CRUDE OIL ASSAY

PROJECT NO. :	201310129	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS, INC.	ANALYSIS DATE:	OCTOBER 25, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 18, 2013
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	TANK BATTERY @ 12:40 SHULL 2-25-9-60; TK #116022		EMPACT
FIELD DATA		SAMPLE TEMP. :	112
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

SPECIFICATION		TEST METHOD	UNITS	RESULTS
API GRAVITY			API 60/60	33.7
RVP @100 DEG F		D323	PSIG	6.7
TOTAL SULFUR		D2622	WT %	0.432
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				BLACK
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. :	201310129	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS, INC.	ANALYSIS DATE:	OCTOBER 21, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 18, 2013
PRODUCER :		CYLINDER NO. :	5041
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 12:15 SHULL 2-25-9-60		EMPACT
FIELD DATA		SAMPLE TEMP. :	140
SAMPLE PRES. :	20	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
NITROGEN (AIR)	0.0156	0.0040	0.0037
CARBON DIOXIDE	0.0227	0.0092	0.0083
METHANE	0.0425	0.0063	0.0155
ETHANE	0.3184	0.0879	0.1823
PROPANE	1.7472	0.7071	1.0301
I-BUTANE	0.5056	0.2697	0.3539
N-BUTANE	2.4522	1.3079	1.6541
I-PENTANE	1.0161	0.6728	0.7955
N-PENTANE	1.6870	1.1170	1.3072
HEXANES PLUS	92.1927	95.8181	94.6494
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	MOLE%	MASS%
BENZENE	1.5577	1.1166
TOLUENE	3.0018	2.5383
ETHYLBENZENE	0.5248	0.5113
XYLENE	1.7749	1.7295
TOTAL BTEX	6.8592	5.8957

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

	TOTAL SAMPLE	C6+ FRACTION	
Specific Gravity (H2O=1) =	0.7384	0.7484	60/60
API Gravity =	60.13	57.57	60/60
Molecular Weight =	108.97	113.997	
Absolute Density =	6.16	6.23	LBS/GAL
Heating Value Liq. Idl Gas=	125069	126892	BTU/GAL
Vapor/Liquid =	21.47	20.86	CUFT/GAL
Vapor Pressure =	11.90	1.91	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. :	201310129	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS, INC.	ANALYSIS DATE:	OCTOBER 21, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 18, 2013
PRODUCER :		CYLINDER NO. :	5041
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 12:15 SHULL 2-25-9-60		EMPACT
FIELD DATA		SAMPLE TEMP. :	140
SAMPLE PRES. :	20	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0227		0.0092		0.0083	
NITROGEN (AIR)	0.0156		0.0040		0.0037	
METHANE	0.0425		0.0063		0.0155	
ETHANE	0.3184		0.0879		0.1823	
PROPANE	1.7472		0.7071		1.0301	
I-BUTANE	0.5056		0.2697		0.3539	
N-BUTANE	2.4522		1.3079		1.6541	
I-PENTANE	1.0161		0.6728		0.7955	
N-PENTANE	1.6870		1.1170		1.3072	
CYCLOPENTANE (N-C5)	1.5783		1.0158		0.9869	
N-HEXANE	7.6675		6.0648		6.7486	
CYCLOHEXANE (OTHER C6)	2.9981		2.3156		2.1830	
OTHER HEXANES	11.9663		9.3726		9.9374	
OTHER HEPTANES	14.0239		12.8060		13.2984	
METHYLCYCLOHEXANE (OTHER C7)	4.0811		3.6775		3.5061	
2,2,4 TRIMETHYLPENTANE	0.8178		0.7369		0.7224	
BENZENE	1.5577		1.1166		0.9341	
TOLUENE	3.0018		2.5383		2.1444	
ETHYLBENZENE	0.5248		0.5113		0.4319	
XYLENES	1.7749		1.7295		1.4627	
OTHER OCTANES	11.0224		11.5685		11.5379	
OCTANES PLUS	----	45.3180	----	56.9109	----	54.9105
NONANES	10.7549		12.5224		12.2711	
DECANES PLUS	20.4232		29.8423		28.4845	
SUB TOTAL	100.0000		100.0000		100.0000	
TOTAL	100.0000		100.0000		100.0000	

API Gravity =	**60.13**	60/60
Vapor Pressure =	**11.90**	PSIA & 100 F
Average Molecular Weight of Decanes plus =	**159.22**	
Average Specific Gravity of Decanes plus =	**0.7710**	

