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

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201308014	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 5, 2013
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 4, 2013
PRODUCER :		CYLINDER NO. :	4037
LEASE NO. :		SAMPLED BY :	BURL MCENDREE
NAME/DESCRIP :	SEPARATOR		EMPACT
	NELSON 2-17-9-60		
FIELD DATA		SAMPLE TEMP. :	162
SAMPLE PRES. :	20	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
NITROGEN (AIR)	0.0530	0.0132	0.0122
CARBON DIOXIDE	0.0312	0.0122	0.0111
METHANE	0.0311	0.0044	0.0109
ETHANE	0.2391	0.0639	0.1337
PROPANE	1.1536	0.4522	0.6646
I-BUTANE	0.3212	0.1659	0.2196
N-BUTANE	1.8037	0.9317	1.1888
I-PENTANE	0.8619	0.5527	0.6593
N-PENTANE	1.5018	0.9631	1.1371
HEXANES PLUS	94.0034	96.8407	95.9627
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	MOLE%	MASS%
BENZENE	1.4260	0.9900
TOLUENE	3.0760	2.5191
ETHYLBENZENE	0.7231	0.6824
XYLENE	2.4283	2.2915
TOTAL BTEX	7.6534	6.4830

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

	TOTAL SAMPLE	C6+ FRACTION	
Specific Gravity (H2O=1) =	0.7457	0.7522	60/60
API Gravity =	58.25	56.61	60/60
Molecular Weight =	112.51	116.542	
Absolute Density =	6.22	6.27	LBS/GAL
Heating Value Liq. Idl Gas=	126291	127678	BTU/GAL
Vapor/Liquid =	20.99	20.51	CUFT/GAL
Vapor Pressure =	8.79	1.64	PSIA @100 F

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

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EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

E & P TANK / GLYCALC INFORMATION

PROJECT NO. :	201308014	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 5, 2013
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 4, 2013
PRODUCER :		CYLINDER NO. :	4037
LEASE NO. :		SAMPLED BY :	BURL MCENDREE
NAME/DESCRIP :	SEPARATOR		EMPACT
	NELSON 2-17-9-60		
FIELD DATA		SAMPLE TEMP. :	162
SAMPLE PRES. :	20	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0312		0.0122		0.0111	
NITROGEN (AIR)	0.0530		0.0132		0.0122	
METHANE	0.0311		0.0044		0.0109	
ETHANE	0.2391		0.0639		0.1337	
PROPANE	1.1536		0.4522		0.6646	
I-BUTANE	0.3212		0.1659		0.2196	
N-BUTANE	1.8037		0.9317		1.1888	
I-PENTANE	0.8619		0.5527		0.6593	
N-PENTANE	1.5018		0.9631		1.1371	
CYCLOPENTANE (N-C5)	1.2893		0.8037		0.7878	
N-HEXANE	6.3711		4.8794		5.4775	
CYCLOHEXANE (OTHER C6)	2.6716		1.9984		1.9007	
OTHER HEXANES	9.9951		7.5769		8.0755	
OTHER HEPTANES	13.4424		11.8854		12.4389	
METHYLCYCLOHEXANE (OTHER C7)	3.9258		3.4261		3.2954	
2,2,4 TRIMETHYLPENTANE	0.8207		0.7162		0.7083	
BENZENE	1.4260		0.9900		0.8356	
TOLUENE	3.0760		2.5191		2.1471	
ETHYLBENZENE	0.7231		0.6824		0.5816	
XYLENES	2.4283		2.2915		1.9557	
OTHER OCTANES	11.5242		11.7183		11.8377	
OCTANES PLUS	----	51.8061	----	62.7617	----	61.0042
NONANES	11.6576		13.1341		12.9098	
DECANES PLUS	24.6522		34.2192		33.0111	
SUB TOTAL	100.0000		100.0000		100.0000	
TOTAL	100.0000		100.0000		100.0000	

API Gravity =	**58.25**	60/60
Vapor Pressure =	**8.79**	PSIA & 100 F
Average Molecular Weight of Decanes plus =	**156.17**	
Average Specific Gravity of Decanes plus =	**0.7720**	

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EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

