

CRUDE OIL ASSAY

PROJECT NO. :	201310129	ANALYSIS NO. :	04
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 @ 13:25		EMPACT
	SHULL 3-25-9-60; TK # 116025		
FIELD DATA		SAMPLE TEMP. :	120
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

<u>SPECIFICATION</u>	<u>TEST METHOD</u>	<u>UNITS</u>	<u>RESULTS</u>
API GRAVITY		API 60/60	33
RVP @100 DEG F	D323	PSIG	4.5
TOTAL SULFUR	D2622	WT %	0.445
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
<u>BS&W</u>	D96		
Crude Oil		VOL %	N/A
Water		VOL %	N/A
Emulsion		VOL %	N/A
Sediment		VOL %	N/A
<u>DISTILLATION:</u>	D86		
INITIAL POINT		DEG F	N/A
50%		DEG F	N/A
90%		DEG F	N/A
END POINT		DEG F	N/A
<u>DISTILLATION:</u>	<u>@TEMP</u>	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 PERFORMED FOR THIS PARAMETER

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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201310129	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS, INC.	ANALYSIS DATE:	OCTOBER 21, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 18, 2013
PRODUCER :		CYLINDER NO. :	13005
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 13:00		EMPACT
	SHULL 3-25-9-60		
FIELD DATA		SAMPLE TEMP. :	178
SAMPLE PRES. :	18	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
NITROGEN (AIR)	0.0000	0.0000	0.0000
CARBON DIOXIDE	0.0110	0.0044	0.0040
METHANE	0.0000	0.0000	0.0000
ETHANE	0.0939	0.0255	0.0531
PROPANE	0.8684	0.3463	0.5070
I-BUTANE	0.3437	0.1807	0.2383
N-BUTANE	2.0004	1.0515	1.3365
I-PENTANE	0.9773	0.6377	0.7578
N-PENTANE	1.6806	1.0966	1.2898
HEXANES PLUS	94.0247	96.6573	95.8135
TOTALS	100.0000	100.0000	100.0000

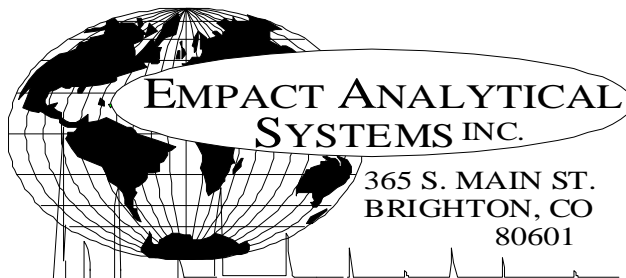
BTEX COMPONENTS	MOLE%	MASS%
BENZENE	1.5464	1.0924
TOLUENE	3.0405	2.5337
ETHYLBENZENE	0.5965	0.5728
XYLENE	1.8289	1.7561
TOTAL BTEX	7.0123	5.9550

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

	TOTAL SAMPLE	C6+ FRACTION
Specific Gravity (H2O=1) =	0.7422	0.7491 60/60
API Gravity =	59.15	57.39 60/60
Molecular Weight =	110.57	114.388
Absolute Density =	6.19	6.24 LBS/GAL
Heating Value Liq. Idl Gas=	125747	127130 BTU/GAL
Vapor/Liquid =	21.25	20.80 CUFT/GAL
Vapor Pressure =	5.89	1.83 PSIA @100 F

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

THIS DATA HAS BEEN ACQUIRED THROUGH APPLICATION OF CURRENT STATE-OF-THE-ART ANALYTICAL TECHNIQUES.
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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

E & P TANK / GLYCALC INFORMATION

PROJECT NO. :	201310129	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS, INC.	ANALYSIS DATE:	OCTOBER 21, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 18, 2013
PRODUCER :		CYLINDER NO. :	13005
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 13:00		EMPACT
	SHULL 3-25-9-60		
FIELD DATA		SAMPLE TEMP. :	178
SAMPLE PRES. :	18	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %	Wt %	LV %
CARBON DIOXIDE	0.0110	0.0044	0.0040
NITROGEN (AIR)	0.0000	0.0000	0.0000
METHANE	0.0000	0.0000	0.0000
ETHANE	0.0939	0.0255	0.0531
PROPANE	0.8684	0.3463	0.5070
I-BUTANE	0.3437	0.1807	0.2383
N-BUTANE	2.0004	1.0515	1.3365
I-PENTANE	0.9773	0.6377	0.7578
N-PENTANE	1.6806	1.0966	1.2898
CYCLOPENTANE (N-C5)	1.5360	0.9742	0.9513
N-HEXANE	7.4108	5.7766	6.4602
CYCLOHEXANE (OTHER C6)	2.9544	2.2487	2.1306
OTHER HEXANES	11.5436	8.9081	9.4805
OTHER HEPTANES	14.1142	12.7014	13.2556
METHYLCYCLOHEXANE (OTHER C7)	3.9791	3.5335	3.3857
2,2,4 TRIMETHYLPENTANE	0.8211	0.7292	0.7184
BENZENE	1.5464	1.0924	0.9185
TOLUENE	3.0405	2.5337	2.1513
ETHYLBENZENE	0.5965	0.5728	0.4863
XYLENES	1.8289	1.7561	1.4908
OTHER OCTANES	11.2676	11.6510	11.6733
OCTANES PLUS	---- 47.8997	---- 58.8887	---- 57.0798
NONANES	11.3044	12.9789	12.7974
DECANES PLUS	22.0812	31.2007	29.9136
SUB TOTAL	100.0000	100.0000	100.0000
TOTAL	100.0000	100.0000	100.0000