EMPACT ANALYTICAL SYSTEMS INC.
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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

BY CARBON NUMBER

PROJECT NO. :	201310129	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS, INC.	ANALYSIS DATE:	OCTOBER 21, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 18, 2013
PRODUCER :		CYLINDER NO. :	5041
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 12:15		EMPACT
	SHULL 2-25-9-60		
FIELD DATA		SAMPLE TEMP. :	140
SAMPLE PRES. :	20	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
NITROGEN		0.0156	0.0040	0.0037
CARBON DIOXIDE		0.0227	0.0092	0.0083
	C1	0.0425	0.0063	0.0155
	C2	0.3184	0.0879	0.1823
	C3	1.7472	0.7071	1.0301
	C4	2.9578	1.5776	2.0080
	C5	4.2814	2.8056	3.0896
	C6	24.1896	18.8696	19.8031
	C7	21.1068	19.0218	18.9489
	C8	14.1399	14.5462	14.1549
	C9	10.7549	12.5224	12.2711
	C10	8.9732	11.3225	10.8695
	C11	4.2497	5.8425	5.4978
	C12	2.5467	3.7283	3.5521
	C13	1.0096	1.6737	1.6108
	C14	1.1856	2.1586	2.0888
	C15	1.1788	2.2980	2.1980
	C16	0.7140	1.4837	1.4100
	C17	0.2878	0.6352	0.6018
	C18	0.1346	0.3144	0.2970
	C19	0.0422	0.1040	0.0977
	C20	0.0362	0.0939	0.0877
	C21	0.0277	0.0754	0.0700
	C22	0.0174	0.0496	0.0459
	C23	0.0068	0.0203	0.0187
	C24	0.0050	0.0155	0.0143
	C25	0.0026	0.0084	0.0077
	C26	0.0025	0.0084	0.0077
	C27	0.0017	0.0059	0.0054
	C28	0.0011	0.0040	0.0036
	C29	0.0000	0.0000	0.0000
	C30+	0.0000	0.0000	0.0000
	Total	100.0000	100.0000	100.0000

EMPACT ANALYTICAL SYSTEMS INC.
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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201310129	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS, INC.	ANALYSIS DATE:	OCTOBER 21, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 18, 2013
PRODUCER :		CYLINDER NO. :	5041
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 12:15 SHULL 2-25-9-60		EMPACT
FIELD DATA		SAMPLE TEMP. :	140
SAMPLE PRES. :	20	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0156	0.0040	0.0037
Carbon Dioxide	NHC	0.0227	0.0092	0.0083
Methane	P1	0.0425	0.0063	0.0155
Ethane	P2	0.3184	0.0879	0.1823
Propane	P3	1.7472	0.7071	1.0301
i-Butane	I4	0.5056	0.2697	0.3539
n-Butane	P4	2.4522	1.3079	1.6541
i-Pentane	I5	1.0161	0.6728	0.7955
n-Pentane	P5	1.6870	1.1170	1.3072
2,2-Dimethylbutane	I6	0.0442	0.0350	0.0395
Cyclopentane	N5	1.5783	1.0158	0.9869
2,3-Dimethylbutane	I6	0.4241	0.3354	0.3714
2-Methylpentane	I6	4.1184	3.2572	3.6575
3-Methylpentane	I6	2.4472	1.9355	2.1371
n-Hexane	P6	7.6675	6.0648	6.7486
2,2-Dimethylpentane	I7	0.0052	0.0048	0.0052
Methylcyclopentane	N6	4.9324	3.8095	3.7319
2,4-Dimethylpentane	I7	0.3305	0.3039	0.3319
2,2,3-Trimethylbutane	I7	0.0812	0.0747	0.0794
Benzene	A6	1.5577	1.1166	0.9341
3,3-Dimethylpentane	I7	0.0272	0.0250	0.0265
Cyclohexane	N6	2.9981	2.3156	2.1830
2-Methylhexane	I7	1.0935	1.0055	1.0884
2,3-Dimethylpentane	I7	0.8084	0.7434	0.7817
1,1-Dimethylcyclopentane	N7	0.4157	0.3746	0.3644
3-Methylhexane	I7	1.8012	1.6563	1.7658
1c,3-Dimethylcyclopentane	N7	0.9211	0.8300	0.8179
1t,3-Dimethylcyclopentane	N7	0.8178	0.7369	0.7224
3-Ethylpentane	I7	0.1068	0.0982	0.1030
1t,2-Dimethylcyclopentane	N7	1.8688	1.6840	1.6450
2,2,4-Trimethylpentane	I8	0.2267	0.2377	0.2511
n-Heptane	P7	4.9102	4.5152	4.8457
1c,2-Dimethylcyclopentane	N7	0.1087	0.0979	0.0931
Methylcyclohexane	N7	4.0811	3.6775	3.5061
2,2-Dimethylhexane	I8	0.5380	0.5640	0.5950