BY CARBON NUMBER

PROJECT NO. :	201308014	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 5, 2013
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 4, 2013
PRODUCER :		CYLINDER NO. :	4037
LEASE NO. :		SAMPLED BY :	BURL MCENDREE
NAME/DESCRIP :	SEPARATOR		EMPACT
	NELSON 2-17-9-60		
FIELD DATA		SAMPLE TEMP. :	162
SAMPLE PRES. :	20	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
NITROGEN		0.0530	0.0132	0.0122
CARBON DIOXIDE		0.0312	0.0122	0.0111
	C1	0.0311	0.0044	0.0109
	C2	0.2391	0.0639	0.1337
	C3	1.1536	0.4522	0.6646
	C4	2.1249	1.0976	1.4084
	C5	3.6530	2.3195	2.5842
	C6	20.4638	15.4447	16.2893
	C7	20.4442	17.8306	17.8814
	C8	15.4963	15.4084	15.0833
	C9	11.6576	13.1341	12.9098
	C10	10.5606	12.9136	12.4923
	C11	5.6088	7.4921	7.1284
	C12	3.4766	5.0139	4.8576
	C13	2.0541	3.3061	3.2129
	C14	1.3400	2.3628	2.3066
	C15	1.0796	2.0383	1.9670
	C16	0.3967	0.7984	0.7655
	C17	0.1092	0.2334	0.2231
	C18	0.0235	0.0531	0.0506
	C19	0.0019	0.0045	0.0042
	C20	0.0010	0.0025	0.0024
	C21	0.0002	0.0005	0.0005
	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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EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201308014	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 5, 2013
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 4, 2013
PRODUCER :		CYLINDER NO. :	4037
LEASE NO. :		SAMPLED BY :	BURL MCENDREE
NAME/DESCRIP :	SEPARATOR		EMPACT
	NELSON 2-17-9-60		
FIELD DATA		SAMPLE TEMP. :	162
SAMPLE PRES. :	20	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0530	0.0132	0.0122
Carbon Dioxide	NHC	0.0312	0.0122	0.0111
Methane	P1	0.0311	0.0044	0.0109
Ethane	P2	0.2391	0.0639	0.1337
Propane	P3	1.1536	0.4522	0.6646
i-Butane	I4	0.3212	0.1659	0.2196
n-Butane	P4	1.8037	0.9317	1.1888
i-Pentane	I5	0.8619	0.5527	0.6593
n-Pentane	P5	1.5018	0.9631	1.1371
2,2-Dimethylbutane	I6	0.0363	0.0278	0.0317
Cyclopentane	N5	1.2893	0.8037	0.7878
2,3-Dimethylbutane	I6	0.3356	0.2571	0.2872
2-Methylpentane	I6	3.2748	2.5084	2.8417
3-Methylpentane	I6	1.9442	1.4892	1.6589
n-Hexane	P6	6.3711	4.8794	5.4775
2,2-Dimethylpentane	I7	0.0025	0.0022	0.0024
Methylcyclopentane	N6	4.4042	3.2944	3.2560
2,4-Dimethylpentane	I7	0.3187	0.2838	0.3127
2,2,3-Trimethylbutane	I7	0.0303	0.0270	0.0289
Benzene	A6	1.4260	0.9900	0.8356
3,3-Dimethylpentane	I7	0.0201	0.0179	0.0192
Cyclohexane	N6	2.6716	1.9984	1.9007
2-Methylhexane	I7	1.0512	0.9362	1.0224
2,3-Dimethylpentane	I7	0.7362	0.6556	0.6955
1,1-Dimethylcyclopentane	N7	0.3821	0.3335	0.3273
3-Methylhexane	I7	1.6939	1.5086	1.6227
1c,3-Dimethylcyclopentane	N7	0.8747	0.7634	0.7590
1t,3-Dimethylcyclopentane	N7	0.8207	0.7162	0.7083
3-Ethylpentane	I7	0.0508	0.0452	0.0478
1t,2-Dimethylcyclopentane	N7	1.8384	1.6044	1.5812
2,2,4-Trimethylpentane	I8	0.1569	0.1593	0.1698
n-Heptane	P7	4.7169	4.2008	4.5483
1c,2-Dimethylcyclopentane	N7	0.1268	0.1107	0.1062
Methylcyclohexane	N7	3.9258	3.4261	3.2954
2,2-Dimethylhexane	I8	0.4514	0.4583	0.4878
Ethylcyclopentane	N7	0.7791	0.6799	0.6570
2,5-Dimethylhexane	I8	0.1241	0.1260	0.1345
2,2,3-Trimethylpentane	I8	0.0390	0.0396	0.0410
2,4-Dimethylhexane	I8	0.2470	0.2508	0.2664
1c,2t,4-Trimethylcyclopentane	N8	0.3917	0.3907	0.3791
3,3-Dimethylhexane	I8	0.0609	0.0618	0.0645