API Gravity	=	59.15	60/60
Vapor Pressure	=	5.89	PSIA & 100 F
Average Molecular Weight of Decanes plus	=	156.24	
Average Specific Gravity of Decanes plus	=	0.7710	

THE DATA PRESENTED HEREIN HAS BEEN ACQUIRED THROUGH JUDICIOUS APPLICATION OF CURRENT STATE-OF-THE ART ANALYTICAL TECHNIQUES. THE APPLICATIONS OF THIS INFORMATION IS THE RESPONSIBILITY OF THE USER. EMPACT ANALYTICAL SYSTEMS, INC. ASSUMES NO RESPONSIBILITY FOR ACCURACY OF THE REPORTED INFORMATION NOR ANY CONSEQUENCES OF ITS APPLICATION.



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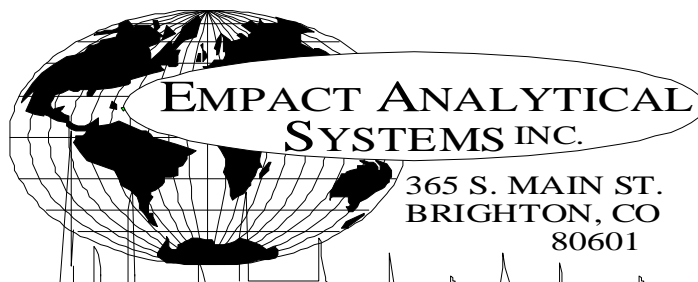
EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

BY CARBON NUMBER

PROJECT NO. :	201310129	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS, INC.	ANALYSIS DATE:	OCTOBER 21, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 18, 2013
PRODUCER :		CYLINDER NO. :	13005
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 13:00		EMPACT
	SHULL 3-25-9-60		
FIELD DATA		SAMPLE TEMP. :	178
SAMPLE PRES. :	18	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER	MOLE%	MASS %	VOLUME %
NITROGEN	0.0000	0.0000	0.0000
CARBON DIOXIDE	0.0110	0.0044	0.0040
C1	0.0000	0.0000	0.0000
C2	0.0939	0.0255	0.0531
C3	0.8684	0.3463	0.5070
C4	2.3441	1.2322	1.5748
C5	4.1939	2.7085	2.9989
C6	23.4552	18.0258	18.9898
C7	21.1338	18.7686	18.7926
C8	14.5141	14.7091	14.3688
C9	11.3044	12.9789	12.7974
C10	9.8750	12.2736	11.8377
C11	5.1551	6.9757	6.5901
C12	2.8033	4.0518	3.8776
C13	1.1855	1.9386	1.8757
C14	1.0467	1.8780	1.8263
C15	0.9410	1.8077	1.7377
C16	0.7097	1.4534	1.3881
C17	0.2397	0.5213	0.4964
C18	0.0729	0.1678	0.1593
C19	0.0252	0.0612	0.0577
C20	0.0157	0.0401	0.0376
C21	0.0064	0.0172	0.0161
C22	0.0032	0.0090	0.0084
C23	0.0018	0.0053	0.0049
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. :	201310129	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS, INC.	ANALYSIS DATE:	OCTOBER 21, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 18, 2013
PRODUCER :		CYLINDER NO. :	13005
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 13:00		IMPACT
	SHULL 3-25-9-60		
FIELD DATA		SAMPLE TEMP. :	178
SAMPLE PRES. :	18	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

