CRUDE OIL ASSAY

PROJECT NO. :	201406177	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 26, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 25, 2014
PRODUCER :		CYLINDER NO. :	1L TEDLAR BAG
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	TANK BATTERY @ 13:50 BRINGELSON RANCH 5-20-9-58		EMPACT
FIELD DATA		SAMPLE TEMP. :	97
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; TK #52003		

SPECIFICATION		TEST METHOD	UNITS	RESULTS
API GRAVITY			API 60/60	37.3
RVP @100 DEG F		D323	PSIG	7.0
TOTAL SULFUR		D2622	WT %	N/A
TOTAL CHLORIDE		D4929	ug/g	N/A
ORGANIC CHLORIDE		D4929	ug/g	N/A
FLASH POINT		D93	° F	N/A
HEATING VALUE		D4809	BTU/ LB	N/A
VISUAL APPEARANCE				DARK RED/BROWN
BS&W		D96		
Crude Oil			VOL %	N/A
Water			VOL %	N/A
Emulsion			VOL %	N/A
Sediment			VOL %	N/A
DISTILLATION:		D86		
INITIAL POINT			DEG F	N/A
50%			DEG F	N/A
90%			DEG F	N/A
END POINT			DEG F	N/A
DISTILLATION:	@TEMP	D445		
Average Centipoise	20°C			N/A
Average Centipoise	30°C			N/A
Average Centipoise	80°C			N/A
Kinetic Viscosity	20°C		cSt (mm2/s)	N/A
Kinetic Viscosity	30°C		cSt (mm2/s)	N/A
Kinetic Viscosity	80°C		cSt (mm2/s)	N/A

ND: NOT DETECTED
N/A: NO TEST PREFORMED FOR THIS PARAMETER

EMPACT ANALYTICAL SYSTEMS INC.
365 S. MAIN ST.
BRIGHTON, CO
80601

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201406177	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 27, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 25, 2014
PRODUCER :		CYLINDER NO. :	17869
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	HEATER-TREATER @ 13:25 BRINGELSON RANCH 5-20-9-58		EMPACT
FIELD DATA		SAMPLE TEMP. :	120
SAMPLE PRES. :	32	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
ALCOHOLS	0.0100	0.0066	0.0062
NITROGEN (AIR)	0.0130	0.0032	0.0029
CARBON DIOXIDE	0.0340	0.0132	0.0120
METHANE	0.1570	0.0223	0.0553
ETHANE	0.5300	0.1409	0.2942
PROPANE	1.8280	0.7128	1.0457
I-BUTANE	0.4410	0.2266	0.2994
N-BUTANE	2.2260	1.1439	1.4568
I-PENTANE	0.9721	0.6201	0.7387
N-PENTANE	1.5890	1.0137	1.1946
HEXANES PLUS	92.1999	96.0967	94.8942
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	**MOLE%**	**MASS%**
BENZENE	0.9160	0.6326
TOLUENE	2.0183	1.6443
ETHYLBENZENE	0.7471	0.7013
XYLENE	2.0519	1.9261
TOTAL BTEX	5.7333	4.9043

(CALC: GPA STD 2145-94 & TP-17 @14.696 & 60 F)

	TOTAL SAMPLE	**C6+ FRACTION**	
Specific Gravity (H2O=1) =	0.7444	0.7531	60/60
API Gravity =	58.59	56.39	60/60
Molecular Weight =	113.10	118.559	
Absolute Density =	6.21	6.28	LBS/GAL
Heating Value Liq. Idl Gas=	125615	127735	BTU/GAL
Vapor/Liquid =	20.83	20.25	CUFT/GAL
Vapor Pressure =	18.96	1.61	PSIA @100 F

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993) ; ASTM D6730*

EMPACT ANALYTICAL SYSTEMS INC.
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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

E & P TANK / GLYCALC INFORMATION

PROJECT NO. :	201406177	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 27, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 25, 2014
PRODUCER :		CYLINDER NO. :	17869
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	HEATER-TREATER @ 13:25 BRINGELSON RANCH 5-20-9-58		EMPACT
FIELD DATA		SAMPLE TEMP. :	120
SAMPLE PRES. :	32	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0340		0.0132		0.0120	
NITROGEN (AIR)	0.0130		0.0032		0.0029	
METHANE	0.1570		0.0223		0.0553	
ETHANE	0.5300		0.1409		0.2942	
PROPANE	1.8280		0.7128		1.0457	
I-BUTANE	0.4410		0.2266		0.2994	
N-BUTANE	2.2260		1.1439		1.4568	
I-PENTANE	0.9721		0.6201		0.7387	
N-PENTANE	1.5890		1.0137		1.1946	
CYCLOPENTANE (N-C5)	1.2873		0.7982		0.7809	
N-HEXANE	6.0594		4.6164		5.1729	
CYCLOHEXANE (OTHER C6)	2.4912		1.8537		1.7598	
OTHER HEXANES	9.7207		7.3315		7.8057	
OTHER HEPTANES	13.3625		11.7510		12.2721	
METHYLCYCLOHEXANE (OTHER C7)	4.5471		3.9476		3.7899	
2,2,4 TRIMETHYLPENTANE	0.9773		0.8485		0.8376	
BENZENE	0.9160		0.6326		0.5329	
TOLUENE	2.0183		1.6443		1.3989	
ETHYLBENZENE	0.7471		0.7013		0.5965	
XYLENES	2.0519		1.9261		1.6405	
OTHER OCTANES	11.3127		11.4699		11.6039	
OCTANES PLUS	----	51.7974	----	63.5214	----	61.3811
NONANES	11.2249		12.5603		12.2562	
DECANES PLUS	25.4835		36.0153		34.4464	
SUB TOTAL	99.9900		99.9934		99.9938	
ALCOHOLS	0.0100		0.0066		0.0062	
TOTAL	100.0000		100.0000		100.0000	