2,3,4-Trimethylpentane	I8	0.1189	0.1207	0.1242
2,3,3-Trimethylpentane	I8	0.0014	0.0014	0.0014
Toluene	A7	3.0760	2.5191	2.1471
2,3-Dimethylhexane	I8	0.2117	0.2149	0.2236
2-Methyl-3-ethylpentane	I8	0.1435	0.1457	0.1500
1,1,2-Trimethylcyclopentane	N8	0.0132	0.0132	0.0127
2-Methylheptane	I8	1.2202	1.2388	1.3120
4-Methylheptane	I8	0.4793	0.4866	0.5029
3-Methyl-3-ethylpentane	I8	0.0734	0.0745	0.0759
3,4-Dimethylhexane	I8	0.1035	0.1051	0.1081
1c,2c,4-Trimethylcyclopentane	N8	0.0499	0.0498	0.0478
1c,3-Dimethylcyclohexane	N8	0.0376	0.0375	0.0363
3-Methylheptane	I8	0.3333	0.3384	0.3553
1c,2t,3-Trimethylcyclopentane	N8	0.8773	0.8750	0.8414
3-Ethylhexane	I8	0.3908	0.3968	0.4122
1t,4-Dimethylcyclohexane	N8	0.5161	0.5147	0.5000
1,1-Dimethylcyclohexane	N8	0.1200	0.1197	0.1136
3c-Ethylmethylcyclopentane	N8	0.0031	0.0031	0.0030
3t-Ethylmethylcyclopentane	N8	0.2423	0.2416	0.2334
2t-Ethylmethylcyclopentane	N8	0.1969	0.1964	0.1892
1,1-Methylethylcyclopentane	N8	0.7645	0.7625	0.7235
2,2,4-Trimethylhexane	I9	0.0726	0.0828	0.0857
1t,2-Dimethylcyclohexane	N8	0.5949	0.5933	0.5666
1t,3-Dimethylcyclohexane	N8	0.0058	0.0058	0.0055
n-Octane	P8	2.6412	2.6816	2.8266
1c,4-Dimethylcyclohexane	N8	0.6563	0.6545	0.6195
i-Propylcyclopentane	I8	0.0330	0.0329	0.0314
2,4,4-Trimethylhexane	I9	0.0219	0.0250	0.0257
2,2,3,4-Tetramethylpentane	I9	0.0136	0.0155	0.0160
2,3,4-Trimethylhexane	I9	0.0164	0.0187	0.0192
1c,2-Dimethylcyclohexane	N8	0.1706	0.1701	0.1583
2,3,5-Trimethylhexane	I9	0.0320	0.0365	0.0375
2,2-Dimethylheptane	I9	0.0195	0.0222	0.0231
1,1,4-Trimethylcyclohexane	N9	1.0347	1.1610	1.1145
2,2,3-Trimethylhexane	I9	0.4041	0.4607	0.4680
2,4-Dimethylheptane	I9	0.1134	0.1293	0.1339
4,4-Dimethylheptane	I9	0.0860	0.0980	0.1015
Ethylcyclohexane	N8	0.6310	0.6293	0.5920
n-Propylcyclopentane	N8	0.2086	0.2080	0.1984
1c,3c,5-Trimethylcyclohexane	N9	0.0322	0.0361	0.0347
2,5-Dimethylheptane	I9	0.1019	0.1162	0.1201
3,3-Dimethylheptane	I9	0.0994	0.1133	0.1171
3,5-Dimethylheptane	I9	0.0792	0.0903	0.0933
2,6-Dimethylheptane	I9	0.0654	0.0746	0.0779
1,1,3-Trimethylcyclohexane	N9	0.0698	0.0783	0.0752
Ethylbenzene	A8	0.7231	0.6824	0.5816
1c,2t,4t-Trimethylcyclohexane	N9	0.3989	0.4476	0.4215
2,3-Dimethylheptane	I9	0.0046	0.0052	0.0053
1,3-Dimethylbenzene (m-Xylene)	A8	0.7606	0.7177	0.6152
1,4-Dimethylbenzene (p-Xylene)	A8	0.9003	0.8496	0.7306
3,4-Dimethylheptane	I9	0.2522	0.2875	0.2912
3,4-Dimethylheptane (2)	I9	0.1933	0.2204	0.2233
4-Ethylheptane	I9	0.0792	0.0903	0.0935
4-Methyloctane	I9	0.2621	0.2988	0.3072
2-Methyloctane	I9	0.3328	0.3794	0.3939
1c,2t,4c-Trimethylcyclohexane	I9	0.1120	0.1277	0.1304
3-Ethylheptane	I9	0.0657	0.0749	0.0764
3-Methyloctane	I9	0.3826	0.4362	0.4484
3,3-Diethylpentane	I9	0.0723	0.0824	0.0809
1c,2t,3-Trimethylcyclohexane	N9	0.1178	0.1322	0.1245
1,1,2-Trimethylcyclohexane	N9	0.0539	0.0605	0.0570
1,2-Dimethylbenzene (o-Xylene)	A8	0.7674	0.7242	0.6099
i-Butylcyclopentane	N9	0.2574	0.2888	0.2741
UnknownC8s	U8	0.0356	0.0361	0.0381
n-Nonane	P9	1.6569	1.8888	1.9499
1,1-Methylethylcyclohexane	N9	0.6620	0.7547	0.7814
i-Propylbenzene	A9	0.3870	0.4134	0.3547
i-Propylcyclohexane	N9	0.1237	0.1388	0.1283
2,2-Dimethyloctane	I10	0.0717	0.0907	0.0909
2,4-Dimethyloctane	I10	0.0593	0.0750	0.0752
2,6-Dimethyloctane	I10	0.0103	0.0130	0.0135
2,5-Dimethyloctane	I10	0.0445	0.0563	0.0564
n-Butylcyclopentane	N9	0.2846	0.3548	0.3291