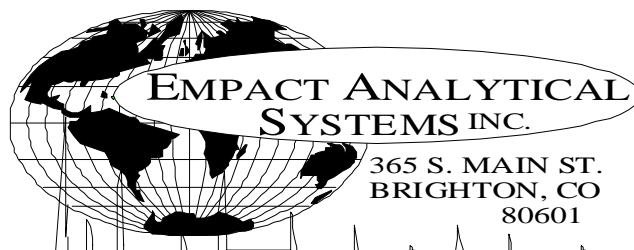
COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0000	0.0000	0.0000
Carbon Dioxide	NHC	0.0110	0.0044	0.0040
Methane	P1	0.0000	0.0000	0.0000
Ethane	P2	0.0939	0.0255	0.0531
Propane	P3	0.8684	0.3463	0.5070
i-Butane	I4	0.3437	0.1807	0.2383
n-Butane	P4	2.0004	1.0515	1.3365
i-Pentane	I5	0.9773	0.6377	0.7578
n-Pentane	P5	1.6806	1.0966	1.2898
2,2-Dimethylbutane	I6	0.0883	0.0688	0.0781
Cyclopentane	N5	1.5360	0.9742	0.9513
2,3-Dimethylbutane	I6	0.3871	0.3017	0.3358
2-Methylpentane	I6	3.8804	3.0244	3.4131
3-Methylpentane	I6	2.3108	1.8011	1.9987
n-Hexane	P6	7.4108	5.7766	6.4602
2,2-Dimethylpentane	I7	0.0083	0.0075	0.0082
Methylcyclopentane	N6	4.8770	3.7121	3.6548
2,4-Dimethylpentane	I7	0.4024	0.3647	0.4003
Benzene	A6	1.5464	1.0924	0.9185
3,3-Dimethylpentane	I7	0.0222	0.0201	0.0214
Cyclohexane	N6	2.9544	2.2487	2.1306
2-Methylhexane	I7	1.0563	0.9572	1.0413
2,3-Dimethylpentane	I7	0.8361	0.7577	0.8008
1,1-Dimethylcyclopentane	N7	0.3935	0.3494	0.3416
3-Methylhexane	I7	1.8018	1.6328	1.7495
1c,3-Dimethylcyclopentane	N7	0.9191	0.8162	0.8084
1t,3-Dimethylcyclopentane	N7	0.8211	0.7292	0.7184
3-Ethylpentane	I7	0.1212	0.1098	0.1157
1t,2-Dimethylcyclopentane	N7	1.8419	1.6356	1.6057
2,2,4-Trimethylpentane	I8	0.2769	0.2861	0.3038
n-Heptane	P7	4.9771	4.5102	4.8646
1c,2-Dimethylcyclopentane	N7	0.1503	0.1335	0.1275
Methylcyclohexane	N7	3.9791	3.5335	3.3857
2,2-Dimethylhexane	I8	0.5006	0.5172	0.5484
Ethylcyclopentane	N7	0.7629	0.6775	0.6522

