CRUDE OIL ASSAY

PROJECT NO. :	201312010	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 3, 2013
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 2, 2013
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	TANK BATTERY @ 16:50 BOB WHITE 4-36-8-62		EMPACT
FIELD DATA		SAMPLE TEMP. :	68
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

SPECIFICATION	TEST METHOD	UNITS	RESULTS
API GRAVITY		API 60/60	36.3
RVP @100 DEG F	D323	PSIG	6.4
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 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. :	201312010	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 5, 2013
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 2, 2013
PRODUCER :		CYLINDER NO. :	7043
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 16:00 BOB WHITE 4-36-8-62		EMPACT
FIELD DATA		SAMPLE TEMP. :	159
SAMPLE PRES. :	30	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
NITROGEN (AIR)	0.0338	0.0089	0.0081
CARBON DIOXIDE	0.0360	0.0149	0.0135
METHANE	0.2275	0.0342	0.0844
ETHANE	0.3676	0.1036	0.2153
PROPANE	1.1009	0.4552	0.6646
I-BUTANE	0.3982	0.2170	0.2854
N-BUTANE	1.7237	0.9392	1.1904
I-PENTANE	0.8441	0.5710	0.6766
N-PENTANE	1.3676	0.9251	1.0850
HEXANES PLUS	93.9006	96.7309	95.7767
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	**MOLE%**	**MASS%**
BENZENE	1.5201	1.1132
TOLUENE	3.2479	2.8057
ETHYLBENZENE	0.6370	0.6341
XYLENE	2.4009	2.3898
TOTAL BTEX	7.8059	6.9428

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

	TOTAL SAMPLE	**C6+ FRACTION**	
Specific Gravity (H2O=1) =	0.7404	0.7477	60/60
API Gravity =	59.61	57.75	60/60
Molecular Weight =	106.66	110.508	
Absolute Density =	6.17	6.23	LBS/GAL
Heating Value Liq. Idl Gas=	125784	127087	BTU/GAL
Vapor/Liquid =	21.99	21.47	CUFT/GAL
Vapor Pressure =	19.74	1.86	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. :	201312010	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 5, 2013
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 2, 2013
PRODUCER :		CYLINDER NO. :	7043
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 16:00		EMPACT
	BOB WHITE 4-36-8-62		
FIELD DATA		SAMPLE TEMP. :	159
SAMPLE PRES. :	30	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0360		0.0149		0.0135	
NITROGEN (AIR)	0.0338		0.0089		0.0081	
METHANE	0.2275		0.0342		0.0844	
ETHANE	0.3676		0.1036		0.2153	
PROPANE	1.1009		0.4552		0.6646	
I-BUTANE	0.3982		0.2170		0.2854	
N-BUTANE	1.7237		0.9392		1.1904	
I-PENTANE	0.8441		0.5710		0.6766	
N-PENTANE	1.3676		0.9251		1.0850	
CYCLOPENTANE (N-C5)	1.4605		0.9603		0.9351	
N-HEXANE	7.1890		5.8088		6.4782	
CYCLOHEXANE (OTHER C6)	3.2625		2.5742		2.4321	
OTHER HEXANES	11.2540		8.9962		9.5093	
OTHER HEPTANES	15.5589		14.5423		15.1108	
METHYLCYCLOHEXANE (OTHER C7)	5.1310		4.7234		4.5131	
2,2,4 TRIMETHYLPENTANE	0.9655		0.8888		0.8732	
BENZENE	1.5201		1.1132		0.9333	
TOLUENE	3.2479		2.8057		2.3755	
ETHYLBENZENE	0.6370		0.6341		0.5368	
XYLENES	2.4009		2.3898		2.0286	
OTHER OCTANES	12.0579		12.9248		12.8428	
OCTANES PLUS	----	45.2767	----	55.2068	----	53.4893
NONANES	11.4199		13.5760		13.3081	
DECANES PLUS	17.7955		24.7933		23.8998	
SUB TOTAL	100.0000		100.0000		100.0000	
TOTAL	100.0000		100.0000		100.0000	