Ethylcyclopentane	N7	0.7276	0.6556	0.6280
2,5-Dimethylhexane	I8	0.1185	0.1242	0.1314
2,2,3-Trimethylpentane	I8	0.0420	0.0440	0.0451
2,4-Dimethylhexane	I8	0.2614	0.2740	0.2884
1c,2t,4-Trimethylcyclopentane	N8	0.3794	0.3907	0.3757
3,3-Dimethylhexane	I8	0.0592	0.0621	0.0642
2,3,4-Trimethylpentane	I8	0.1059	0.1110	0.1132
2,3,3-Trimethylpentane	I8	0.0013	0.0014	0.0014
Toluene	A7	3.0018	2.5383	2.1444
2,3-Dimethylhexane	I8	0.1948	0.2042	0.2106
2-Methyl-3-ethylpentane	I8	0.1731	0.1815	0.1852
1,1,2-Trimethylcyclopentane	N8	0.0181	0.0186	0.0177
2-Methylheptane	I8	1.1220	1.1762	1.2347
4-Methylheptane	I8	0.4875	0.5110	0.5235
3-Methyl-3-ethylpentane	I8	0.0850	0.0891	0.0900
3,4-Dimethylhexane	I8	0.1028	0.1078	0.1099
1c,2c,4-Trimethylcyclopentane	N8	0.0525	0.0541	0.0515
1c,3-Dimethylcyclohexane	N8	0.0316	0.0325	0.0312
3-Methylheptane	I8	0.3928	0.4118	0.4286
1c,2t,3-Trimethylcyclopentane	N8	0.8776	0.9037	0.8613
3-Ethylhexane	I8	0.2396	0.2512	0.2587
1t,4-Dimethylcyclohexane	N8	0.6058	0.6238	0.6007
1,1-Dimethylcyclohexane	N8	0.1309	0.1348	0.1268
3c-Ethylmethylcyclopentane	N8	0.0039	0.0040	0.0038
3t-Ethylmethylcyclopentane	N8	0.2251	0.2318	0.2220
2t-Ethylmethylcyclopentane	N8	0.1705	0.1756	0.1677
1,1-Methylethylcyclopentane	N8	0.7069	0.7279	0.6845
2,2,4-Trimethylhexane	I9	0.0723	0.0851	0.0873
1t,2-Dimethylcyclohexane	N8	0.5785	0.5957	0.5639
1t,3-Dimethylcyclohexane	N8	0.0022	0.0023	0.0022
n-Octane	P8	1.8949	1.9864	2.0754
1c,4-Dimethylcyclohexane	N8	0.8773	0.9034	0.8475
i-Propylcyclopentane	I8	0.1161	0.1196	0.1131
2,4,4-Trimethylhexane	I9	0.0246	0.0290	0.0295
2,2,3,4-Tetramethylpentane	I9	0.0156	0.0184	0.0188
2,3,4-Trimethylhexane	I9	0.0194	0.0228	0.0232
1c,2-Dimethylcyclohexane	N8	0.1820	0.1874	0.1729
2,3,5-Trimethylhexane	I9	0.0556	0.0654	0.0665
2,2-Dimethylheptane	I9	0.0187	0.0220	0.0227
1,1,4-Trimethylcyclohexane	N9	0.9087	1.0528	1.0018
2,2,3-Trimethylhexane	I9	0.4386	0.5163	0.5198
2,4-Dimethylheptane	I9	0.0338	0.0398	0.0408
4,4-Dimethylheptane	I9	0.1160	0.1365	0.1401
Ethylcyclohexane	N8	0.5856	0.6030	0.5623
n-Propylcyclopentane	N8	0.2094	0.2156	0.2039
1c,3c,5-Trimethylcyclohexane	N9	0.0475	0.0550	0.0523
2,5-Dimethylheptane	I9	0.0961	0.1131	0.1159
3,3-Dimethylheptane	I9	0.0917	0.1079	0.1105
3,5-Dimethylheptane	I9	0.0854	0.1005	0.1030
2,6-Dimethylheptane	I9	0.0595	0.0700	0.0725
1,1,3-Trimethylcyclohexane	N9	0.0753	0.0872	0.0830
Ethylbenzene	A8	0.5248	0.5113	0.4319
1c,2t,4t-Trimethylcyclohexane	N9	0.3888	0.4504	0.4204
1,3-Dimethylbenzene (m-Xylene)	A8	0.4424	0.4311	0.3663
1,4-Dimethylbenzene (p-Xylene)	A8	0.7306	0.7119	0.6068
3,4-Dimethylheptane	I9	0.3107	0.3657	0.3672
3,4-Dimethylheptane (2)	I9	0.2198	0.2587	0.2598
4-Ethylheptane	I9	0.0802	0.0944	0.0969
4-Methyloctane	I9	0.2138	0.2517	0.2565
2-Methyloctane	I9	0.2877	0.3386	0.3484
1c,2t,4c-Trimethylcyclohexane	I9	0.1155	0.1360	0.1376
3-Ethylheptane	I9	0.0726	0.0855	0.0864
3-Methyloctane	I9	0.3553	0.4182	0.4261
3,3-Diethylpentane	I9	0.0532	0.0626	0.0609
1c,2t,3-Trimethylcyclohexane	N9	0.1123	0.1301	0.1214
1,1,2-Trimethylcyclohexane	N9	0.0391	0.0453	0.0423
1,2-Dimethylbenzene (o-Xylene)	A8	0.6019	0.5865	0.4896