API Gravity	=	**58.59**	60/60
Vapor Pressure	=	**18.96**	PSIA & 100 F
Average Molecular Weight of Decanes plus	=	**159.84**	
Average Specific Gravity of Decanes plus	=	**0.7780**	

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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

BY CARBON NUMBER

PROJECT NO. :	201406177	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 27, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 25, 2014
PRODUCER :		CYLINDER NO. :	17869
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	HEATER-TREATER @ 13:25		EMPACT
	BRINGELSON RANCH 5-20-9-58		
FIELD DATA		SAMPLE TEMP. :	120
SAMPLE PRES. :	32	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
ALCOHOLS		0.0100	0.0066	0.0062
NITROGEN		0.0130	0.0032	0.0029
CARBON DIOXIDE		0.0340	0.0132	0.0120
	C1	0.1570	0.0223	0.0553
	C2	0.5300	0.1409	0.2942
	C3	1.8280	0.7128	1.0457
	C4	2.6670	1.3705	1.7562
	C5	3.8484	2.4320	2.7142
	C6	19.1873	14.4342	15.2713
	C7	19.9279	17.3429	17.4609
	C8	15.0890	14.9458	14.6785
	C9	11.2249	12.5603	12.2562
	C10	9.8862	11.9565	11.4114
	C11	5.0479	6.6357	6.2146
	C12	3.2673	4.6497	4.4714
	C13	2.5142	3.9868	3.8531
	C14	2.1389	3.7518	3.6557
	C15	1.9407	3.6450	3.5108
	C16	0.5941	1.1895	1.1383
	C17	0.0942	0.2003	0.1911
	C18	0.0000	0.0000	0.0000
	C19	0.0000	0.0000	0.0000
	C20	0.0000	0.0000	0.0000
	C21	0.0000	0.0000	0.0000
	C22	0.0000	0.0000	0.0000
	C23	0.0000	0.0000	0.0000
	C24	0.0000	0.0000	0.0000
	C25	0.0000	0.0000	0.0000
	C26	0.0000	0.0000	0.0000
	C27	0.0000	0.0000	0.0000
	C28	0.0000	0.0000	0.0000
	C29	0.0000	0.0000	0.0000
	C30+	0.0000	0.0000	0.0000
	Total	100.0000	100.0000	100.0000

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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201406177	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 27, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 25, 2014
PRODUCER :		CYLINDER NO. :	17869
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	HEATER-TREATER @ 13:25		EMPACT
	BRINGELSON RANCH 5-20-9-58		
FIELD DATA		SAMPLE TEMP. :	120
SAMPLE PRES. :	32	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0130	0.0032	0.0029
Carbon Dioxide	NHC	0.0340	0.0132	0.0120
Methane	P1	0.1570	0.0223	0.0553
Ethane	P2	0.5300	0.1409	0.2942
Propane	P3	1.8280	0.7128	1.0457
i-Butane	I4	0.4410	0.2266	0.2994
n-Butane	P4	2.2260	1.1439	1.4568
2,2-Dimethylpropane	I5	0.0101	0.0064	0.0080
i-Pentane	I5	0.9620	0.6137	0.7307
n-Pentane	P5	1.5890	1.0137	1.1946
t-Butanol	X4	0.0100	0.0066	0.0062
2,2-Dimethylbutane	I6	0.0360	0.0274	0.0312
Cyclopentane	N5	1.2873	0.7982	0.7809
2,3-Dimethylbutane	I6	0.3166	0.2412	0.2690
2-Methylpentane	I6	3.2076	2.4441	2.7636
3-Methylpentane	I6	1.9431	1.4806	1.6462
n-Hexane	P6	6.0594	4.6164	5.1729
2,2-Dimethylpentane	I7	0.0268	0.0237	0.0258
Methylcyclopentane	N6	4.2174	3.1382	3.0957
2,4-Dimethylpentane	I7	0.2187	0.1938	0.2131
2,2,3-Trimethylbutane	I7	0.0111	0.0098	0.0105
Benzene	A6	0.9160	0.6326	0.5329
3,3-Dimethylpentane	I7	0.0228	0.0202	0.0216
Cyclohexane	N6	2.4912	1.8537	1.7598
2-Methylhexane	I7	1.2486	1.1062	1.2057
2,3-Dimethylpentane	I7	0.5594	0.4956	0.5248
1,1-Dimethylcyclopentane	N7	0.4848	0.4209	0.4123
3-Methylhexane	I7	1.6500	1.4618	1.5694
1c,3-Dimethylcyclopentane	N7	1.0402	0.9031	0.8962
1t,3-Dimethylcyclopentane	N7	0.9773	0.8485	0.8376
3-Ethylpentane	I7	0.1372	0.1215	0.1283
1t,2-Dimethylcyclopentane	N7	1.7882	1.5524	1.5270
2,2,4-Trimethylpentane	I8	0.0300	0.0303	0.0322
n-Heptane	P7	4.4539	3.9459	4.2643
1c,2-Dimethylcyclopentane	N7	0.1748	0.1518	0.1453