API Gravity =	**59.61**	60/60
Vapor Pressure =	**19.74**	PSIA & 100 F
Average Molecular Weight of Decanes plus =	**148.61**	
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. :	201312010	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 5, 2013
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 2, 2013
PRODUCER :		CYLINDER NO. :	7043
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 16:00		EMPACT
	BOB WHITE 4-36-8-62		
FIELD DATA		SAMPLE TEMP. :	159
SAMPLE PRES. :	30	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
NITROGEN		0.0338	0.0089	0.0081
CARBON DIOXIDE		0.0360	0.0149	0.0135
	C1	0.2275	0.0342	0.0844
	C2	0.3676	0.1036	0.2153
	C3	1.1009	0.4552	0.6646
	C4	2.1219	1.1562	1.4758
	C5	3.6722	2.4564	2.6967
	C6	23.2256	18.4924	19.3529
	C7	23.9378	22.0714	21.9994
	C8	16.0613	16.8375	16.2814
	C9	11.4199	13.5760	13.3081
	C10	9.8327	12.7100	12.3397
	C11	4.3026	6.0870	5.7957
	C12	1.8432	2.7557	2.6328
	C13	1.0950	1.8655	1.8032
	C14	0.5121	0.9525	0.9237
	C15	0.1890	0.3764	0.3608
	C16	0.0118	0.0251	0.0239
	C17	0.0052	0.0117	0.0111
	C18	0.0031	0.0074	0.0070
	C19	0.0008	0.0020	0.0019
	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

EMPACT ANALYTICAL SYSTEMS INC.
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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201312010	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 5, 2013
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 2, 2013
PRODUCER :		CYLINDER NO. :	7043
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 16:00		EMPACT
	BOB WHITE 4-36-8-62		
FIELD DATA		SAMPLE TEMP. :	159
SAMPLE PRES. :	30	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0338	0.0089	0.0081
Carbon Dioxide	NHC	0.0360	0.0149	0.0135
Methane	P1	0.2275	0.0342	0.0844
Ethane	P2	0.3676	0.1036	0.2153
Propane	P3	1.1009	0.4552	0.6646
i-Butane	I4	0.3982	0.2170	0.2854
n-Butane	P4	1.7237	0.9392	1.1904
i-Pentane	I5	0.8441	0.5710	0.6766
n-Pentane	P5	1.3676	0.9251	1.0850
2,2-Dimethylbutane	I6	0.0287	0.0232	0.0263
Cyclopentane	N5	1.4605	0.9603	0.9351
2,3-Dimethylbutane	I6	0.3669	0.2964	0.3289
2-Methylpentane	I6	3.6299	2.9328	3.3004
3-Methylpentane	I6	2.1280	1.7194	1.9027
n-Hexane	P6	7.1890	5.8088	6.4782
2,2-Dimethylpentane	I7	0.0135	0.0127	0.0138
Methylcyclopentane	N6	5.1005	4.0244	3.9510
2,4-Dimethylpentane	I7	0.3014	0.2831	0.3098
2,2,3-Trimethylbutane	I7	0.0182	0.0171	0.0182
Benzene	A6	1.5201	1.1132	0.9333
3,3-Dimethylpentane	I7	0.0238	0.0224	0.0238
Cyclohexane	N6	3.2625	2.5742	2.4321
2-Methylhexane	I7	1.1776	1.1063	1.2001
2,3-Dimethylpentane	I7	0.9569	0.8989	0.9473
1,1-Dimethylcyclopentane	N7	0.5134	0.4726	0.4608
3-Methylhexane	I7	1.9570	1.8384	1.9643
1c,3-Dimethylcyclopentane	N7	1.0641	0.9796	0.9674
1t,3-Dimethylcyclopentane	N7	0.9655	0.8888	0.8732
3-Ethylpentane	I7	0.0699	0.0657	0.0691
1t,2-Dimethylcyclopentane	N7	1.9817	1.8243	1.7859
2,2,4-Trimethylpentane	I8	0.1881	0.2014	0.2132
n-Heptane	P7	5.3894	5.0628	5.4452
1c,2-Dimethylcyclopentane	N7	0.1405	0.1293	0.1232
Methylcyclohexane	N7	5.1310	4.7234	4.5131
2,2-Dimethylhexane	I8	0.2511	0.2689	0.2843