i-Butylcyclopentane	N9	0.2277	0.2638	0.2481
UnknownC8s	U8	0.0413	0.0433	0.0452
n-Nonane	P9	1.3166	1.5497	1.5858
1,1-Methylethylcyclohexane	N9	0.5910	0.6956	0.7139
i-Propylbenzene	A9	0.3046	0.3360	0.2858
i-Propylcyclohexane	N9	0.1081	0.1252	0.1147
2,2-Dimethyloctane	I10	0.0612	0.0799	0.0794
2,4-Dimethyloctane	I10	0.0693	0.0905	0.0899
2,6-Dimethyloctane	I10	0.0092	0.0120	0.0123
2,5-Dimethyloctane	I10	0.0259	0.0338	0.0336
n-Butylcyclopentane	N9	0.1663	0.2141	0.1968
3,3-Dimethyloctane	I10	0.1384	0.1807	0.1796
n-Propylbenzene	A9	0.3017	0.3328	0.2831
3,6-Dimethyloctane	I10	0.2154	0.2813	0.2794
3-Methyl-5-ethylheptane	I10	0.3348	0.3941	0.3988
1,3-Methylethylbenzene	A9	0.3241	0.3575	0.3016
1,4-Methylethylbenzene	A9	0.0731	0.0806	0.0680
1,3,5-Trimethylbenzene	A9	0.1072	0.1182	0.1004
2,3-Dimethyloctane	I10	0.0667	0.0871	0.0865
5-Methylnonane	I10	0.2028	0.2648	0.2655
1,2-Methylethylbenzene	A9	0.3376	0.3724	0.3125
2-Methylnonane	I10	0.1359	0.1774	0.1794
3-Ethyloctane	I10	0.1030	0.1345	0.1336
3-Methylnonane	I10	0.1740	0.2272	0.2275
1,2,4-Trimethylbenzene	A9	0.0212	0.0234	0.0196
t-Butylbenzene	A10	0.2663	0.3280	0.2782
i-Butylcyclohexane	N10	0.2255	0.2903	0.2627
1t-Methyl-2-n-propylcyclohexane	I10	0.1252	0.1474	0.1492
i-Butylbenzene	A10	0.0576	0.0709	0.0611
sec-Butylbenzene	A10	0.0205	0.0253	0.0216
UnknownC9s	U9	2.3225	2.7337	2.7973
n-Decane	P10	1.1143	1.4550	1.4638
1,2,3-Trimethylbenzene	A9	0.1454	0.1604	0.1319
1,3-Methyl-i-propylbenzene	A10	0.0719	0.0793	0.0665
1,4-Methyl-i-propylbenzene	A10	0.0851	0.0939	0.0788
Sec-Butylcyclohexane	N10	0.2018	0.2598	0.2348
1,2-Methyl-i-propylbenzene	A10	0.1458	0.1796	0.1506
3-Ethylnonane	I10	0.0689	0.0900	0.0910
1,3-Diethylbenzene	A10	0.1311	0.1615	0.1374
1,3-Methyl-n-propylbenzene	A10	0.0718	0.0884	0.0755
1,4-Diethylbenzene	A10	0.1310	0.1614	0.1376
1,4-Methyl-n-propylbenzene	A10	0.0489	0.0602	0.0515
n-Butylbenzene	A10	0.1160	0.1429	0.1219
1,3-Dimethyl-5-ethylbenzene	A10	0.0670	0.0825	0.0701
1,2-Diethylbenzene	A10	0.1186	0.1461	0.1221
1,2-Methyl-n-propylbenzene	A10	0.0824	0.1015	0.0854
1,4-Dimethyl-2-ethylbenzene	A10	0.1016	0.1251	0.1048
1,3-Dimethyl-4-ethylbenzene	A10	0.0273	0.0336	0.0282
1,2-Dimethyl-4-ethylbenzene	A10	0.2533	0.3120	0.2622
1,3-Dimethyl-2-ethylbenzene	A10	0.0709	0.0873	0.0721
1t,2c,4-Trimethylcyclopentane	A10	0.5019	0.5168	0.5077
1,2-Dimethyl-3-ethylbenzene	A10	0.0982	0.1210	0.0997
1,2-Ethyl-i-propylbenzene	A10	0.0930	0.1146	0.0961
1,4-Methyl-t-butylbenzene	A11	0.1624	0.2000	0.1677
UnknownC10s	U10	2.9630	3.8689	3.8923
n-Undecane	P11	0.7300	1.0472	1.0389
1,4-Ethyl-i-propylbenzene	A11	0.0918	0.1131	0.0948
1,2,4,5-Tetramethylbenzene	A11	0.1135	0.1398	0.1160
1,2-Methyl-n-butylbenzene	A11	0.0481	0.0592	0.0496
1,2,3,5-Tetramethylbenzene	A11	0.1088	0.1340	0.1106
1,2-Methyl-t-butylbenzene	A11	0.0607	0.0748	0.0627
5-Methylindan	A11	0.0110	0.0172	0.0169
4-Methylindan	A11	0.0122	0.0191	0.0187
1,2-Ethyl-n-propylbenzene	A11	0.0407	0.0501	0.0420
2-Methylindan	A11	0.0755	0.1180	0.1158
1,3-Methyl-n-butylbenzene	A11	0.0699	0.0861	0.0722
1,3-Di-i-propylbenzene	A11	0.0508	0.0626	0.0525