Methylcyclohexane	N7	4.5471	3.9476	3.7899
2,2-Dimethylhexane	I8	0.5946	0.6005	0.6379
Ethylcyclopentane	N7	0.4526	0.3929	0.3790
2,5-Dimethylhexane	I8	0.1077	0.1088	0.1159
2,2,3-Trimethylpentane	I8	0.0424	0.0428	0.0442
2,4-Dimethylhexane	I8	0.2286	0.2309	0.2448
1c,2t,4-Trimethylcyclopentane	N8	0.5005	0.4966	0.4809
3,3-Dimethylhexane	I8	0.0524	0.0529	0.0551
2,3,4-Trimethylpentane	I8	0.0909	0.0918	0.0943
2,3,3-Trimethylpentane	I8	0.0058	0.0059	0.0060
Toluene	A7	2.0183	1.6443	1.3989
2,3-Dimethylhexane	I8	0.2821	0.2849	0.2959
2-Methyl-3-ethylpentane	I8	0.0972	0.0982	0.1009
1,1,2-Trimethylcyclopentane	N8	0.0054	0.0054	0.0052
2-Methylheptane	I8	1.4442	1.4586	1.5419
4-Methylheptane	I8	0.3721	0.3758	0.3877
3-Methyl-3-ethylpentane	I8	0.0914	0.0923	0.0938
3,4-Dimethylhexane	I8	0.0645	0.0651	0.0669
1c,2c,4-Trimethylcyclopentane	N8	0.0437	0.0434	0.0416
1c,3-Dimethylcyclohexane	N8	0.0269	0.0267	0.0258
3-Methylheptane	I8	0.6458	0.6523	0.6836
1c,2t,3-Trimethylcyclopentane	N8	1.3731	1.3623	1.3075
3-Ethylhexane	I8	0.1433	0.1447	0.1500
1t,4-Dimethylcyclohexane	N8	0.5492	0.5449	0.5284
1,1-Dimethylcyclohexane	N8	0.1478	0.1466	0.1388
3c-Ethylmethylcyclopentane	N8	0.0063	0.0063	0.0061
3t-Ethylmethylcyclopentane	N8	0.1690	0.1677	0.1617
2t-Ethylmethylcyclopentane	N8	0.1464	0.1453	0.1397
1,1-Methylethylcyclopentane	N8	0.4338	0.4304	0.4076
2,2,4-Trimethylhexane	I9	0.0499	0.0566	0.0585
1t,2-Dimethylcyclohexane	N8	0.7384	0.7326	0.6984
1t,3-Dimethylcyclohexane	N8	0.0024	0.0024	0.0023
UnknownC7s	U7	0.1161	0.1029	0.1112
n-Octane	P8	2.6522	2.6787	2.8182
i-Propylcyclopentane	I8	0.0813	0.0807	0.0769
2,4,4-Trimethylhexane	I9	0.0286	0.0324	0.0332
2,2,3,4-Tetramethylpentane	I9	0.0234	0.0265	0.0272
2,3,4-Trimethylhexane	I9	0.0355	0.0403	0.0413
1c,2-Dimethylcyclohexane	N8	0.2141	0.2124	0.1973
2,3,5-Trimethylhexane	I9	0.1275	0.1446	0.1481
2,2-Dimethylheptane	I9	0.0190	0.0215	0.0224
1,1,4-Trimethylcyclohexane	N9	1.0531	1.1755	1.1263
2,2,3-Trimethylhexane	I9	0.4232	0.4799	0.4866
2,4-Dimethylheptane	I9	0.0352	0.0399	0.0412
4,4-Dimethylheptane	I9	0.0414	0.0469	0.0485
Ethylcyclohexane	N8	0.6100	0.6052	0.5683
n-Propylcyclopentane	N8	0.2483	0.2463	0.2345
1c,3c,5-Trimethylcyclohexane	N9	0.0423	0.0472	0.0452
2,5-Dimethylheptane	I9	0.0680	0.0771	0.0795
3,3-Dimethylheptane	I9	0.0856	0.0971	0.1002
3,5-Dimethylheptane	I9	0.0585	0.0663	0.0684
2,6-Dimethylheptane	I9	0.0486	0.0551	0.0575
1,1,3-Trimethylcyclohexane	N9	0.1207	0.1347	0.1291
Ethylbenzene	A8	0.7471	0.7013	0.5965
1c,2t,4t-Trimethylcyclohexane	N9	0.1435	0.1602	0.1506
2,3-Dimethylheptane	I9	0.2787	0.3161	0.3220
1,3-Dimethylbenzene (m-Xylene)	A8	1.1967	1.1234	0.9611
1,4-Dimethylbenzene (p-Xylene)	A8	0.2832	0.2658	0.2281
3,4-Dimethylheptane	I9	0.0416	0.0472	0.0477
3,4-Dimethylheptane (2)	I9	0.1443	0.1636	0.1654
4-Ethylheptane	I9	0.0287	0.0325	0.0336
4-Methyloctane	I9	0.3094	0.3509	0.3601
2-Methyloctane	I9	0.4040	0.4581	0.4747
1c,2t,4c-Trimethylcyclohexane	I9	0.0549	0.0623	0.0635
3-Ethylheptane	I9	0.0652	0.0739	0.0752
3-Methyloctane	I9	0.4844	0.5493	0.5636
3,3-Diethylpentane	I9	0.0626	0.0710	0.0696