2,5-Dimethylhexane	I8	0.1438	0.1486	0.1580
2,2,3-Trimethylpentane	I8	0.0209	0.0216	0.0223
2,4-Dimethylhexane	I8	0.2569	0.2654	0.2808
1c,2t,4-Trimethylcyclopentane	N8	0.3734	0.3789	0.3662
3,3-Dimethylhexane	I8	0.0583	0.0602	0.0626
2,3,4-Trimethylpentane	I8	0.1111	0.1148	0.1177
2,3,3-Trimethylpentane	I8	0.0133	0.0137	0.0139
Toluene	A7	3.0405	2.5337	2.1513
2,3-Dimethylhexane	I8	0.1810	0.1870	0.1938
2-Methyl-3-ethylpentane	I8	0.1670	0.1725	0.1769
1,1,2-Trimethylcyclopentane	N8	0.0626	0.0635	0.0607
2-Methylheptane	I8	1.1382	1.1759	1.2406
4-Methylheptane	I8	0.5447	0.5627	0.5794
3-Methyl-3-ethylpentane	I8	0.1096	0.1132	0.1149
3,4-Dimethylhexane	I8	0.0414	0.0428	0.0439
1c,2c,4-Trimethylcyclopentane	N8	0.0510	0.0518	0.0495
1c,3-Dimethylcyclohexane	N8	0.0343	0.0348	0.0335
3-Methylheptane	I8	0.4090	0.4225	0.4419
1c,2t,3-Trimethylcyclopentane	N8	0.9154	0.9290	0.8899
3-Ethylhexane	I8	0.1784	0.1843	0.1907
1t,4-Dimethylcyclohexane	N8	0.6054	0.6144	0.5946
1,1-Dimethylcyclohexane	N8	0.1489	0.1511	0.1428
3t-Ethylmethylcyclopentane	N8	0.2488	0.2525	0.2430
2t-Ethylmethylcyclopentane	N8	0.1800	0.1827	0.1754
1,1-Methylethylcyclopentane	N8	0.7637	0.7750	0.7325
2,2,4-Trimethylhexane	I9	0.0909	0.1054	0.1087
1t,2-Dimethylcyclohexane	N8	0.6258	0.6351	0.6042
1t,3-Dimethylcyclohexane	N8	0.0051	0.0052	0.0049
n-Octane	P8	1.9952	2.0612	2.1643
1c,4-Dimethylcyclohexane	N8	0.9610	0.9752	0.9195
i-Propylcyclopentane	I8	0.0399	0.0405	0.0385
2,4,4-Trimethylhexane	I9	0.0298	0.0346	0.0354
2,2,3,4-Tetramethylpentane	I9	0.0174	0.0202	0.0207
2,3,4-Trimethylhexane	I9	0.0186	0.0216	0.0221
1c,2-Dimethylcyclohexane	N8	0.1542	0.1565	0.1451
2,3,5-Trimethylhexane	I9	0.0685	0.0795	0.0813
2,2-Dimethylheptane	I9	0.0192	0.0223	0.0232
1,1,4-Trimethylcyclohexane	N9	0.9243	1.0553	1.0092
2,2,3-Trimethylhexane	I9	0.4297	0.4984	0.5043
2,4-Dimethylheptane	I9	0.0265	0.0307	0.0317
4,4-Dimethylheptane	I9	0.1298	0.1506	0.1553
Ethylcyclohexane	N8	0.5825	0.5911	0.5539
n-Propylcyclopentane	N8	0.1904	0.1932	0.1836
1c,3c,5-Trimethylcyclohexane	N9	0.0578	0.0660	0.0631
2,5-Dimethylheptane	I9	0.0997	0.1156	0.1190
3,3-Dimethylheptane	I9	0.0956	0.1109	0.1142
3,5-Dimethylheptane	I9	0.0827	0.0959	0.0987
2,6-Dimethylheptane	I9	0.0650	0.0754	0.0785
1,1,3-Trimethylcyclohexane	N9	0.0780	0.0891	0.0852
Ethylbenzene	A8	0.5965	0.5728	0.4863
1c,2t,4t-Trimethylcyclohexane	N9	0.4537	0.5180	0.4859
2,3-Dimethylheptane	I9	0.0013	0.0015	0.0015
1,3-Dimethylbenzene (m-Xylene)	A8	0.4302	0.4131	0.3527
1,4-Dimethylbenzene (p-Xylene)	A8	0.6737	0.6469	0.5541
3,4-Dimethylheptane	I9	0.3961	0.4595	0.4637
3,4-Dimethylheptane (2)	I9	0.1919	0.2226	0.2246
4-Ethylheptane	I9	0.1037	0.1203	0.1241
4-Methyloctane	I9	0.2319	0.2690	0.2755
2-Methyloctane	I9	0.3135	0.3637	0.3762
1c,2t,4c-Trimethylcyclohexane	I9	0.1229	0.1426	0.1450
3-Ethylheptane	I9	0.0809	0.0938	0.0953
3-Methyloctane	I9	0.3616	0.4194	0.4295
3,3-Diethylpentane	I9	0.0593	0.0688	0.0673
1c,2t,3-Trimethylcyclohexane	N9	0.1233	0.1408	0.1321
1,1,2-Trimethylcyclohexane	N9	0.0524	0.0598	0.0561
1,2-Dimethylbenzene (o-Xylene)	A8	0.7250	0.6961	0.5840
i-Butylcyclopentane	N9	0.2391	0.2730	0.2581