sec-Pentylbenzene	A11	0.1372	0.1690	0.1417
n-Pentylbenzene	A11	0.0265	0.0361	0.0309
1t-M-2-(4MP)cyclopentane	P12	0.0351	0.0549	0.0539
1,2-Di-n-propylbenzene	A11	0.0559	0.0689	0.0578
1,4-Di-i-propylbenzene	A11	0.1603	0.1975	0.1656
Tetrahydronaphthalene	A10	0.0166	0.0204	0.0171
t-Decahydronaphthalene	A10	0.1077	0.1327	0.1113
Naphthalene	A10	0.0534	0.0628	0.0527
1-t-Butyl-3,5-dimethylbenzene	A12	0.1055	0.1299	0.1089
1,4-Ethyl-t-butylbenzene	A11	0.0481	0.0592	0.0496
UnknownC11s	U11	2.0022	2.8721	2.8494
n-Dodecane	P12	0.6179	0.9659	0.9477
1,3-Di-n-propylbenzene	A12	0.0658	0.0811	0.0680
1,3,5-Triethylbenzene	A12	0.1043	0.1150	0.0977
1,2,4-Triethylbenzene	A12	0.2779	0.3065	0.2571
1,4-Methyl-n-pentylbenzene	A12	0.0505	0.0622	0.0521
n-Hexylbenzene	A12	0.0444	0.0661	0.0566
1,2,3,4,5-Pentamethylbenzene	A13	0.0749	0.0923	0.0774
2-Methylnaphthalene	A11	0.0968	0.1263	0.1059
1-Methylnaphthalene	A11	0.1473	0.1922	0.1385
UnknownC12s	U12	1.2453	1.9467	1.9101
n-Tridecane	P13	0.2609	0.4414	0.4280
UnknownC13s	U13	0.6738	1.1400	1.1054
n-Tetradecane	P14	0.2974	0.5415	0.5240
UnknownC14s	U14	0.8882	1.6171	1.5648
n-Pentadecane	P15	0.2735	0.5332	0.5100
UnknownC15s	U15	0.9053	1.7648	1.6880
n-Hexadecane	P16	0.1747	0.3630	0.3450
UnknownC16s	U16	0.5393	1.1207	1.0650
n-Heptadecane	P17	0.0723	0.1596	0.1512
UnknownC17s	U17	0.2155	0.4756	0.4506
n-Octadecane	P18	0.0280	0.0654	0.0618
UnknownC18s	U18	0.1066	0.2490	0.2352
n-Nonadecane	P19	0.0201	0.0495	0.0465
UnknownC19s	U19	0.0221	0.0545	0.0512
n-Eicosane	P20	0.0187	0.0485	0.0453
UnknownC20s	U20	0.0175	0.0454	0.0424
n-Heneicosane	P21	0.0125	0.0340	0.0316
UnknownC21s	U21	0.0152	0.0414	0.0384
n-Docosane	P22	0.0102	0.0291	0.0269
UnknownC22s	U22	0.0072	0.0205	0.0190
n-Tricosane	P23	0.0068	0.0203	0.0187
n-Tetracosane	P24	0.0050	0.0155	0.0143
n-Pentacosane	P25	0.0026	0.0084	0.0077
n-Hexacosane	P26	0.0025	0.0084	0.0077
n-Heptacosane	P27	0.0017	0.0059	0.0054
n-Octacosane	P28	0.0011	0.0040	0.0036
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. :	201310129	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS, INC.	ANALYSIS DATE:	OCTOBER 25, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 18, 2013
PRODUCER :		CYLINDER NO. :	0950
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 12:20 SHULL 2-25-9-60		
FIELD DATA		SAMPLE TEMP. :	41
SAMPLE PRES. :	142	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN (1-7) @ >7PPM @ 12:25 LENGTH OF H2S STAIN (2.5-60) @ 7PPM @ 12:30; POSSIBLE MOISTURE IN SAMPLE		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0002	0.0006		
HELIUM	0.02	0.00	---	---
OXYGEN/ARGON	0.01	0.01	---	---
NITROGEN	1.08	1.29	---	---
CARBON DIOXIDE	2.80	5.27	---	---
METHANE	70.00930	48.02220	---	---
ETHANE	12.1926	15.6760	3.2555	3.2733
PROPANE	9.4174	17.7561	2.5908	2.6049
I-BUTANE	0.8255	2.0515	0.2693	0.2708
N-BUTANE	2.5445	6.3236	0.8009	0.8052
I-PENTANE	0.3959	1.2185	0.1421	0.1430
N-PENTANE	0.4320	1.3327	0.1562	0.1570
HEXANES PLUS	0.2726	1.0488	0.1020	0.1025
TOTALS	100.00000	100.00000	7.3168	7.3567