1c,2t,3-Trimethylcyclohexane	N9	0.0571	0.0637	0.0599
1,1,2-Trimethylcyclohexane	N9	0.0405	0.0452	0.0425
1,2-Dimethylbenzene (o-Xylene)	A8	0.5720	0.5369	0.4513
i-Butylcyclopentane	N9	0.3306	0.3690	0.3495
UnknownC8s	U8	0.0482	0.0487	0.0512
n-Nonane	P9	1.9163	2.1732	2.2393
1,1-Methylethylcyclohexane	N9	0.3336	0.3783	0.3910
i-Propylbenzene	A9	0.3520	0.3741	0.3204
i-Propylcyclohexane	N9	0.1114	0.1243	0.1146
2,2-Dimethyloctane	I10	0.0658	0.0828	0.0828
2,4-Dimethyloctane	I10	0.1030	0.1296	0.1296
2,6-Dimethyloctane	I10	0.0120	0.0151	0.0156
2,5-Dimethyloctane	I10	0.0532	0.0669	0.0669
n-Butylcyclopentane	N9	0.3200	0.3969	0.3674
3,3-Dimethyloctane	I10	0.0904	0.1137	0.1138
n-Propylbenzene	A9	0.4461	0.4741	0.4061
3,6-Dimethyloctane	I10	0.1931	0.2429	0.2429
3-Methyl-5-ethylheptane	I10	0.4350	0.4933	0.5027
1,3-Methylethylbenzene	A9	0.3424	0.3639	0.3091
1,4-Methylethylbenzene	A9	0.2782	0.2956	0.2511
1,3,5-Trimethylbenzene	A9	0.1334	0.1418	0.1213
2,3-Dimethyloctane	I10	0.0634	0.0798	0.0798
5-Methylnonane	I10	0.2419	0.3043	0.3072
1,2-Methylethylbenzene	A9	0.5193	0.5519	0.4663
2-Methylnonane	I10	0.0389	0.0489	0.0498
3-Ethyloctane	I10	0.1114	0.1401	0.1401
3-Methylnonane	I10	0.2625	0.3302	0.3330
1,2,4-Trimethylbenzene	A9	0.0499	0.0530	0.0448
t-Butylbenzene	A10	0.5928	0.7035	0.6010
i-Butylcyclohexane	N10	0.2197	0.2725	0.2483
1t-Methyl-2-n-propylcyclohexane	I10	0.0883	0.1001	0.1020
i-Butylbenzene	A10	0.0914	0.1085	0.0941
sec-Butylbenzene	A10	0.0450	0.0534	0.0459
UnknownC9s	U9	1.4675	1.6642	1.7148
n-Decane	P10	1.4848	1.8679	1.8923
1,2,3-Trimethylbenzene	A9	0.2488	0.2644	0.2189
1,3-Methyl-i-propylbenzene	A10	0.0753	0.0800	0.0676
1,4-Methyl-i-propylbenzene	A10	0.1352	0.1437	0.1214
Sec-Butylcyclohexane	N10	0.3694	0.4581	0.4169
1,2-Methyl-i-propylbenzene	A10	0.2114	0.2509	0.2118
3-Ethylnonane	I10	0.0475	0.0598	0.0609
1,3-Diethylbenzene	A10	0.1577	0.1871	0.1603
1,3-Methyl-n-propylbenzene	A10	0.0572	0.0679	0.0584
1,4-Diethylbenzene	A10	0.1741	0.2066	0.1774
1,4-Methyl-n-propylbenzene	A10	0.1249	0.1482	0.1277
n-Butylbenzene	A10	0.0604	0.0717	0.0616
1,3-Dimethyl-5-ethylbenzene	A10	0.0711	0.0844	0.0722
1,2-Diethylbenzene	A10	0.1575	0.1869	0.1573
1,2-Methyl-n-propylbenzene	A10	0.1280	0.1519	0.1287
1,4-Dimethyl-2-ethylbenzene	A10	0.1632	0.1937	0.1634
1,3-Dimethyl-4-ethylbenzene	A10	0.0094	0.0112	0.0095
1,2-Dimethyl-4-ethylbenzene	A10	0.1956	0.2321	0.1964
1,3-Dimethyl-2-ethylbenzene	A10	0.1169	0.1387	0.1153
1t,2c,4-Trimethylcyclopentane	A10	0.5611	0.5567	0.5507
1,2-Dimethyl-3-ethylbenzene	A10	0.1009	0.1197	0.0993
1,2-Ethyl-i-propylbenzene	A10	0.1103	0.1309	0.1105
1,4-Methyl-t-butylbenzene	A11	0.2018	0.2395	0.2022
UnknownC10s	U10	2.3121	2.9086	2.9466
n-Undecane	P11	1.1574	1.5996	1.5980
1,4-Ethyl-i-propylbenzene	A11	0.0690	0.0819	0.0691
1,2,4,5-Tetramethylbenzene	A11	0.1000	0.1187	0.0992
1,2-Methyl-n-butylbenzene	A11	0.0777	0.0922	0.0778
1,2,3,5-Tetramethylbenzene	A11	0.0664	0.0788	0.0655
1,2-Methyl-t-butylbenzene	A11	0.0991	0.1176	0.0993
5-Methylindan	A11	0.0199	0.0300	0.0296
4-Methylindan	A11	0.0201	0.0303	0.0299
1,2-Ethyl-n-propylbenzene	A11	0.1649	0.1957	0.1652