n-Nonane	P9	1.4219	1.6494	1.6962
1,1-Methylethylcyclohexane	N9	0.6779	0.7863	0.8111
i-Propylbenzene	A9	0.1944	0.2113	0.1806
i-Propylcyclohexane	N9	0.1243	0.1419	0.1306
2,2-Dimethyloctane	I10	0.0737	0.0948	0.0946
2,4-Dimethyloctane	I10	0.0761	0.0979	0.0977
2,6-Dimethyloctane	I10	0.0132	0.0170	0.0175
2,5-Dimethyloctane	I10	0.0320	0.0412	0.0411
n-Butylcyclopentane	N9	0.1789	0.2269	0.2097
3,3-Dimethyloctane	I10	0.1532	0.1971	0.1969
n-Propylbenzene	A9	0.3060	0.3326	0.2844
3,6-Dimethyloctane	I10	0.2398	0.3086	0.3080
3-Methyl-5-ethylheptane	I10	0.4585	0.5318	0.5409
1,3-Methylethylbenzene	A9	0.3425	0.3723	0.3156
1,4-Methylethylbenzene	A9	0.0849	0.0923	0.0783
1,3,5-Trimethylbenzene	A9	0.1231	0.1338	0.1142
2,3-Dimethyloctane	I10	0.0706	0.0908	0.0906
5-Methylnonane	I10	0.1660	0.2136	0.2152
1,2-Methylethylbenzene	A9	0.3697	0.4019	0.3389
2-Methylnonane	I10	0.1491	0.1919	0.1950
3-Ethyloctane	I10	0.1032	0.1328	0.1326
3-Methylnonane	I10	0.1974	0.2540	0.2557
1,2,4-Trimethylbenzene	A9	0.0287	0.0312	0.0263
t-Butylbenzene	A10	0.1279	0.1553	0.1324
i-Butylcyclohexane	N10	0.2574	0.3265	0.2970
1t-Methyl-2-n-propylcyclohexane	I10	0.1318	0.1529	0.1555
i-Butylbenzene	A10	0.0529	0.0642	0.0556
sec-Butylbenzene	A10	0.0614	0.0745	0.0639
UnknownC9s	U9	2.3487	2.7244	2.8018
n-Decane	P10	1.2294	1.5820	1.5996
1,2,3-Trimethylbenzene	A9	0.1383	0.1503	0.1242
1,3-Methyl-i-propylbenzene	A10	0.0826	0.0898	0.0757
1,4-Methyl-i-propylbenzene	A10	0.0937	0.1019	0.0859
Sec-Butylcyclohexane	N10	0.2131	0.2703	0.2455
1,2-Methyl-i-propylbenzene	A10	0.1531	0.1858	0.1565
3-Ethylnonane	I10	0.0748	0.0963	0.0978
1,3-Diethylbenzene	A10	0.1467	0.1781	0.1523
1,3-Methyl-n-propylbenzene	A10	0.0819	0.0994	0.0853
1,4-Diethylbenzene	A10	0.1551	0.1883	0.1614
1,4-Methyl-n-propylbenzene	A10	0.0464	0.0563	0.0484
n-Butylbenzene	A10	0.1826	0.2217	0.1900
1,3-Dimethyl-5-ethylbenzene	A10	0.0711	0.0863	0.0737
1,2-Diethylbenzene	A10	0.1467	0.1781	0.1496
1,2-Methyl-n-propylbenzene	A10	0.1021	0.1239	0.1048
1,4-Dimethyl-2-ethylbenzene	A10	0.1050	0.1275	0.1074
1,3-Dimethyl-4-ethylbenzene	A10	0.0422	0.0512	0.0432
1,2-Dimethyl-4-ethylbenzene	A10	0.2956	0.3588	0.3031
1,3-Dimethyl-2-ethylbenzene	A10	0.0858	0.1041	0.0864
1t,2c,4-Trimethylcyclopentane	A10	0.5154	0.5230	0.5164
1,2-Dimethyl-3-ethylbenzene	A10	0.0954	0.1158	0.0959
1,2-Ethyl-i-propylbenzene	A10	0.1079	0.1310	0.1104
1,4-Methyl-t-butylbenzene	A11	0.2050	0.2488	0.2096
UnknownC10s	U10	3.2329	4.1600	4.2062
n-Undecane	P11	1.1698	1.6537	1.6489
1,4-Ethyl-i-propylbenzene	A11	0.0735	0.0892	0.0752
1,2,4,5-Tetramethylbenzene	A11	0.1361	0.1652	0.1377
1,2-Methyl-n-butylbenzene	A11	0.0665	0.0807	0.0680
1,2,3,5-Tetramethylbenzene	A11	0.1415	0.1718	0.1426
1,2-Methyl-t-butylbenzene	A11	0.0816	0.0990	0.0834
5-Methylindan	A11	0.0181	0.0279	0.0275
4-Methylindan	A11	0.0126	0.0194	0.0191
1,2-Ethyl-n-propylbenzene	A11	0.1133	0.1375	0.1159
2-Methylindan	A11	0.0936	0.1442	0.1422
1,3-Methyl-n-butylbenzene	A11	0.1072	0.1301	0.1096
1,3-Di-i-propylbenzene	A11	0.0777	0.0943	0.0795
sec-Pentylbenzene	A11	0.2067	0.2509	0.2114
n-Pentylbenzene	A11	0.0513	0.0688	0.0592