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0101	0.0337
TOLUENE	0.0049	0.0193
ETHYLBENZENE	0.0005	0.0023
XYLENES	0.0011	0.0051
TOTAL BTEX	0.0166	0.0604

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1196.9 **/scf**	1203.4 **/scf**
	NET WET REAL :	1176.0 **/scf**	1182.5 **/scf**
HIGH	GROSS DRY REAL :	1316.7 **/scf**	1323.9 **/scf**
	GROSS WET REAL :	1293.7 **/scf**	1300.9 **/scf**
	NET DRY REAL :	19435.4 **/lb**	19541.5 **/lb**
	GROSS DRY REAL :	21379.6 **/lb**	21496.4 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8071
	COMPRESSIBILITY FACTOR :		0.99580

(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

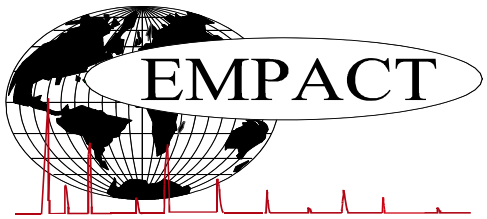
303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201310129	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS, INC.	ANALYSIS DATE:	OCTOBER 25, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 18, 2013
PRODUCER :		CYLINDER NO. :	0950
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 12:20 SHULL 2-25-9-60		
FIELD DATA		SAMPLE TEMP. :	41
SAMPLE PRES. :	142	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN (1-7) @ >7PPM @ 12:25 LENGTH OF H2S STAIN (2.5-60) @ 7PPM @ 12:30; POSSIBLE MOISTURE IN SAMPLE		