2-Methylindan	A11	0.0626	0.0943	0.0932
1,3-Methyl-n-butylbenzene	A11	0.0736	0.0873	0.0737
1,3-Di-i-propylbenzene	A11	0.0619	0.0735	0.0620
sec-Pentylbenzene	A11	0.1209	0.1435	0.1211
n-Pentylbenzene	A11	0.1201	0.1574	0.1357
1t-M-2-(4MP)cyclopentane	P12	0.0202	0.0304	0.0300
1,2-Di-n-propylbenzene	A11	0.1115	0.1323	0.1117
1,4-Di-i-propylbenzene	A11	0.2073	0.2460	0.2077
Tetrahydronaphthalene	A10	0.1170	0.1388	0.1172
t-Decahydronaphthalene	A10	0.1196	0.1419	0.1198
Naphthalene	A10	0.1178	0.1335	0.1127
1-t-Butyl-3,5-dimethylbenzene	A12	0.0658	0.0781	0.0659
1,4-Ethyl-t-butylbenzene	A11	0.1135	0.1347	0.1137
UnknownC11s	U11	1.7323	2.3941	2.3918
n-Dodecane	P12	1.0153	1.5291	1.5108
1,3-Di-n-propylbenzene	A12	0.0948	0.1125	0.0950
1,3,5-Triethylbenzene	A12	0.0524	0.0557	0.0476
1,2,4-Triethylbenzene	A12	0.3762	0.3998	0.3377
1,4-Methyl-n-pentylbenzene	A12	0.0703	0.0834	0.0704
n-Hexylbenzene	A12	0.1027	0.1473	0.1271
1,2,3,4,5-Pentamethylbenzene	A13	0.2515	0.2985	0.2520
2-Methylnaphthalene	A11	0.2775	0.3489	0.2945
1-Methylnaphthalene	A11	0.1904	0.2394	0.1737
UnknownC12s	U12	1.4696	2.2134	2.1869
n-Tridecane	P13	0.9128	1.4879	1.4527
UnknownC13s	U13	1.3499	2.2004	2.1484
n-Tetradecane	P14	0.7385	1.2954	1.2622
UnknownC14s	U14	1.4004	2.4564	2.3935
n-Pentadecane	P15	0.5173	0.9716	0.9358
UnknownC15s	U15	1.4234	2.6734	2.5750
n-Hexadecane	P16	0.0341	0.0683	0.0654
UnknownC16s	U16	0.5600	1.1212	1.0729
UnknownC17s	U17	0.0942	0.2003	0.1911
n-Triacontane Plus	P30	0.0000	0.0000	0.0000
TOTAL		100.0000	100.0000	100.0000

EMPACT ANALYTICAL SYSTEMS INC.
365 S. MAIN ST.
BRIGHTON, CO
80601

303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201406177	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 28, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 25, 2014
PRODUCER :		CYLINDER NO. :	0219
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 13:35 BRINGELSON RANCH 5-20-9-58		
FIELD DATA		SAMPLE TEMP. :	108
SAMPLE PRES. :	91	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 2 PPM (1-7 PPM) @ 13:40		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0002	0.0006		
HELIUM	0.01	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.01	0.01	---	---
NITROGEN	0.98	1.09	---	---
CARBON DIOXIDE	2.40	4.19	---	---
METHANE	66.05030	42.03920	---	---
ETHANE	12.7410	15.1998	3.4048	3.4234
PROPANE	10.5630	18.4798	2.9080	2.9238
I-BUTANE	1.0470	2.4144	0.3426	0.3445
N-BUTANE	3.5927	8.2847	1.1319	1.1381
I-PENTANE	0.7435	2.1227	0.2664	0.2680
N-PENTANE	0.8526	2.4406	0.3085	0.3102
HEXANES PLUS	1.0097	3.7282	0.4094	0.4115
TOTALS	100.00000	100.00000	8.7716	8.8195