1t-M-2-(4MP)cyclopentane	P12	0.0216	0.0333	0.0328
1,2-Di-n-propylbenzene	A11	0.1016	0.1233	0.1039
1,4-Di-i-propylbenzene	A11	0.0705	0.0856	0.0721
Tetrahydronaphthalene	A10	0.0180	0.0219	0.0184
t-Decahydronaphthalene	A10	0.1230	0.1493	0.1258
Naphthalene	A10	0.1103	0.1279	0.1078
1-t-Butyl-3,5-dimethylbenzene	A12	0.1619	0.1965	0.1656
1,4-Ethyl-t-butylbenzene	A11	0.0632	0.0767	0.0646
UnknownC11s	U11	2.0896	2.9540	2.9454
n-Dodecane	P12	0.7794	1.2007	1.1840
1,3-Di-n-propylbenzene	A12	0.0723	0.0878	0.0740
1,3,5-Triethylbenzene	A12	0.0848	0.0922	0.0787
1,2,4-Triethylbenzene	A12	0.2899	0.3151	0.2656
1,4-Methyl-n-pentylbenzene	A12	0.0486	0.0590	0.0497
n-Hexylbenzene	A12	0.0617	0.0905	0.0779
1,2,3,4,5-Pentamethylbenzene	A13	0.0840	0.1020	0.0859
2-Methylnaphthalene	A11	0.1154	0.1484	0.1250
1-Methylnaphthalene	A11	0.1603	0.2062	0.1493
UnknownC12s	U12	1.2831	1.9767	1.9493
n-Tridecane	P13	0.2784	0.4642	0.4524
UnknownC13s	U13	0.8231	1.3724	1.3374
n-Tetradecane	P14	0.1904	0.3416	0.3322
UnknownC14s	U14	0.8563	1.5364	1.4941
n-Pentadecane	P15	0.2657	0.5104	0.4906
UnknownC15s	U15	0.6753	1.2973	1.2471
n-Hexadecane	P16	0.2025	0.4147	0.3961
UnknownC16s	U16	0.5072	1.0387	0.9920
n-Heptadecane	P17	0.0887	0.1929	0.1837
UnknownC17s	U17	0.1510	0.3284	0.3127
n-Octadecane	P18	0.0334	0.0769	0.0730
UnknownC18s	U18	0.0395	0.0909	0.0863
n-Nonadecane	P19	0.0168	0.0408	0.0385
UnknownC19s	U19	0.0084	0.0204	0.0192
n-Eicosane	P20	0.0157	0.0401	0.0376
n-Heneicosane	P21	0.0064	0.0172	0.0161
n-Docosane	P22	0.0032	0.0090	0.0084
n-Tricosane	P23	0.0018	0.0053	0.0049
TOTAL		100.0000	100.0000	100.0000

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303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201310129	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS, INC.	ANALYSIS DATE:	OCTOBER 25, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 18, 2013
PRODUCER :		CYLINDER NO. :	0652
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 13:10		
	SHULL 3-25-9-60		
FIELD DATA		SAMPLE TEMP. :	75
SAMPLE PRES. :	130	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN (1-7) @ 7PPM @ 13:15		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0007	0.0018		
HELIUM	0.02	0.00	---	---
OXYGEN/ARGON	0.02	0.03	---	---
NITROGEN	1.05	1.25	---	---
CARBON DIOXIDE	2.83	5.29	---	---
METHANE	70.68670	48.18930	---	---
ETHANE	11.3499	14.5032	3.0313	3.0478
PROPANE	8.8629	16.6082	2.4376	2.4509
I-BUTANE	0.8365	2.0661	0.2733	0.2748
N-BUTANE	2.7484	6.7885	0.8649	0.8697
I-PENTANE	0.5120	1.5657	0.1842	0.1852
N-PENTANE	0.5915	1.8136	0.2142	0.2154
HEXANES PLUS	0.4914	1.8936	0.1950	0.1959
TOTALS	100.00000	100.00000	7.2005	7.2397

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.650	14.730
BENZENE	0.0164	0.0544	LOW NET DRY REAL :	1203.6 /scf	1210.2 /scf
TOLUENE	0.0090	0.0352	NET WET REAL :	1182.6 /scf	1189.1 /scf
ETHYLBENZENE	0.0010	0.0045	HIGH GROSS DRY REAL :	1323.6 /scf	1330.9 /scf
XYLENES	0.0022	0.0099	GROSS WET REAL :	1300.5 /scf	1307.7 /scf
TOTAL BTEX	0.0286	0.1040	NET DRY REAL :	19422.2 /lb	19528.3 /lb
			GROSS DRY REAL :	21361.4 /lb	21478.1 /lb

RELATIVE DENSITY (AIR=1):	0.8119
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.
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RESPONSIBILITY FOR ACCURACY OF THE REPORTED INFORMATION NOR ANY CONSEQUENCES OF ITS APPLICATION.