1,1,3-Trimethylcyclopentane	N7	0.2482	0.2611	0.2567
Ethylcyclopentane	N7	0.7378	0.6792	0.6520
2,5-Dimethylhexane	I8	0.1061	0.1136	0.1204
2,2,3-Trimethylpentane	I8	0.0413	0.0442	0.0454
2,4-Dimethylhexane	I8	0.2636	0.2823	0.2978
1c,2t,4-Trimethylcyclopentane	N8	0.4769	0.5017	0.4836
3,3-Dimethylhexane	I8	0.0620	0.0664	0.0688
2,3,4-Trimethylpentane	I8	0.0899	0.0963	0.0985
2,3,3-Trimethylpentane	I8	0.0298	0.0319	0.0323
Toluene	A7	3.2479	2.8057	2.3755
2,3-Dimethylhexane	I8	0.1747	0.1871	0.1934
2-Methyl-3-ethylpentane	I8	0.1631	0.1747	0.1786
1,1,2-Trimethylcyclopentane	N8	0.0234	0.0246	0.0234
2-Methylheptane	I8	1.4194	1.5201	1.5992
4-Methylheptane	I8	0.4093	0.4383	0.4500
3-Methyl-3-ethylpentane	I8	0.1967	0.2107	0.2132
3,4-Dimethylhexane	I8	0.1208	0.1294	0.1323
1c,2c,4-Trimethylcyclopentane	N8	0.0394	0.0414	0.0395
1c,3-Dimethylcyclohexane	N8	0.0396	0.0417	0.0401
3-Methylheptane	I8	0.2301	0.2464	0.2570
1c,2t,3-Trimethylcyclopentane	N8	1.3830	1.4549	1.3897
3-Ethylhexane	I8	0.2654	0.2842	0.2933
1t,4-Dimethylcyclohexane	N8	0.7064	0.7431	0.7171
1,1-Dimethylcyclohexane	N8	0.1469	0.1545	0.1456
3t-Ethylmethylcyclopentane	N8	0.2410	0.2535	0.2433
2t-Ethylmethylcyclopentane	N8	0.1799	0.1893	0.1812
1,1-Methylethylcyclopentane	N8	0.7289	0.7668	0.7227
2,2,4-Trimethylhexane	I9	0.0605	0.0728	0.0749
1t,2-Dimethylcyclohexane	N8	0.7373	0.7756	0.7358
n-Octane	P8	1.8769	2.0101	2.1047
1c,4-Dimethylcyclohexane	N8	1.2486	1.3135	1.2349
i-Propylcyclopentane	I8	0.0646	0.0680	0.0645
2,4,4-Trimethylhexane	I9	0.0186	0.0224	0.0228
2,2,3,4-Tetramethylpentane	I9	0.0142	0.0171	0.0175
2,3,4-Trimethylhexane	I9	0.0258	0.0310	0.0316
1c,2-Dimethylcyclohexane	N8	0.1899	0.1998	0.1847
2,3,5-Trimethylhexane	I9	0.0929	0.1117	0.1139
2,2-Dimethylheptane	I9	0.0170	0.0204	0.0211
1,1,4-Trimethylcyclohexane	N9	0.9760	1.1552	1.1016
2,2,3-Trimethylhexane	I9	0.4123	0.4958	0.5003
2,4-Dimethylheptane	I9	0.2540	0.3054	0.3141
4,4-Dimethylheptane	I9	0.1074	0.1291	0.1328
Ethylcyclohexane	N8	0.6588	0.6931	0.6477
n-Propylcyclopentane	N8	0.1899	0.1998	0.1894
1c,3c,5-Trimethylcyclohexane	N9	0.0545	0.0645	0.0615
2,5-Dimethylheptane	I9	0.1001	0.1204	0.1236
3,3-Dimethylheptane	I9	0.0972	0.1169	0.1200
3,5-Dimethylheptane	I9	0.0486	0.0584	0.0600
2,6-Dimethylheptane	I9	0.0614	0.0738	0.0766
1,1,3-Trimethylcyclohexane	N9	0.0496	0.0587	0.0560
Ethylbenzene	A8	0.6370	0.6341	0.5368
1c,2t,4t-Trimethylcyclohexane	N9	0.3983	0.4714	0.4410
2,3-Dimethylheptane	I9	0.0036	0.0043	0.0044
1,3-Dimethylbenzene (m-Xylene)	A8	0.8072	0.8035	0.6841
1,4-Dimethylbenzene (p-Xylene)	A8	0.9944	0.9898	0.8455
3,4-Dimethylheptane	I9	0.2431	0.2923	0.2941
3,4-Dimethylheptane (2)	I9	0.2221	0.2671	0.2688
4-Ethylheptane	I9	0.0759	0.0913	0.0939
4-Methyloctane	I9	0.2667	0.3207	0.3275
2-Methyloctane	I9	0.2986	0.3591	0.3703
1c,2t,4c-Trimethylcyclohexane	I9	0.1461	0.1757	0.1782
3-Ethylheptane	I9	0.0610	0.0734	0.0743
3-Methyloctane	I9	0.2898	0.3485	0.3558
3,3-Diethylpentane	I9	0.0538	0.0647	0.0631
1c,2t,3-Trimethylcyclohexane	N9	0.1029	0.1218	0.1139
1,1,2-Trimethylcyclohexane	N9	0.0308	0.0365	0.0341
1,2-Dimethylbenzene (o-Xylene)	A8	0.5993	0.5965	0.4990