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0260	0.0806
TOLUENE	0.0184	0.0673
ETHYLBENZENE	0.0023	0.0097
XYLENES	0.0068	0.0286
TOTAL BTEX	0.0535	0.1862

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1298.7 **/scf**	1305.8 **/scf**
	NET WET REAL :	1276.0 **/scf**	1283.1 **/scf**
HIGH	GROSS DRY REAL :	1425.5 **/scf**	1433.3 **/scf**
	GROSS WET REAL :	1400.6 **/scf**	1408.4 **/scf**
	NET DRY REAL :	19576.9 **/lb**	19683.8 **/lb**
	GROSS DRY REAL :	21492.1 **/lb**	21609.5 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8690
	COMPRESSIBILITY FACTOR :		0.99517

(CALC: GPA STD 2145 & TP-17 @14.696 & 60 F)

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993) ; ASTM D6730*

EMPACT ANALYTICAL SYSTEMS INC.
365 S. MAIN ST.
BRIGHTON, CO
80601

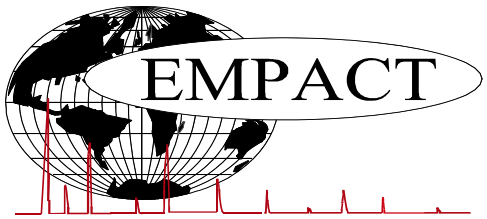
303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201406177	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 28, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 25, 2014
PRODUCER :		CYLINDER NO. :	0219
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 13:35 BRINGELSON RANCH 5-20-9-58		
FIELD DATA		SAMPLE TEMP. :	108
SAMPLE PRES. :	91	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 2 PPM (1-7 PPM) @ 13:40		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	2.40	4.19
Nitrogen	0.98	1.09
Methane	66.05030	42.03920
Ethane	12.7410	15.1998
Propane	10.5630	18.4798
Isobutane	1.0470	2.4144
n-Butane	3.5927	8.2847
Isopentane	0.6724	1.9248
n-Pentane	0.8526	2.4406
Cyclopentane	0.0711	0.1979
n-Hexane	0.1928	0.6592
Cyclohexane	0.0516	0.1723
Other Hexanes	0.3503	1.1883
Heptanes	0.1908	0.7527
Methycyclohexane	0.0491	0.1913
2,2,4 Trimethylpentane	0.0002	0.0009
Benzene	0.0260	0.0806
Toluene	0.0184	0.0673
Ethylbenzene	0.0023	0.0097
Xylenes	0.0068	0.0286
C8+ Heavies	0.1214	0.5773
Subtotal	99.98980	99.98940
Oxygen/Argon	0.01	0.01
Alcohols	0.0002	0.0006
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201406177	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 28, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 25, 2014
PRODUCER :		CYLINDER NO. :	0219
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 13:35 BRINGELSON RANCH 5-20-9-58		
FIELD DATA		SAMPLE TEMP. :	108
SAMPLE PRES. :	91	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 2 PPM (1-7 PPM) @ 13:40		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.01	0.00	---	---
Hydrogen	---	0.00	0.00	---	---
Oxygen/Argon	---	0.01	0.01	---	---
Nitrogen	---	0.98	1.09	---	---
Carbon Dioxide	---	2.40	4.19	---	---
Methane	P1	66.05030	42.03920	---	---
Ethane	P2	12.7410	15.1998	3.405	3.423
Propane	P3	10.5630	18.4798	2.908	2.924
i-Butane	I4	1.0470	2.4144	0.343	0.345
n-Butane	P4	3.5926	8.2845	1.132	1.138
2,2-Dimethylpropane	I5	0.0031	0.0089	0.001	0.001
i-Pentane	I5	0.6693	1.9159	0.244	0.246
UnknownC4s	U4	0.0001	0.0002	0.000	0.000
n-Pentane	P5	0.8526	2.4406	0.309	0.310
t-Butanol	X4	0.0002	0.0006	0.000	0.000
2,2-Dimethylbutane	I6	0.0024	0.0082	0.001	0.001
Cyclopentane	N5	0.0711	0.1979	0.021	0.021
2,3-Dimethylbutane	I6	0.0139	0.0475	0.006	0.006
2-Methylpentane	I6	0.1420	0.4855	0.059	0.059
3-Methylpentane	I6	0.0749	0.2561	0.030	0.030
n-Hexane	P6	0.1928	0.6592	0.079	0.080
2,2-Dimethylpentane	I7	0.0004	0.0016	0.000	0.000
Methylcyclopentane	N6	0.1171	0.3910	0.041	0.041
2,4-Dimethylpentane	I7	0.0051	0.0203	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0260	0.0806	0.007	0.007
3,3-Dimethylpentane	I7	0.0003	0.0012	0.000	0.000
Cyclohexane	N6	0.0516	0.1723	0.018	0.018
2-Methylhexane	I7	0.0216	0.0859	0.010	0.010
2,3-Dimethylpentane	I7	0.0091	0.0362	0.004	0.004
1,1-Dimethylcyclopentane	N7	0.0094	0.0366	0.004	0.004
3-Methylhexane	I7	0.0255	0.1014	0.012	0.012
1c,3-Dimethylcyclopentane	N7	0.0168	0.0655	0.008	0.008
1t,3-Dimethylcyclopentane	N7	0.0149	0.0580	0.007	0.007
3-Ethylpentane	I7	0.0011	0.0044	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0272	0.1060	0.013	0.013
2,2,4-Trimethylpentane	I8	0.0002	0.0009	0.000	0.000
n-Heptane	P7	0.0529	0.2103	0.024	0.024
1c,2-Dimethylcyclopentane	N7	0.0019	0.0074	0.001	0.001
Methylcyclohexane	N7	0.0491	0.1913	0.020	0.020
2,2-Dimethylhexane	I8	0.0058	0.0263	0.003	0.003
Ethylcyclopentane	N7	0.0045	0.0175	0.002	0.002
2,5-Dimethylhexane	I8	0.0008	0.0036	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0004	0.0018	0.000	0.000
2,4-Dimethylhexane	I8	0.0021	0.0095	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0045	0.0200	0.002	0.002
3,3-Dimethylhexane	I8	0.0004	0.0018	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0047	0.0209	0.002	0.002