3,3-Dimethyloctane	I10	0.0726	0.0918	0.0920
n-Propylbenzene	A9	0.4034	0.4309	0.3698
3,6-Dimethyloctane	I10	0.2093	0.2647	0.2652
3-Methyl-5-ethylheptane	I10	0.5049	0.5756	0.5877
1,3-Methylethylbenzene	A9	0.4183	0.4469	0.3803
1,4-Methylethylbenzene	A9	0.1211	0.1294	0.1101
1,3,5-Trimethylbenzene	A9	0.1053	0.1125	0.0964
2,3-Dimethyloctane	I10	0.0762	0.0964	0.0966
5-Methylnonane	I10	0.1706	0.2157	0.2182
1,2-Methylethylbenzene	A9	0.3180	0.3397	0.2876
2-Methylnonane	I10	0.0507	0.0641	0.0654
3-Ethyloctane	I10	0.1060	0.1341	0.1344
3-Methylnonane	I10	0.2100	0.2656	0.2684
1,2,4-Trimethylbenzene	A9	0.0606	0.0647	0.0548
t-Butylbenzene	A10	0.2125	0.2535	0.2170
i-Butylcyclohexane	N10	0.2470	0.3079	0.2811
1t-Methyl-2-n-propylcyclohexane	I10	0.0962	0.1097	0.1120
i-Butylbenzene	A10	0.0779	0.0929	0.0807
sec-Butylbenzene	A10	0.1353	0.1614	0.1389
UnknownC9s	U9	2.0125	2.2942	2.3684
n-Decane	P10	1.4164	1.7912	1.8180
1,2,3-Trimethylbenzene	A9	0.2573	0.2749	0.2280
1,3-Methyl-i-propylbenzene	A10	0.1039	0.1110	0.0940
1,4-Methyl-i-propylbenzene	A10	0.0351	0.0375	0.0317
Sec-Butylcyclohexane	N10	0.3266	0.4072	0.3713
1,2-Methyl-i-propylbenzene	A10	0.2103	0.2509	0.2122
3-Ethylnonane	I10	0.0393	0.0497	0.0507
1,3-Diethylbenzene	A10	0.1455	0.1736	0.1490
1,3-Methyl-n-propylbenzene	A10	0.0523	0.0624	0.0537
1,4-Diethylbenzene	A10	0.1609	0.1919	0.1651
1,4-Methyl-n-propylbenzene	A10	0.0760	0.0907	0.0783
n-Butylbenzene	A10	0.0708	0.0845	0.0727
1,3-Dimethyl-5-ethylbenzene	A10	0.0269	0.0321	0.0275
1,2-Diethylbenzene	A10	0.1478	0.1763	0.1486
1,2-Methyl-n-propylbenzene	A10	0.1110	0.1324	0.1124
1,4-Dimethyl-2-ethylbenzene	A10	0.1421	0.1695	0.1433
1,3-Dimethyl-4-ethylbenzene	A10	0.0740	0.0883	0.0747
1,2-Dimethyl-4-ethylbenzene	A10	0.2099	0.2504	0.2123
1,3-Dimethyl-2-ethylbenzene	A10	0.0392	0.0468	0.0390
1t,2c,4-Trimethylcyclopentane	A10	0.5253	0.5239	0.5193
1,2-Dimethyl-3-ethylbenzene	A10	0.1972	0.2352	0.1955
1,2-Ethyl-i-propylbenzene	A10	0.1159	0.1383	0.1170
1,4-Methyl-t-butylbenzene	A11	0.0572	0.0682	0.0577
UnknownC10s	U10	3.6563	4.6237	4.6930
n-Undecane	P11	1.1907	1.6542	1.6557
1,4-Ethyl-i-propylbenzene	A11	0.1578	0.1882	0.1592
1,2,4,5-Tetramethylbenzene	A11	0.0678	0.0809	0.0677
1,2-Methyl-n-butylbenzene	A11	0.1694	0.2021	0.1709
1,2,3,5-Tetramethylbenzene	A11	0.0566	0.0675	0.0562
1,2-Methyl-t-butylbenzene	A11	0.0794	0.0947	0.0801
5-Methylindan	A11	0.0233	0.0353	0.0349
4-Methylindan	A11	0.0340	0.0515	0.0510
1,2-Ethyl-n-propylbenzene	A11	0.0678	0.0809	0.0684
2-Methylindan	A11	0.0258	0.0391	0.0387
1,3-Methyl-n-butylbenzene	A11	0.0799	0.0953	0.0806
1,3-Di-i-propylbenzene	A11	0.1054	0.1257	0.1063
sec-Pentylbenzene	A11	0.0800	0.0954	0.0807
n-Pentylbenzene	A11	0.1151	0.1517	0.1310
1t-M-2-(4MP)cyclopentane	P12	0.0257	0.0389	0.0385
1,2-Di-n-propylbenzene	A11	0.0894	0.1066	0.0902
1,4-Di-i-propylbenzene	A11	0.1921	0.2292	0.1939
Tetrahydronaphthalene	A10	0.0325	0.0388	0.0328
t-Decahydronaphthalene	A10	0.1504	0.1794	0.1517
Naphthalene	A10	0.1400	0.1595	0.1349
1-t-Butyl-3,5-dimethylbenzene	A12	0.0615	0.0734	0.0621
1,4-Ethyl-t-butylbenzene	A11	0.1000	0.1193	0.1009
UnknownC11s	U11	2.5471	3.5387	3.5419
n-Dodecane	P12	1.0540	1.5957	1.5796
1,3-Di-n-propylbenzene	A12	0.0626	0.0747	0.0632
1,3,5-Triethylbenzene	A12	0.0555	0.0593	0.0508
1,2,4-Triethylbenzene	A12	0.3778	0.4036	0.3415
1,4-Methyl-n-pentylbenzene	A12	0.0372	0.0444	0.0376
n-Hexylbenzene	A12	0.0671	0.0968	0.0837