i-Butylcyclopentane	N9	0.2864	0.3390	0.3195
UnknownC8s	U8	0.0806	0.0863	0.0904
n-Nonane	P9	1.2641	1.5200	1.5587
1,1-Methylethylcyclohexane	N9	0.7146	0.8593	0.8839
i-Propylbenzene	A9	0.3817	0.4301	0.3666
i-Propylcyclohexane	N9	0.0788	0.0933	0.0856
2,2-Dimethyloctane	I10	0.0837	0.1117	0.1112
2,4-Dimethyloctane	I10	0.0767	0.1023	0.1018
2,6-Dimethyloctane	I10	0.0121	0.0161	0.0166
2,5-Dimethyloctane	I10	0.0420	0.0560	0.0557
n-Butylcyclopentane	N9	0.1959	0.2576	0.2373
3,3-Dimethyloctane	I10	0.0773	0.1031	0.1027
n-Propylbenzene	A9	0.2508	0.2826	0.2409
3,6-Dimethyloctane	I10	0.1907	0.2544	0.2532
3-Methyl-5-ethylheptane	I10	0.3937	0.4734	0.4801
1,3-Methylethylbenzene	A9	0.3875	0.4367	0.3692
1,4-Methylethylbenzene	A9	0.2846	0.3207	0.2711
1,3,5-Trimethylbenzene	A9	0.0805	0.0907	0.0772
2,3-Dimethyloctane	I10	0.0647	0.0863	0.0859
5-Methylnonane	I10	0.1316	0.1755	0.1763
1,2-Methylethylbenzene	A9	0.2264	0.2551	0.2145
2-Methylnonane	I10	0.0672	0.0896	0.0908
3-Ethyloctane	I10	0.0693	0.0924	0.0920
3-Methylnonane	I10	0.1315	0.1754	0.1760
1,2,4-Trimethylbenzene	A9	0.0419	0.0472	0.0397
t-Butylbenzene	A10	0.2065	0.2598	0.2209
i-Butylcyclohexane	N10	0.1910	0.2512	0.2278
1t-Methyl-2-n-propylcyclohexane	I10	0.0818	0.0984	0.0998
i-Butylbenzene	A10	0.0657	0.0827	0.0714
sec-Butylbenzene	A10	0.0910	0.1145	0.0979
UnknownC9s	U9	2.4340	2.9268	3.0014
n-Decane	P10	1.0946	1.4601	1.4721
1,2,3-Trimethylbenzene	A9	0.2099	0.2365	0.1948
1,3-Methyl-i-propylbenzene	A10	0.0881	0.0993	0.0835
1,4-Methyl-i-propylbenzene	A10	0.0549	0.0619	0.0521
Sec-Butylcyclohexane	N10	0.2380	0.3130	0.2835
1,2-Methyl-i-propylbenzene	A10	0.1458	0.1835	0.1542
3-Ethylnonane	I10	0.0225	0.0300	0.0304
1,3-Diethylbenzene	A10	0.1013	0.1275	0.1087
1,3-Methyl-n-propylbenzene	A10	0.0623	0.0784	0.0671
1,4-Diethylbenzene	A10	0.1071	0.1348	0.1152
1,4-Methyl-n-propylbenzene	A10	0.0606	0.0763	0.0655
n-Butylbenzene	A10	0.0614	0.0773	0.0661
1,3-Dimethyl-5-ethylbenzene	A10	0.1316	0.1656	0.1410
1,2-Diethylbenzene	A10	0.0687	0.0864	0.0724
1,2-Methyl-n-propylbenzene	A10	0.0686	0.0863	0.0728
1,4-Dimethyl-2-ethylbenzene	A10	0.0904	0.1138	0.0956
1,3-Dimethyl-4-ethylbenzene	A10	0.0554	0.0697	0.0586
1,2-Dimethyl-4-ethylbenzene	A10	0.1399	0.1760	0.1482
1,3-Dimethyl-2-ethylbenzene	A10	0.0508	0.0639	0.0529
1t,2c,4-Trimethylcyclopentane	A10	0.5885	0.6191	0.6096
1,2-Dimethyl-3-ethylbenzene	A10	0.1152	0.1450	0.1197
1,2-Ethyl-i-propylbenzene	A10	0.0355	0.0447	0.0376
1,4-Methyl-t-butylbenzene	A11	0.0405	0.0510	0.0428
UnknownC10s	U10	4.3265	5.7712	5.8187
n-Undecane	P11	0.7866	1.1527	1.1461
1,4-Ethyl-i-propylbenzene	A11	0.1576	0.1983	0.1666
1,2,4,5-Tetramethylbenzene	A11	0.0732	0.0921	0.0766
1,2-Methyl-n-butylbenzene	A11	0.1011	0.1272	0.1069
1,2,3,5-Tetramethylbenzene	A11	0.0642	0.0808	0.0669
1,2-Methyl-t-butylbenzene	A11	0.0476	0.0599	0.0503
5-Methylindan	A11	0.0235	0.0375	0.0369
4-Methylindan	A11	0.0412	0.0658	0.0647
1,2-Ethyl-n-propylbenzene	A11	0.1540	0.1938	0.1628
2-Methylindan	A11	0.0326	0.0521	0.0512
1,3-Methyl-n-butylbenzene	A11	0.0391	0.0492	0.0413
1,3-Di-i-propylbenzene	A11	0.0241	0.0303	0.0255