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2,3,4-Trimethylpentane	I8	0.0007	0.0032	0.000	0.000
Toluene	A7	0.0184	0.0673	0.006	0.006
2,3-Dimethylhexane	I8	0.0021	0.0095	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0007	0.0032	0.000	0.000
1,1,2-Trimethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
2-Methylheptane	I8	0.0097	0.0440	0.005	0.005
4-Methylheptane	I8	0.0024	0.0109	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0003	0.0014	0.000	0.000
3,4-Dimethylhexane	I8	0.0005	0.0023	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0002	0.0009	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0002	0.0009	0.000	0.000
3-Methylheptane	I8	0.0040	0.0181	0.002	0.002
1c,2t,3-Trimethylcyclopentane	N8	0.0082	0.0365	0.004	0.004
3-Ethylhexane	I8	0.0010	0.0045	0.001	0.001
1t,4-Dimethylcyclohexane	N8	0.0030	0.0134	0.002	0.002
1,1-Dimethylcyclohexane	N8	0.0009	0.0040	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0010	0.0044	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0008	0.0036	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0024	0.0107	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0003	0.0015	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0038	0.0169	0.002	0.002
n-Octane	P8	0.0127	0.0576	0.006	0.006
1c,4-Dimethylcyclohexane	N8	0.0030	0.0134	0.002	0.002
i-Propylcyclopentane	I8	0.0001	0.0004	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0002	0.0010	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0001	0.0005	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0009	0.0040	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0039	0.0195	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0014	0.0071	0.001	0.001
2,4-Dimethylheptane	I9	0.0003	0.0015	0.000	0.000
4,4-Dimethylheptane	I9	0.0002	0.0010	0.000	0.000
Ethylcyclohexane	N8	0.0020	0.0089	0.001	0.001
n-Propylcyclopentane	N8	0.0008	0.0036	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0002	0.0010	0.000	0.000
2,5-Dimethylheptane	I9	0.0003	0.0015	0.000	0.000
3,3-Dimethylheptane	I9	0.0003	0.0015	0.000	0.000
3,5-Dimethylheptane	I9	0.0002	0.0010	0.000	0.000
2,6-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
Ethylbenzene	I8	0.0023	0.0097	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0008	0.0040	0.000	0.000
2,3-Dimethylheptane	I9	0.0003	0.0015	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0028	0.0118	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0023	0.0097	0.001	0.001
3,4-Dimethylheptane	I9	0.0003	0.0015	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0005	0.0025	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
4-Methyloctane	I9	0.0008	0.0041	0.000	0.000
2-Methyloctane	I9	0.0011	0.0056	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
3-Ethylheptane	I9	0.0002	0.0010	0.000	0.000
3-Methyloctane	I9	0.0012	0.0061	0.001	0.001
1c,2t,4c-Trimethylcyclohexane	I9	0.0001	0.0005	0.000	0.000
1,1,2-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
3,3-Diethylpentane	I9	0.0001	0.0005	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0017	0.0071	0.001	0.001
i-Butylcyclopentane	N9	0.0010	0.0050	0.001	0.001
UnknownC8s	U8	0.0002	0.0009	0.000	0.000
n-Nonane	P9	0.0040	0.0204	0.002	0.002
1,1-Methylethylcyclohexane	N9	0.0006	0.0030	0.000	0.000
i-Propylbenzene	A9	0.0009	0.0043	0.000	0.000
i-Propylcyclohexane	N9	0.0002	0.0010	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
2,4-Dimethyloctane	I10	0.0002	0.0011	0.000	0.000
2,5-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Butylcyclopentane	N9	0.0008	0.0040	0.000	0.000
3,3-Dimethyloctane	I10	0.0002	0.0011	0.000	0.000
n-Propylbenzene	A9	0.0007	0.0033	0.000	0.000
3,6-Dimethyloctane	I10	0.0004	0.0023	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0006	0.0034	0.000	0.000