Componet	Mole %	Wt %
Helium	0.02	0.00
Carbon Dioxide	2.80	5.27
Nitrogen	1.08	1.29
Methane	70.00930	48.02220
Ethane	12.1926	15.6760
Propane	9.4174	17.7561
Isobutane	0.8255	2.0515
n-Butane	2.5445	6.3236
Isopentane	0.3644	1.1241
n-Pentane	0.4320	1.3327
Cyclopentane	0.0315	0.0944
n-Hexane	0.0616	0.2270
Cyclohexane	0.0140	0.0504
Other Hexanes	0.1156	0.4230
Heptanes	0.0404	0.1718
Methycyclohexane	0.0085	0.0357
2,2,4 Trimethylpentane	0.0001	0.0005
Benzene	0.0101	0.0337
Toluene	0.0049	0.0193
Ethylbenzene	0.0005	0.0023
Xylenes	0.0011	0.0051
C8+ Heavies	0.0158	0.0800
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. :	201310129	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS, INC	ANALYSIS DATE:	OCTOBER 25, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 18, 2013
PRODUCER :		CYLINDER NO. :	0950
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 12:20 SHULL 2-25-9-60		
FIELD DATA		SAMPLE TEMP. :	41
SAMPLE PRES. :	142	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN (1-7) @ >7PPM @ 12:25; LENGTH LENGTH OF H2S STAIN (2.5-60) @ 7PPM @ 12:30; POSSIBLE MOISTURE IN SAMPLE		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.02	0.00	---	---
Oxygen/Argon	---	0.01	0.01	---	---
Nitrogen	---	1.08	1.29	---	---
Carbon Dioxide	---	2.80	5.27	---	---
Methane	P1	70.00930	48.02220	---	---
Ethane	P2	12.1926	15.6760	3.256	3.273
Propane	P3	9.4174	17.7561	2.591	2.605
i-Butane	I4	0.8255	2.0515	0.269	0.271
n-Butane	P4	2.5445	6.3236	0.801	0.805
2,2-Dimethylpropane	I5	0.0015	0.0046	0.001	0.001
i-Pentane	I5	0.3629	1.1195	0.132	0.133
i-Propanol	X3	0.0001	0.0003	0.000	0.000
n-Pentane	P5	0.4320	1.3327	0.156	0.157
t-Butanol	X4	0.0001	0.0003	0.000	0.000
2,2-Dimethylbutane	I6	0.0007	0.0026	0.000	0.000
Cyclopentane	N5	0.0315	0.0944	0.009	0.009
2,3-Dimethylbutane	I6	0.0035	0.0129	0.001	0.001
2-Methylpentane	I6	0.0503	0.1854	0.021	0.021
3-Methylpentane	I6	0.0257	0.0947	0.010	0.010
n-Hexane	P6	0.0616	0.2270	0.025	0.025
2,2-Dimethylpentane	I7	0.0002	0.0009	0.000	0.000
Methylcyclopentane	N6	0.0354	0.1274	0.012	0.012
2,4-Dimethylpentane	I7	0.0012	0.0051	0.001	0.001
Benzene	A6	0.0101	0.0337	0.003	0.003
3,3-Dimethylpentane	I7	0.0001	0.0004	0.000	0.000
Cyclohexane	N6	0.0140	0.0504	0.005	0.005
2-Methylhexane	I7	0.0049	0.0210	0.002	0.002
2,3-Dimethylpentane	I7	0.0024	0.0103	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0010	0.0042	0.000	0.000
3-Methylhexane	I7	0.0057	0.0244	0.003	0.003
1c,3-Dimethylcyclopentane	N7	0.0032	0.0134	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0028	0.0118	0.001	0.001
3-Ethylpentane	I7	0.0005	0.0021	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0059	0.0248	0.003	0.003
2,2,4-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
n-Heptane	P7	0.0106	0.0454	0.005	0.005
1c,2-Dimethylcyclopentane	N7	0.0004	0.0017	0.000	0.000
Methylcyclohexane	N7	0.0085	0.0357	0.003	0.003
2,2-Dimethylhexane	I8	0.0005	0.0024	0.000	0.000
Ethylcyclopentane	N7	0.0015	0.0063	0.001	0.001
2,5-Dimethylhexane	I8	0.0002	0.0010	0.000	0.000
2,4-Dimethylhexane	I8	0.0003	0.0015	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0007	0.0034	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0009	0.0043	0.000	0.000
2,3,4-Trimethylpentane	I8	0.0002	0.0010	0.000	0.000
Toluene	A7	0.0049	0.0193	0.002	0.002
2,3-Dimethylhexane	I8	0.0003	0.0015	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0002	0.0010	0.000	0.000