sec-Pentylbenzene	A11	0.0589	0.0741	0.0623
n-Pentylbenzene	A11	0.0253	0.0352	0.0302
1t-M-2-(4MP)cyclopentane	P12	0.0416	0.0664	0.0653
1,2-Di-n-propylbenzene	A11	0.0967	0.1217	0.1022
1,4-Di-i-propylbenzene	A11	0.0921	0.1159	0.0974
Tetrahydronaphthalene	A10	0.0140	0.0176	0.0148
t-Decahydronaphthalene	A10	0.0741	0.0932	0.0783
Naphthalene	A10	0.0604	0.0726	0.0610
1-t-Butyl-3,5-dimethylbenzene	A12	0.0398	0.0501	0.0421
1,4-Ethyl-t-butylbenzene	A11	0.0377	0.0474	0.0398
UnknownC11s	U11	2.2190	3.2519	3.2333
n-Dodecane	P12	0.2621	0.4186	0.4116
1,3-Di-n-propylbenzene	A12	0.0282	0.0355	0.0298
1,3,5-Triethylbenzene	A12	0.0982	0.1107	0.0942
1,2,4-Triethylbenzene	A12	0.2139	0.2410	0.2026
1,4-Methyl-n-pentylbenzene	A12	0.0445	0.0560	0.0471
n-Hexylbenzene	A12	0.0406	0.0618	0.0531
1,2,3,4,5-Pentamethylbenzene	A13	0.0577	0.0726	0.0610
2-Methylnaphthalene	A11	0.0718	0.0957	0.0804
1-Methylnaphthalene	A11	0.1158	0.1544	0.1115
UnknownC12s	U12	1.0743	1.7156	1.6870
n-Tridecane	P13	0.1713	0.2961	0.2877
UnknownC13s	U13	0.8660	1.4968	1.4545
n-Tetradecane	P14	0.0292	0.0543	0.0527
UnknownC14s	U14	0.4829	0.8982	0.8710
n-Pentadecane	P15	0.0140	0.0279	0.0267
UnknownC15s	U15	0.1750	0.3485	0.3341
n-Hexadecane	P16	0.0118	0.0251	0.0239
n-Heptadecane	P17	0.0052	0.0117	0.0111
n-Octadecane	P18	0.0031	0.0074	0.0070
n-Nonadecane	P19	0.0008	0.0020	0.0019
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. :	201312010	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 4, 2013
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 2, 2013
PRODUCER :		CYLINDER NO. :	0712
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 16:15 BOB WHITE 4-36-8-62		
FIELD DATA		SAMPLE TEMP. :	52
SAMPLE PRES. :	21	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 1-7 @ 7 PPM @ 16:25 LENGTH OF H2S STAIN @ 2.5-60 @ 7 PPM @ 16:30		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0010	0.0024		
HELIUM	0.01	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.04	0.05	---	---
NITROGEN	0.98	1.08	---	---
CARBON DIOXIDE	2.56	4.44	---	---
METHANE	66.93410	42.28650	---	---
ETHANE	11.9723	14.1771	3.1993	3.2167
PROPANE	9.3898	16.3058	2.5843	2.5984
I-BUTANE	1.0453	2.3926	0.3416	0.3434
N-BUTANE	3.5681	8.1671	1.1238	1.1300
I-PENTANE	0.8921	2.5261	0.3186	0.3202
N-PENTANE	1.0727	3.0479	0.3886	0.3908
HEXANES PLUS	1.5346	5.5245	0.6237	0.6270
TOTALS	100.00000	100.00000	8.5799	8.6265

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0512	0.1575
TOLUENE	0.0292	0.1060
ETHYLBENZENE	0.0021	0.0088
XYLENES	0.0063	0.0263
TOTAL BTEX	0.0888	0.2986