303-637-0150

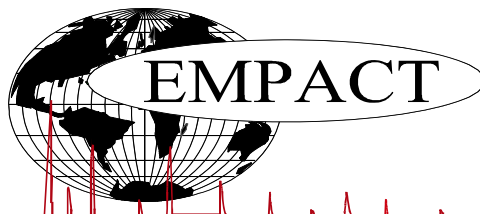
EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201310129	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS, INC.	ANALYSIS DATE:	OCTOBER 25, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 18, 2013
PRODUCER :		CYLINDER NO. :	0652
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 13:10		
	SHULL 3-25-9-60		
FIELD DATA		SAMPLE TEMP. :	75
SAMPLE PRES. :	130	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN (1-7) @ 7PPM @ 13:15		

Componet	Mole %	Wt %
Helium	0.02	0.00
Carbon Dioxide	2.83	5.29
Nitrogen	1.05	1.25
Methane	70.68670	48.18930
Ethane	11.3499	14.5032
Propane	8.8629	16.6082
Isobutane	0.8365	2.0661
n-Butane	2.7484	6.7885
Isopentane	0.4641	1.4230
n-Pentane	0.5915	1.8136
Cyclopentane	0.0479	0.1427
n-Hexane	0.1095	0.4010
Cyclohexane	0.0255	0.0912
Other Hexanes	0.1948	0.7081
Heptanes	0.0813	0.3438
Methycyclohexane	0.0170	0.0709
2,2,4 Trimethylpentane	0.0001	0.0005
Benzene	0.0164	0.0544
Toluene	0.0090	0.0352
Ethylbenzene	0.0010	0.0045
Xylenes	0.0022	0.0099
C8+ Heavies	0.0346	0.1741
<i>Subtotal</i>	99.97930	99.96820
Oxygen/Argon	0.02	0.03
Alcohols	0.0007	0.0018
Total	100.00000	100.00000

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



**EXTENDED NATURAL GAS ANALYSIS (*DHA)
DHA COMPONENT LIST**

PROJECT NO. :	201310129	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS, INC	ANALYSIS DATE:	OCTOBER 25, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 18, 2013
PRODUCER :		CYLINDER NO. :	0652
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 13:10		
	SHULL 3-25-9-60		
FIELD DATA		SAMPLE TEMP. :	75
SAMPLE PRES. :	130	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN (1-7) @	7PPM @ 13:15	

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.02	0.00	---	---
Oxygen/Argon	---	0.02	0.03	---	---
Nitrogen	---	1.05	1.25	---	---
Carbon Dioxide	---	2.83	5.29	---	---
Methane	P1	70.68670	48.18930	---	---
Ethane	P2	11.3499	14.5032	3.031	3.048
Propane	P3	8.8629	16.6082	2.438	2.451
i-Butane	I4	0.8365	2.0661	0.273	0.275
n-Butane	P4	2.7483	6.7882	0.865	0.870
2,2-Dimethylpropane	I5	0.0016	0.0049	0.001	0.001
i-Pentane	I5	0.4625	1.4181	0.169	0.170
Acetone	X3	0.0004	0.0010	0.000	0.000
i-Propanol	X3	0.0002	0.0005	0.000	0.000
UnknownC4s	U4	0.0001	0.0003	0.000	0.000
n-Pentane	P5	0.5915	1.8136	0.214	0.215
t-Butanol	X4	0.0001	0.0003	0.000	0.000
2,2-Dimethylbutane	I6	0.0011	0.0040	0.000	0.000
Cyclopentane	N5	0.0479	0.1427	0.014	0.014
2,3-Dimethylbutane	I6	0.0051	0.0187	0.002	0.002
2-Methylpentane	I6	0.0835	0.3058	0.035	0.035
3-Methylpentane	I6	0.0433	0.1586	0.018	0.018
n-Hexane	P6	0.1095	0.4010	0.045	0.045
2,2-Dimethylpentane	I7	0.0003	0.0013	0.000	0.000
Methylcyclopentane	N6	0.0618	0.2210	0.022	0.022
2,4-Dimethylpentane	I7	0.0023	0.0098	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0164	0.0544	0.005	0.005
3,3-Dimethylpentane	I7	0.0002	0.0009	0.000	0.000
Cyclohexane	N6	0.0255	0.0912	0.009	0.009
2-Methylhexane	I7	0.0098	0.0417	0.005	0.005
2,3-Dimethylpentane	I7	0.0048	0.0204	0.002	0.002
1,1-Dimethylcyclopentane	N7	0.0019	0.0080	0.001	0.001
3-Methylhexane	I7	0.0117	0.0498	0.005	0.005
1c,3-Dimethylcyclopentane	N7	0.0061	0.0255	0.003	0.003
1t,3-Dimethylcyclopentane	N7	0.0054	0.0225	0.002	0.002
3-Ethylpentane	I7	0.0009	0.0038	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0116	0.0484	0.005	0.005
2,2,4-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
n-Heptane	P7	0.0223	0.0950	0.010	0.010
1c,2-Dimethylcyclopentane	N7	0.0008	0.0034	0.000	0.000
Methylcyclohexane	N7	0.0170	0.0709	0.007	0.007
2,2-Dimethylhexane	I8	0.0010	0.0048	0.000	0.000
Ethylcyclopentane	N7	0.0031	0.0129	0.001	0.001
2,5-Dimethylhexane	I8	0.0004	0.0020	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
2,4-Dimethylhexane	I8	0.0007	0.0034	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0014	0.0067	0.001	0.001
3,3-Dimethylhexane	I8	0.0001	0.0005	0.000	0.000