1,2,3,4,5-Pentamethylbenzene	A13	0.1341	0.1600	0.1353
2-Methylnaphthalene	A11	0.1501	0.1897	0.1604
1-Methylnaphthalene	A11	0.2199	0.2779	0.2020
UnknownC12s	U12	1.7352	2.6271	2.6006
n-Tridecane	P13	0.7346	1.2037	1.1775
UnknownC13s	U13	1.1854	1.9424	1.9001
n-Tetradecane	P14	0.3066	0.5406	0.5277
UnknownC14s	U14	1.0334	1.8222	1.7789
n-Pentadecane	P15	0.1511	0.2853	0.2753
UnknownC15s	U15	0.9285	1.7530	1.6917
n-Hexadecane	P16	0.0580	0.1167	0.1119
UnknownC16s	U16	0.3387	0.6817	0.6536
n-Heptadecane	P17	0.0041	0.0088	0.0084
UnknownC17s	U17	0.1051	0.2246	0.2147
n-Octadecane	P18	0.0024	0.0054	0.0051
UnknownC18s	U18	0.0211	0.0477	0.0455
n-Nonadecane	P19	0.0014	0.0033	0.0031
UnknownC19s	U19	0.0005	0.0012	0.0011
n-Eicosane	P20	0.0010	0.0025	0.0024
n-Heneicosane	P21	0.0002	0.0005	0.0005
TOTAL		100.0000	100.0000	100.0000

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303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201308014	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 9, 2013
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 4, 2013
PRODUCER :		CYLINDER NO. :	0975
LEASE NO. :		SAMPLED BY :	BURL MCENDREE - EMPACT
NAME/DESCRIP :	SALES GAS NELSON 2-17-9-60		
FIELD DATA		SAMPLE TEMP. :	116
SAMPLE PRES. :	132	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 12 PPM		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0005	0.0012		
HELIUM	0.03	0.01	---	---
OXYGEN/ARGON	0.02	0.03	---	---
NITROGEN	1.31	1.54	---	---
CARBON DIOXIDE	2.84	5.26	---	---
METHANE	71.21710	48.09620	---	---
ETHANE	10.2790	13.0115	2.7449	2.7599
PROPANE	8.3716	15.5404	2.3024	2.3150
I-BUTANE	0.8309	2.0331	0.2713	0.2728
N-BUTANE	2.8941	7.0813	0.9110	0.9159
I-PENTANE	0.6210	1.8804	0.2222	0.2234
N-PENTANE	0.7390	2.2446	0.2673	0.2687
HEXANES PLUS	0.8468	3.2713	0.3422	0.3439
TOTALS	100.00000	100.00000	7.0613	7.0996

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0302	0.0993
TOLUENE	0.0197	0.0764
ETHYLBENZENE	0.0021	0.0094
XYLENES	0.0032	0.0143
TOTAL BTEX	0.0552	0.1994

BTU @		14.650	14.730
LOW	NET DRY REAL :	1209.8 **/scf**	1216.4 **/scf**
	NET WET REAL :	1188.7 **/scf**	1195.2 **/scf**
HIGH	GROSS DRY REAL :	1330.1 **/scf**	1337.4 **/scf**
	GROSS WET REAL :	1306.8 **/scf**	1314.1 **/scf**
	NET DRY REAL :	19347.0 **/lb**	19452.6 **/lb**
	GROSS DRY REAL :	21273.0 **/lb**	21389.2 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8194
	COMPRESSIBILITY FACTOR :		0.99582