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1303.5 **/scf**	1310.7 **/scf**
	NET WET REAL :	1280.7 **/scf**	1287.9 **/scf**
HIGH	GROSS DRY REAL :	1430.6 **/scf**	1438.4 **/scf**
	GROSS WET REAL :	1405.6 **/scf**	1413.4 **/scf**
	NET DRY REAL :	19503.5 **/lb**	19610.0 **/lb**
	GROSS DRY REAL :	21407.7 **/lb**	21524.6 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8758
	COMPRESSIBILITY FACTOR :		0.99523

(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

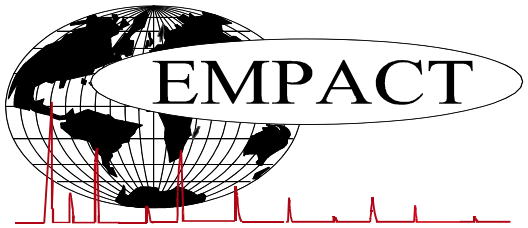
303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201312010	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 4, 2013
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 2, 2013
PRODUCER :		CYLINDER NO. :	0712
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 16:15 BOB WHITE 4-36-8-62		
FIELD DATA		SAMPLE TEMP. :	52
SAMPLE PRES. :	21	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 1-7 @ 7 PPM @ 16:25 LENGTH OF H2S STAIN @ 2.5-60 @ 7 PPM @ 16:30		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	2.56	4.44
Nitrogen	0.98	1.08
Methane	66.93410	42.28650
Ethane	11.9723	14.1771
Propane	9.3898	16.3058
Isobutane	1.0453	2.3926
n-Butane	3.5681	8.1671
Isopentane	0.7834	2.2259
n-Pentane	1.0727	3.0479
Cyclopentane	0.1087	0.3002
n-Hexane	0.3179	1.0789
Cyclohexane	0.0908	0.3010
Other Hexanes	0.5402	1.8182
Heptanes	0.3054	1.1968
Methycyclohexane	0.0701	0.2711
2,2,4 Trimethylpentane	0.0002	0.0009
Benzene	0.0512	0.1575
Toluene	0.0292	0.1060
Ethylbenzene	0.0021	0.0088
Xylenes	0.0063	0.0263
C8+ Heavies	0.1212	0.5590
Subtotal	99.95900	99.94760
Oxygen/Argon	0.04	0.05
Alcohols	0.0010	0.0024
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201312010	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 4, 2013
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 2, 2013
PRODUCER :		CYLINDER NO. :	0712
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 16:15 BOB WHITE 4-36-8-62		
FIELD DATA		SAMPLE TEMP. :	52
SAMPLE PRES. :	21	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 1-7 @ 7 PPM @ 16:25 LENGTH OF H2S STAIN @ 2.5-60 @ 7 PPM @ 16:30		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.01	0.00	---	---
Hydrogen	---	0.00	0.00	---	---
Oxygen/Argon	---	0.04	0.05	---	---
Nitrogen	---	0.98	1.08	---	---
Carbon Dioxide	---	2.56	4.44	---	---
Methane	P1	66.93410	42.28650	---	---
Ethane	P2	11.9723	14.1771	3.199	3.217
Propane	P3	9.3898	16.3058	2.584	2.598
i-Butane	I4	1.0453	2.3926	0.342	0.343
n-Butane	P4	3.5681	8.1671	1.124	1.130
2,2-Dimethylpropane	I5	0.0032	0.0091	0.001	0.001
Ethanol	X2	0.0002	0.0004	0.000	0.000
i-Pentane	I5	0.7802	2.2168	0.286	0.287
Acetone	X3	0.0003	0.0007	0.000	0.000
i-Propanol	X3	0.0003	0.0007	0.000	0.000
n-Pentane	P5	1.0727	3.0479	0.389	0.391
t-Butanol	X4	0.0002	0.0006	0.000	0.000
2,2-Dimethylbutane	I6	0.0029	0.0099	0.001	0.001
Cyclopentane	N5	0.1087	0.3002	0.032	0.032
2,3-Dimethylbutane	I6	0.0184	0.0625	0.008	0.008
2-Methylpentane	I6	0.2134	0.7242	0.088	0.089
3-Methylpentane	I6	0.1138	0.3862	0.046	0.046
n-Hexane	P6	0.3179	1.0789	0.130	0.131
2,2-Dimethylpentane	I7	0.0014	0.0055	0.001	0.001
Methylcyclopentane	N6	0.1916	0.6350	0.068	0.069
2,4-Dimethylpentane	I7	0.0085	0.0336	0.004	0.004
2,2,3-Trimethylbutane	I7	0.0002	0.0008	0.000	0.000
Benzene	A6	0.0512	0.1575	0.014	0.014
3,3-Dimethylpentane	I7	0.0008	0.0032	0.000	0.000
Cyclohexane	N6	0.0908	0.3010	0.031	0.031
2-Methylhexane	I7	0.0373	0.1472	0.017	0.017
2,3-Dimethylpentane	I7	0.0172	0.0679	0.008	0.008
1,1-Dimethylcyclopentane	N7	0.0098	0.0379	0.004	0.004
3-Methylhexane	I7	0.0425	0.1677	0.019	0.019
1c,3-Dimethylcyclopentane	N7	0.0236	0.0913	0.011	0.011
1t,3-Dimethylcyclopentane	N7	0.0211	0.0816	0.010	0.010