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2-Methylheptane	I8	0.0014	0.0068	0.001	0.001
4-Methylheptane	I8	0.0004	0.0020	0.000	0.000
3-Methyl-3-ethylpentane	I8	0.0001	0.0005	0.000	0.000
3-Methylheptane	I8	0.0007	0.0034	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0009	0.0043	0.000	0.000
3-Ethylhexane	I8	0.0002	0.0010	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0003	0.0015	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0001	0.0005	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0002	0.0009	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0002	0.0009	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0007	0.0034	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0005	0.0024	0.000	0.000
n-Octane	P8	0.0020	0.0098	0.001	0.001
1c,4-Dimethylcyclohexane	N8	0.0001	0.0005	0.000	0.000
i-Propylcyclopentane	I8	0.0001	0.0005	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0001	0.0005	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0006	0.0033	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0002	0.0011	0.000	0.000
Ethylcyclohexane	N8	0.0003	0.0015	0.000	0.000
n-Propylcyclopentane	N8	0.0001	0.0005	0.000	0.000
2,6-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0006	0.000	0.000
Ethylbenzene	I8	0.0005	0.0023	0.000	0.000
1c,2t,4t-Trimethylcyclohexane	N9	0.0001	0.0006	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0007	0.0032	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0001	0.0005	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0001	0.0006	0.000	0.000
4-Methyloctane	I9	0.0001	0.0006	0.000	0.000
2-Methyloctane	I9	0.0001	0.0006	0.000	0.000
3-Methyloctane	I9	0.0002	0.0011	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0003	0.0014	0.000	0.000
i-Butylcyclopentane	N9	0.0001	0.0006	0.000	0.000
n-Nonane	P9	0.0004	0.0022	0.000	0.000
1,1-Methylethylcyclohexane	N9	0.0001	0.0006	0.000	0.000
i-Propylbenzene	A9	0.0002	0.0010	0.000	0.000
n-Butylcyclopentane	N9	0.0001	0.0006	0.000	0.000
n-Propylbenzene	A9	0.0001	0.0005	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0001	0.0006	0.000	0.000
1,3-Methylethylbenzene	A9	0.0001	0.0005	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0005	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0005	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0006	0.0033	0.000	0.000
n-Decane	P10	0.0001	0.0006	0.000	0.000
UnknownC10s	U10	0.0002	0.0012	0.000	0.000
TOTAL		100.00000	100.00000	7.3168	7.3567

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0101	0.0337
TOLUENE	0.0049	0.0193
ETHYLBENZENE	0.0005	0.0023
XYLENES	0.0011	0.0051
TOTAL BTEX	0.0166	0.0604

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1196.9 **/scf**	1203.4 **/scf**
	NET WET REAL :	1176.0 **/scf**	1182.5 **/scf**
HIGH	GROSS DRY REAL :	1316.7 **/scf**	1323.9 **/scf**
	GROSS WET REAL :	1293.7 **/scf**	1300.9 **/scf**
	NET DRY REAL :	19435.4 **/lb**	19541.5 **/lb**
	GROSS DRY REAL :	21379.6 **/lb**	21496.4 **/lb**

RELATIVE DENSITY (AIR=1): 0.8071

COMPRESSIBILITY FACTOR : 0.99580

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

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

THIS DATA HAS BEEN ACQUIRED THROUGH APPLICATION OF CURRENT STATE-OF-THE-ART ANALYTICAL TECHNIQUES. THE USE OF THIS INFORMATION IS THE RESPONSIBLITY OF THE USER. EMPACT ANALYTICAL SYSTEMS, ASSUMES NO RESPONSIBLITY FOR ACCURACY OF THE REPORTED INFORMATION NOR ANY CONSEQUENCES OF IT'S APPLICATION.

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