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

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

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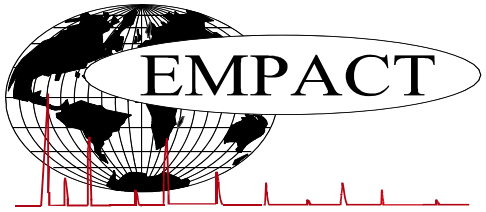
303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201308014	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 9, 2013
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 4, 2013
PRODUCER :		CYLINDER NO. :	0975
LEASE NO. :		SAMPLED BY :	BURL MCENDREE - EMPACT
NAME/DESCRIP :	SALES GAS NELSON 2-17-9-60		
FIELD DATA		SAMPLE TEMP. :	116
SAMPLE PRES. :	132	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 12 PPM		

Componet	Mole %	Wt %
Helium	0.03	0.01
Carbon Dioxide	2.84	5.26
Nitrogen	1.31	1.54
Methane	71.21710	48.09620
Ethane	10.2790	13.0115
Propane	8.3716	15.5404
Isobutane	0.8309	2.0331
n-Butane	2.8941	7.0813
Isopentane	0.5531	1.6799
n-Pentane	0.7390	2.2446
Cyclopentane	0.0679	0.2005
n-Hexane	0.1734	0.6291
Cyclohexane	0.0446	0.1580
Other Hexanes	0.3029	1.0900
Heptanes	0.1595	0.6681
Methycyclohexane	0.0336	0.1389
2,2,4 Trimethylpentane	0.0001	0.0005
Benzene	0.0302	0.0993
Toluene	0.0197	0.0764
Ethylbenzene	0.0021	0.0094
Xylenes	0.0032	0.0143
C8+ Heavies	0.0775	0.3873
Subtotal	99.97950	99.96880
Oxygen/Argon	0.02	0.03
Alcohols	0.0005	0.0012
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201308014	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 9, 2013
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 4, 2013
PRODUCER :		CYLINDER NO. :	0975
LEASE NO. :		SAMPLED BY :	BURL MCENDREE - EMPACT
NAME/DESCRIP :	SALES GAS NELSON 2-17-9-60		
FIELD DATA		SAMPLE TEMP. :	116
SAMPLE PRES. :	132	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 12 PPM		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.03	0.01	---	---
Oxygen/Argon	---	0.02	0.03	---	---
Nitrogen	---	1.31	1.54	---	---
Carbon Dioxide	---	2.84	5.26	---	---
Methane	P1	71.21710	48.09620	---	---
Ethane	P2	10.2790	13.0115	2.745	2.760
Propane	P3	8.3716	15.5404	2.302	2.315
i-Butane	I4	0.8309	2.0331	0.271	0.273
n-Butane	P4	2.8941	7.0813	0.911	0.916
2,2-Dimethylpropane	I5	0.0019	0.0058	0.001	0.001
Ethanol	X2	0.0002	0.0004	0.000	0.000
i-Pentane	I5	0.5512	1.6741	0.201	0.202
i-Propanol	X3	0.0001	0.0002	0.000	0.000
n-Pentane	P5	0.7390	2.2446	0.267	0.269
t-Butanol	X4	0.0002	0.0006	0.000	0.000
2,2-Dimethylbutane	I6	0.0015	0.0054	0.001	0.001
Cyclopentane	N5	0.0679	0.2005	0.020	0.020
2,3-Dimethylbutane	I6	0.0101	0.0366	0.004	0.004
2-Methylpentane	I6	0.1225	0.4444	0.051	0.051
3-Methylpentane	I6	0.0650	0.2358	0.026	0.026
n-Hexane	P6	0.1734	0.6291	0.071	0.072
2,2-Dimethylpentane	I7	0.0005	0.0021	0.000	0.000
Methylcyclopentane	N6	0.1038	0.3678	0.037	0.037
2,4-Dimethylpentane	I7	0.0039	0.0165	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0302	0.0993	0.008	0.008
3,3-Dimethylpentane	I7	0.0003	0.0013	0.000	0.000
Cyclohexane	N6	0.0446	0.1580	0.015	0.015
2-Methylhexane	I7	0.0186	0.0785	0.009	0.009
2,3-Dimethylpentane	I7	0.0089	0.0375	0.004	0.004
1,1-Dimethylcyclopentane	N7	0.0037	0.0153	0.002	0.002
3-Methylhexane	I7	0.0223	0.0941	0.010	0.010
1c,3-Dimethylcyclopentane	N7	0.0118	0.0488	0.005	0.005
1t,3-Dimethylcyclopentane	N7	0.0106	0.0438	0.005	0.005
3-Ethylpentane	I7	0.0016	0.0067	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0222	0.0918	0.010	0.010
2,2,4-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
n-Heptane	P7	0.0463	0.1953	0.021	0.021
1c,2-Dimethylcyclopentane	N7	0.0021	0.0087	0.001	0.001
Methylcyclohexane	N7	0.0336	0.1389	0.013	0.013
2,2-Dimethylhexane	I8	0.0022	0.0106	0.001	0.001