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3-Ethylpentane	I7	0.0033	0.0130	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0416	0.1609	0.019	0.019
2,2,4-Trimethylpentane	I8	0.0002	0.0009	0.000	0.000
UnknownC6s	U6	0.0001	0.0004	0.000	0.000
n-Heptane	P7	0.0853	0.3366	0.039	0.039
1c,2-Dimethylcyclopentane	N7	0.0033	0.0128	0.002	0.002
Methylcyclohexane	N7	0.0701	0.2711	0.028	0.028
2,2-Dimethylhexane	I8	0.0055	0.0247	0.003	0.003
Ethylcyclopentane	N7	0.0094	0.0364	0.004	0.004
2,5-Dimethylhexane	I8	0.0018	0.0081	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0001	0.0004	0.000	0.000
2,4-Dimethylhexane	I8	0.0030	0.0135	0.002	0.002
1c,2t,4-Trimethylcyclopentane	N8	0.0057	0.0252	0.003	0.003
3,3-Dimethylhexane	I8	0.0004	0.0018	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0063	0.0278	0.003	0.003
2,3,4-Trimethylpentane	I8	0.0011	0.0050	0.001	0.001
2,3,3-Trimethylpentane	I8	0.0001	0.0004	0.000	0.000
Toluene	A7	0.0292	0.1060	0.010	0.010
2,3-Dimethylhexane	I8	0.0013	0.0059	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0014	0.0063	0.001	0.001
2-Methylheptane	I8	0.0120	0.0540	0.006	0.006
4-Methylheptane	I8	0.0033	0.0149	0.002	0.002
3-Methyl-3-ethylpentane	I8	0.0003	0.0013	0.000	0.000
3,4-Dimethylhexane	I8	0.0004	0.0018	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0003	0.0013	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0003	0.0013	0.000	0.000
3-Methylheptane	I8	0.0056	0.0252	0.003	0.003
1c,2t,3-Trimethylcyclopentane	N8	0.0080	0.0354	0.004	0.004
3-Ethylhexane	I8	0.0008	0.0036	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0028	0.0124	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0010	0.0044	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0015	0.0066	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0013	0.0058	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0043	0.0190	0.002	0.002
2,2,4-Trimethylhexane	I9	0.0003	0.0015	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0040	0.0177	0.002	0.002
UnknownC7s	U7	0.0001	0.0004	0.000	0.000
n-Octane	P8	0.0154	0.0693	0.008	0.008
1c,4-Dimethylcyclohexane	N8	0.0013	0.0058	0.001	0.001
i-Propylcyclopentane	I8	0.0004	0.0018	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	0.0011	0.0048	0.001	0.001
1,1,4-Trimethylcyclohexane	N9	0.0040	0.0199	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0014	0.0071	0.001	0.001
2,4-Dimethylheptane	I9	0.0004	0.0020	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
Ethylcyclohexane	N8	0.0020	0.0088	0.001	0.001
n-Propylcyclopentane	N8	0.0009	0.0040	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,5-Dimethylheptane	I9	0.0002	0.0010	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	0.0002	0.0010	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0006	0.0030	0.000	0.000
Ethylbenzene	I8	0.0021	0.0088	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0006	0.0030	0.000	0.000
2,3-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000

