D GC/PID/FID	ZM	Data is estimated because result is below 200 ug/Kg; ACZ does not have a closed-system purge and trap as described in method 5035.
		TVH C6 to C10	M8021B/8015D GC/PID/FID	ZM	Data is estimated because result is below 200 ug/Kg; ACZ does not have a closed-system purge and trap as described in method 5035.
	WG458397	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	DD	Sample required dilution due to matrix color or odor.
	WG458974	*All Compounds*	M8270C GC/MS	Q6	Sample was received above recommended temperature.
		2-Methylnaphthalene	M8270C GC/MS	DD	Sample required dilution due to matrix color or odor.
		Acenaphthene	M8270C GC/MS	DD	Sample required dilution due to matrix color or odor.
		Acenaphthylene	M8270C GC/MS	DD	Sample required dilution due to matrix color or odor.
		Anthracene	M8270C GC/MS	DD	Sample required dilution due to matrix color or odor.
		Benzo(a)anthracene	M8270C GC/MS	DD	Sample required dilution due to matrix color or odor.
		Benzo(a)pyrene	M8270C GC/MS	DD	Sample required dilution due to matrix color or odor.
		Benzo(b)fluoranthene	M8270C GC/MS	DD	Sample required dilution due to matrix color or odor.
		Benzo(g,h,i)perylene	M8270C GC/MS	DD	Sample required dilution due to matrix color or odor.
		Benzo(k)fluoranthene	M8270C GC/MS	DD	Sample required dilution due to matrix color or odor.
		Chrysene	M8270C GC/MS	DD	Sample required dilution due to matrix color or odor.
		Dibenzo(a,h)anthracene	M8270C GC/MS	DD	Sample required dilution due to matrix color or odor.
		Fluoranthene	M8270C GC/MS	DD	Sample required dilution due to matrix color or odor.
		Fluorene	M8270C GC/MS	DD	Sample required dilution due to matrix color or odor.
		Indeno(1,2,3-cd)pyrene	M8270C GC/MS	DD	Sample required dilution due to matrix color or odor.
		Naphthalene	M8270C GC/MS	DD	Sample required dilution due to matrix color or odor.
		Phenanthrene	M8270C GC/MS	DD	Sample required dilution due to matrix color or odor.
		Pyrene	M8270C GC/MS	DD	Sample required dilution due to matrix color or odor.
L47448-02	WG458170	*All Compounds*	M8021B GC/PID	Q6	Sample was received above recommended temperature.
		Benzene	M8021B GC/PID	D1	Sample required dilution due to matrix.
			M8021B GC/PID	ZM	Data is estimated because result is below 200 ug/Kg; ACZ does not have a closed-system purge and trap as described in method 5035.
		Ethylbenzene	M8021B GC/PID	ZM	Data is estimated because result is below 200 ug/Kg; ACZ does not have a closed-system purge and trap as described in method 5035.
				ZM	Data is estimated because result is below 200 ug/Kg; ACZ does not have a closed-system purge and trap as described in method 5035.
		m p Xylene	M8021B GC/PID	ZM	Data is estimated because result is below 200 ug/Kg; ACZ does not have a closed-system purge and trap as described in method 5035.
		o Xylene	M8021B GC/PID	ZM	Data is estimated because result is below 200 ug/Kg; ACZ does not have a closed-system purge and trap as described in method 5035.
				D1	Sample required dilution due to matrix.
		Toluene	M8021B GC/PID	ZM	Data is estimated because result is below 200 ug/Kg; ACZ does not have a closed-system purge and trap as described in method 5035.
			M8021B GC/PID	ZM	Data is estimated because result is below 200 ug/Kg; ACZ does not have a closed-system purge and trap as described in method 5035.
	WG458397	*All Compounds*	M8015D GC/FID	Q6	Sample was received above recommended temperature.
		TPH C10 to C28	M8015D GC/FID	DD	Sample required dilution due to matrix color or odor.

REPAD.15.06.05.01

ACZ Project ID: **L47448**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
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North Park Engineering & Consulting, IncACZ Project ID: **L47448**

Soil Analysis

The following parameters are not offered for certification or are not covered by AZ certificate #AZ0102.

Conductivity @25C	SM2510B
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2
Solids, Percent	D2216-80

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Conductivity @25C	SM2510B
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2
Solids, Percent	D2216-80

North Park Engineering & Consulting, Inc
Marcus Production

ACZ Project ID: L47448

Date Received: 10/09/2018 15:33

Received By:

Date Printed: 10/10/2018

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2) Is the Chain of Custody form or other directive shipping papers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Does this project require special handling procedures such as CLP protocol?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4) Are any samples NRC licensable material?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5) If samples are received past hold time, proceed with requested short hold time analyses?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6) Is the Chain of Custody form complete and accurate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) Were any changes made to the Chain of Custody form prior to ACZ receiving the samples?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A change was made in the Sample Identification Line 2 and the Relinquished By: Time: section prior to ACZ custody.			

Samples/Containers

	YES	NO	NA
8) Are all containers intact and with no leaks?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9) Are all labels on containers and are they intact and legible?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10) Do the sample labels and Chain of Custody form match for Sample ID, Date, and Time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11) For preserved bottle types, was the pH checked and within limits? ¹	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
12) Is there sufficient sample volume to perform all requested work?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13) Is the custody seal intact on all containers?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
14) Are samples that require zero headspace acceptable?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
15) Are all sample containers appropriate for analytical requirements?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16) Is there an Hg-1631 trip blank present?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
17) Is there a VOA trip blank present?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18) Were all samples received within hold time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NA indicates Not Applicable			

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp (°C)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
NA29286	10.4	<=6.0	16	N/A

Was ice present in the shipment container(s)?

Yes - Wet ice was present in the shipment container(s).

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

North Park Engineering & Consulting, Inc
Marcus Production

ACZ Project ID: L47448

Date Received: 10/09/2018 15:33

Received By:

Date Printed: 10/10/2018

¹ The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na₂S₂O₃ preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

L47448

CHAIN of CUSTODY

Report to:

Name: Randy Miller

Company: North Park Engineering & Consulting, Inc.

E-mail: randy@npeng.com

Address: PO Box 395

Walden, CO 80480

Telephone: 970-218-4974

Copy of Report to:

Name:

Company:

E-mail:

Telephone: 307-266-1498

Invoice to:

Name: Randy Miller

Company: North Park Engineering & Consulting, Inc.

E-mail: randy@npeng.com

Address: PO Box 395

Walden, CO 80480

Telephone: 970-218-4974

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses?

YES

NO

X

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO"

is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring?

YES

NO

X

If yes, please include state forms. Results will be reported to PQL.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: BTX-TPH, SOIL-910-1+SAR

Project/PO #: Marcus Production

Reporting state for compliance testing: n/a

Sampler's Name: Randy Miller

Are any samples NRC licensable material? Yes No N

SAMPLE IDENTIFICATION DATE:TIME Matrix

State 1-36 Pit 2 Bottom

10-8-18 11:00

Matrix

SO

1

of Containers

SOIL-910-1+SAR

BTX-TPH

X

State 1-36 Pit 2 W

10-8-18 11:05

SO

1

X

Matrix

SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:

DATE:TIME

RECEIVED BY:

DATE:TIME

Randall Miller

10/9/18 14:00

JJC

10-9-18 15:18