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Ethylcyclopentane	N7	0.0066	0.0273	0.003	0.003
2,5-Dimethylhexane	I8	0.0009	0.0043	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
2,4-Dimethylhexane	I8	0.0016	0.0077	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0031	0.0146	0.001	0.001
3,3-Dimethylhexane	I8	0.0002	0.0010	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0037	0.0175	0.002	0.002
2,3,4-Trimethylpentane	I8	0.0007	0.0034	0.000	0.000
Toluene	A7	0.0197	0.0764	0.007	0.007
2,3-Dimethylhexane	I8	0.0014	0.0067	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0008	0.0038	0.000	0.000
2-Methylheptane	I8	0.0073	0.0351	0.004	0.004
4-Methylheptane	I8	0.0021	0.0101	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0001	0.0005	0.000	0.000
3,4-Dimethylhexane	I8	0.0003	0.0014	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	0.0029	0.0139	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0046	0.0217	0.002	0.002
3-Ethylhexane	I8	0.0008	0.0038	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0015	0.0071	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0005	0.0024	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0012	0.0057	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0010	0.0047	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0032	0.0151	0.002	0.002
2,2,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0022	0.0104	0.001	0.001
n-Octane	P8	0.0098	0.0471	0.005	0.005
1c,4-Dimethylcyclohexane	N8	0.0017	0.0080	0.001	0.001
i-Propylcyclopentane	I8	0.0002	0.0009	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0001	0.0005	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0005	0.0024	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0030	0.0160	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0010	0.0054	0.001	0.001
4,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
Ethylcyclohexane	N8	0.0015	0.0071	0.001	0.001
n-Propylcyclopentane	N8	0.0005	0.0024	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,5-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
3,3-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
3,5-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
2,6-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0003	0.0016	0.000	0.000
Ethylbenzene	I8	0.0021	0.0094	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0004	0.0021	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0017	0.0076	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0004	0.0018	0.000	0.000
3,4-Dimethylheptane	I9	0.0013	0.0070	0.001	0.001
3,4-Dimethylheptane (2)	I9	0.0003	0.0016	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
4-Methyloctane	I9	0.0006	0.0032	0.000	0.000
2-Methyloctane	I9	0.0007	0.0038	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0002	0.0010	0.000	0.000
3-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
3-Methyloctane	I9	0.0007	0.0038	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	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	0.0011	0.0049	0.000	0.000
i-Butylcyclopentane	N9	0.0003	0.0016	0.000	0.000
n-Nonane	P9	0.0019	0.0103	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0003	0.0016	0.000	0.000
i-Propylbenzene	A9	0.0003	0.0015	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
n-Butylcyclopentane	N9	0.0003	0.0016	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	0.0002	0.0012	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0003	0.0018	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
1,3,5-Trimethylbenzene	A9	0.0001	0.0005	0.000	0.000
5-Methylnonane	I10	0.0002	0.0012	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0005	0.000	0.000
3-Methylnonane	I10	0.0001	0.0006	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0005	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0023	0.0124	0.001	0.001
n-Decane	P10	0.0003	0.0018	0.000	0.000
Sec-Butylcyclohexane	A10	0.0001	0.0006	0.000	0.000
UnknownC10s	U10	0.0014	0.0084	0.001	0.001
UnknownC11s	U11	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	0.0009	0.000	0.000
UnknownC15s	U15	0.0002	0.0018	0.000	0.000
n-Hexadecane	P16	0.0001	0.0010	0.000	0.000
UnknownC16s	U16	0.0001	0.0010	0.000	0.000
n-Heptadecane	P17	0.0001	0.0010	0.000	0.000
n-Octadecane	P18	0.0001	0.0010	0.000	0.000
UnknownC18s	U18	0.0001	0.0010	0.000	0.000
TOTAL		100.00000	100.00000	7.0613	7.0996

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0302	0.0993
TOLUENE	0.0197	0.0764
ETHYLBENZENE	0.0021	0.0094
XYLENES	0.0032	0.0143
TOTAL BTEX	0.0552	0.1994

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1209.8 **/scf**	1216.4 **/scf**
	NET WET REAL :	1188.7 **/scf**	1195.2 **/scf**
HIGH	GROSS DRY REAL :	1330.1 **/scf**	1337.4 **/scf**
	GROSS WET REAL :	1306.8 **/scf**	1314.1 **/scf**
	NET DRY REAL :	19347.0 **/lb**	19452.6 **/lb**
	GROSS DRY REAL :	21273.0 **/lb**	21389.2 **/lb**