1,3-Dimethylbenzene (m-Xylene)	A8	0.0041	0.0171	0.002	0.002
1,4-Dimethylbenzene (p-Xylene)	A8	0.0009	0.0038	0.000	0.000
3,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0004	0.0020	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
4-Methyloctane	I9	0.0007	0.0035	0.000	0.000
2-Methyloctane	I9	0.0008	0.0041	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0002	0.0010	0.000	0.000
3-Ethylheptane	I9	0.0003	0.0015	0.000	0.000
3-Methyloctane	I9	0.0010	0.0050	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	0.0002	0.0010	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0013	0.0054	0.000	0.000
i-Butylcyclopentane	N9	0.0006	0.0030	0.000	0.000
UnknownC8s	U8	0.0011	0.0050	0.001	0.001
n-Nonane	P9	0.0027	0.0136	0.002	0.002
1,1-Methylethylcyclohexane	N9	0.0004	0.0020	0.000	0.000
i-Propylbenzene	A9	0.0004	0.0019	0.000	0.000
i-Propylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
2,5-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Butylcyclopentane	N9	0.0004	0.0020	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Propylbenzene	A9	0.0004	0.0019	0.000	0.000
3,6-Dimethyloctane	I10	0.0003	0.0017	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0003	0.0017	0.000	0.000
1,3-Methylethylbenzene	A9	0.0003	0.0014	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0005	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0003	0.0014	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
5-Methylnonane	I10	0.0002	0.0011	0.000	0.000
1,2-Methylethylbenzene	A9	0.0003	0.0014	0.000	0.000
3-Methylnonane	I10	0.0001	0.0006	0.000	0.000
t-Butylbenzene	A10	0.0004	0.0021	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0022	0.0111	0.001	0.001
n-Decane	P10	0.0007	0.0039	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0001	0.0005	0.000	0.000
Sec-Butylcyclohexane	A10	0.0001	0.0006	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Diethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
UnknownC10s	U10	0.0014	0.0078	0.001	0.001
n-Undecane	P11	0.0002	0.0012	0.000	0.000
UnknownC11s	U11	0.0001	0.0006	0.000	0.000
n-Dodecane	P12	0.0001	0.0007	0.000	0.000
n-Tridecane	P13	0.0001	0.0007	0.000	0.000
n-Tetradecane	P14	0.0001	0.0008	0.000	0.000
n-Pentadecane	P15	0.0001	0.0008	0.000	0.000
TOTAL		100.00000	100.00000	8.5799	8.6265

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0512	0.1575
TOLUENE	0.0292	0.1060
ETHYLBENZENE	0.0021	0.0088
XYLENES	0.0063	0.0263
TOTAL BTEX	0.0888	0.2986

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1303.5 **/scf**	1310.7 **/scf**
	NET WET REAL :	1280.7 **/scf**	1287.9 **/scf**
HIGH	GROSS DRY REAL :	1430.6 **/scf**	1438.4 **/scf**
	GROSS WET REAL :	1405.6 **/scf**	1413.4 **/scf**
	NET DRY REAL :	19503.5 **/lb**	19610.0 **/lb**
	GROSS DRY REAL :	21407.7 **/lb**	21524.6 **/lb**

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	RELATIVE DENSITY (AIR=1):	0.8758
(CALC: GPA STD 2145 & TP-17 @14.696 & 60 F)	COMPRESSIBILITY FACTOR :	0.99523

**(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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EMPACT ANALYTICAL SYSTEMS INC.
365 S. MAIN ST.
BRIGHTON, CO
80601
(303) 637-0150

CHAIN OF CUSTODY RECORD

CO. NAME:	CARRIZO OIL & GAS, Inc.	CONTACT NAME:	Russ Wilcox	TELE. NO.:	LAB PROJECT NO.
Sampler *(PRINT NAME):*	Gale McEndree	Signature:	Gale McEndree	FAX NO:	
PROJECT INFO. / NO.	Work Order # 11331				201312010

SAMPLE ID	SAMPLE DESCRIPTION	Comp.	Grab	Date	TIme	SAMPLE MATRIX	Container	No. of Containers	ANALYSIS / METHOD			REMARKS
	BOB WHITE 4-36-8-62											
	Tank Battery		X	12/02/13	16:50	Oil	1 Qt jar	1	API	RVP		TK # 23602 / Deg. 68
	Separator		X	12/02/13	16:00	Oil	500cc Piston	1	DHA			Cyl. # 7043 / Pres 30 / Temp 159
	Sales Gas		X	12/02/13	16:15	NG	300 cc cyl	1	DHA			# 0712 / Pres 21 / temp 52
	Sales Gas		x	12/02/13	16:25	NG	length of Stain	1	SULFUR			1 to 7= 7+ ppm
	Sales Gas		x	12/02/13	16:30	NG	length of Stain	1	SULFUR			2.5 to 60= 7 ppm

COMMENTS:

Relinquished by:(Signature)	Gale McEndree	Received by:(Signature)	TIme:	Date:
Relinquished by:(Signature)		Received by:(Signature)	TIme	Date
Laboratory: EMPACT Analytical		Received for Laboratory by:	TIme	Date
Method of Shipment:	EASI Courier	Dispatched by:(Signature)	TIme:	Date