1t,2c,4-Trimethylcyclopentane	N8	0.0017	0.0081	0.001	0.001
2,3,4-Trimethylpentane	I8	0.0003	0.0014	0.000	0.000
Toluene	A7	0.0090	0.0352	0.003	0.003
2,3-Dimethylhexane	I8	0.0005	0.0024	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0004	0.0020	0.000	0.000
2-Methylheptane	I8	0.0030	0.0146	0.002	0.002
4-Methylheptane	I8	0.0009	0.0044	0.000	0.000
3-Methyl-3-ethylpentane	I8	0.0001	0.0005	0.000	0.000
3,4-Dimethylhexane	I8	0.0001	0.0005	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0001	0.0005	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0001	0.0005	0.000	0.000
3-Methylheptane	I8	0.0015	0.0073	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0019	0.0091	0.001	0.001
3-Ethylhexane	I8	0.0003	0.0014	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0007	0.0034	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0002	0.0009	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0005	0.0024	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0005	0.0024	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0015	0.0071	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0010	0.0048	0.001	0.001
n-Octane	P8	0.0044	0.0214	0.002	0.002
1c,4-Dimethylcyclohexane	N8	0.0003	0.0014	0.000	0.000
i-Propylcyclopentane	I8	0.0001	0.0005	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0003	0.0014	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0014	0.0075	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0005	0.0027	0.000	0.000
2,4-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
Ethylcyclohexane	N8	0.0006	0.0029	0.000	0.000
n-Propylcyclopentane	N8	0.0002	0.0009	0.000	0.000
3,3-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
2,6-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0002	0.0011	0.000	0.000
Ethylbenzene	I8	0.0010	0.0045	0.000	0.000
1c,2t,4t-Trimethylcyclohexane	N9	0.0001	0.0006	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0014	0.0063	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0002	0.0009	0.000	0.000
3,4-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0001	0.0006	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0006	0.000	0.000
4-Methyloctane	I9	0.0003	0.0016	0.000	0.000
2-Methyloctane	I9	0.0003	0.0016	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0006	0.000	0.000
3-Ethylheptane	I9	0.0001	0.0006	0.000	0.000
3-Methyloctane	I9	0.0003	0.0016	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0001	0.0006	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0006	0.0027	0.000	0.000
i-Butylcyclopentane	N9	0.0002	0.0011	0.000	0.000
UnknownC8s	U8	0.0001	0.0005	0.000	0.000
n-Nonane	P9	0.0010	0.0054	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0001	0.0006	0.000	0.000
i-Propylbenzene	A9	0.0003	0.0015	0.000	0.000
i-Propylcyclohexane	N9	0.0001	0.0006	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Butylcyclopentane	N9	0.0002	0.0011	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Propylbenzene	A9	0.0002	0.0010	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	0.0002	0.0010	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0005	0.000	0.000
5-Methylnonane	I10	0.0001	0.0006	0.000	0.000
1,2-Methylethylbenzene	A9	0.0002	0.0010	0.000	0.000
3-Methylnonane	I10	0.0001	0.0006	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0009	0.0049	0.001	0.001
n-Decane	P10	0.0002	0.0012	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0001	0.0005	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0001	0.0006	0.000	0.000
Sec-Butylcyclohexane	A10	0.0001	0.0006	0.000	0.000
UnknownC10s	U10	0.0004	0.0024	0.000	0.000

n-Undecane	P11	0.0001	0.0007	0.000	0.000
1,4-Di-i-propylbenzene	A11	0.0001	0.0007	0.000	0.000
TOTAL		100.00000	100.00000	7.2005	7.2397

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.650	14.730
BENZENE	0.0164	0.0544	LOW NET DRY REAL :	1203.6 /scf	1210.2 /scf
TOLUENE	0.0090	0.0352	NET WET REAL :	1182.6 /scf	1189.1 /scf
ETHYLBENZENE	0.0010	0.0045	HIGH GROSS DRY REAL :	1323.6 /scf	1330.9 /scf
XYLENES	0.0022	0.0099	GROSS WET REAL :	1300.5 /scf	1307.7 /scf
TOTAL BTEX	0.0286	0.1040	NET DRY REAL :	19422.2 /lb	19528.3 /lb
			GROSS DRY REAL :	21361.4 /lb	21478.1 /lb

RELATIVE DENSITY (AIR=1): 0.8119
 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.
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