1,3-Methylethylbenzene	A9	0.0006	0.0029	0.000	0.000
1,4-Methylethylbenzene	A9	0.0002	0.0010	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0004	0.0019	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
5-Methylnonane	I10	0.0004	0.0023	0.000	0.000
1,2-Methylethylbenzene	A9	0.0007	0.0033	0.000	0.000
3-Ethyloctane	I10	0.0001	0.0006	0.000	0.000
3-Methylnonane	I10	0.0002	0.0011	0.000	0.000
1,2,4-Trimethylbenzene	A9	0.0001	0.0005	0.000	0.000
t-Butylbenzene	A10	0.0007	0.0037	0.000	0.000
i-Butylcyclohexane	N10	0.0002	0.0011	0.000	0.000
i-Butylbenzene	A10	0.0001	0.0005	0.000	0.000
sec-Butylbenzene	A10	0.0001	0.0005	0.000	0.000
UnknownC9s	U9	0.0040	0.0204	0.002	0.002
n-Decane	P10	0.0014	0.0079	0.001	0.001
1,2,3-Trimethylbenzene	A9	0.0003	0.0014	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Methyl-i-propylbenzene	A10	0.0001	0.0005	0.000	0.000
Sec-Butylcyclohexane	A10	0.0003	0.0017	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0002	0.0011	0.000	0.000
1,3-Diethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Diethylbenzene	A10	0.0002	0.0011	0.000	0.000
1,3-Dimethyl-5-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,2-Diethylbenzene	A10	0.0001	0.0005	0.000	0.000
t-Decahydronaphthalene	A9	0.0001	0.0006	0.000	0.000
1,2-Methyl-n-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Dimethyl-2-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0002	0.0011	0.000	0.000
1,3-Dimethyl-2-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,2-Dimethyl-3-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Methyl-t-butylbenzene	A11	0.0001	0.0006	0.000	0.000
UnknownC10s	U10	0.0026	0.0147	0.002	0.002
n-Undecane	P11	0.0005	0.0031	0.000	0.000
1,2,4,5-Tetramethylbenzene	A11	0.0001	0.0005	0.000	0.000
1,2,3,5-Tetramethylbenzene	A11	0.0001	0.0005	0.000	0.000
1,2-Ethyl-n-propylbenzene	A11	0.0001	0.0006	0.000	0.000
2-Methylindan	A11	0.0001	0.0005	0.000	0.000
1,2-Di-n-propylbenzene	A11	0.0001	0.0006	0.000	0.000
Naphthalene	A10	0.0001	0.0005	0.000	0.000
UnknownC11s	U11	0.0009	0.0056	0.001	0.001
n-Dodecane	P12	0.0002	0.0014	0.000	0.000
2-Methylnaphthalene	A11	0.0001	0.0006	0.000	0.000
UnknownC12s	U12	0.0003	0.0019	0.000	0.000
n-Tridecane	P13	0.0001	0.0007	0.000	0.000
UnknownC13s	U13	0.0001	0.0007	0.000	0.000
n-Tetradecane	P14	0.0001	0.0008	0.000	0.000
UnknownC14s	U14	0.0001	0.0008	0.000	0.000
n-Pentadecane	P15	0.0001	0.0008	0.000	0.000
UnknownC15s	U15	0.0002	0.0017	0.000	0.000
n-Hexadecane	P16	0.0001	0.0009	0.000	0.000
TOTAL		100.00000	100.00000	8.7716	8.8195

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0260	0.0806
TOLUENE	0.0184	0.0673
ETHYLBENZENE	0.0023	0.0097
XYLENES	0.0068	0.0286
TOTAL BTEX	0.0535	0.1862

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1298.7 **/scf**	1305.8 **/scf**
	NET WET REAL :	1276.0 **/scf**	1283.1 **/scf**
HIGH	GROSS DRY REAL :	1425.5 **/scf**	1433.3 **/scf**
	GROSS WET REAL :	1400.6 **/scf**	1408.4 **/scf**
	NET DRY REAL :	19576.9 **/lb**	19683.8 **/lb**
	GROSS DRY REAL :	21492.1 **/lb**	21609.5 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8690
	COMPRESSIBILITY FACTOR :		0.99517

(CALC: GPA STD 2145 & TP-17 @14.696 & 60 F)

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993) ; ASTM D6730*

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