RELATIVE DENSITY (AIR=1): 0.8194

COMPRESSIBILITY FACTOR : 0.99582

(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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EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201308014	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 6, 2013
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 4, 2013
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	BURL MCENDREE
NAME/DESCRIP :	SALES OIL		EMPACT
	NELSON 2-17-9-60		
FIELD DATA		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

COMPONENT	MOLE %	MASS %	VOL %
ALCOHOLS	0.0019	0.0012	0.0011
NITROGEN (AIR)	0.0000	0.0000	0.0000
CARBON DIOXIDE	0.0000	0.0000	0.0000
METHANE	0.0440	0.0059	0.0146
ETHANE	0.2276	0.0575	0.1199
PROPANE	2.2165	0.8215	1.2034
I-BUTANE	0.9575	0.4677	0.6171
N-BUTANE	5.7707	2.8187	3.5847
I-PENTANE	3.3406	2.0256	2.4085
N-PENTANE	6.0351	3.6603	4.3059
HEXANES PLUS	81.4061	90.1416	87.7448
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	**MOLE%**	**MASS%**
BENZENE	1.2851	0.8436
TOLUENE	2.4525	1.8991
ETHYLBENZENE	0.5393	0.4812
XYLENE	2.1284	1.8992
TOTAL BTEX	6.4053	5.1231

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

	TOTAL SAMPLE	**C6+ FRACTION**	
Specific Gravity (H2O=1) =	0.743	0.763	60/60
API Gravity =	58.94	53.95	60/60
Molecular Weight =	100.00	132.745	
Absolute Density =	6.19	6.36	LBS/GAL
Heating Value Liq. Idl Gas=	124126	127140	BTU/GAL
Vapor/Liquid =	20.19	18.71	CUFT/GAL
Vapor Pressure =	14.64	1.36	PSIA @100 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 LIQUID ANALYSIS (*DHA)

E & P TANK / GLYCALC INFORMATION

PROJECT NO. :	201308014	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 6, 2013
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 4, 2013
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	BURL MCENDREE
NAME/DESCRIP :	SALES OIL		EMPACT
	NELSON 2-17-9-60		
FIELD DATA		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

COMPONENT	Mole %		Wt %		LV %	
NITROGEN (AIR)	0.0000		0.0000		0.0000	
METHANE	0.0440		0.0059		0.0146	
ETHANE	0.2276		0.0575		0.1199	
PROPANE	2.2165		0.8215		1.2034	
I-BUTANE	0.9575		0.4677		0.6171	
N-BUTANE	5.7707		2.8187		3.5847	
I-PENTANE	3.3406		2.0256		2.4085	
N-PENTANE	6.0351		3.6603		4.3059	
CYCLOPENTANE (N-C5)	1.2971		0.7645		0.7469	
N-HEXANE	4.3747		3.1685		3.5453	
CYCLOHEXANE (OTHER C6)	2.0026		1.4165		1.3428	
OTHER HEXANES	7.0842		5.0735		5.3639	
OTHER HEPTANES	9.6378		8.0541		8.3816	
METHYLCYCLOHEXANE (OTHER C7)	2.8578		2.3583		2.2609	
2,2,4 TRIMETHYLPENTANE	0.6220		0.5133		0.5060	
BENZENE	1.2851		0.8436		0.7096	
TOLUENE	2.4525		1.8991		1.6133	
ETHYLBENZENE	0.5393		0.4812		0.4087	
XYLENES	2.1284		1.8992		1.6153	
OTHER OCTANES	8.2393		7.9228		7.9613	
OCTANES PLUS	----	50.4143	----	66.5635	----	63.7805
NONANES	9.1239		9.7102		9.4519	
DECANES PLUS	29.7614		46.0368		43.8373	
SUB TOTAL	99.9981		99.9988		99.9989	
ALCOHOLS	0.0019		0.0012		0.0011	
TOTAL	100.0000		100.0000		100.0000	

API Gravity	=	**58.94**	60/60
Vapor Pressure	=	**14.64**	PSIA & 100 F
Average Molecular Weight of Decanes plus	=	**184.05**	
Average Specific Gravity of Decanes plus	=	**0.7830**	

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

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

BY CARBON NUMBER

PROJECT NO. :	201308014	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 6, 2013
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 4, 2013
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	BURL MCENDREE
NAME/DESCRIP :	SALES OIL		EMPACT
	NELSON 2-17-9-60		
FIELD DATA		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
ALCOHOLS		0.0019	0.0012	0.0011
NITROGEN		0.0000	0.0000	0.0000
CARBON DIOXIDE		0.0000	0.0000	0.0000
	C1	0.0440	0.0059	0.0146
	C2	0.2276	0.0575	0.1199
	C3	2.2165	0.8215	1.2034
	C4	6.7282	3.2864	4.2018
	C5	10.6728	6.4504	7.4613
	C6	14.7466	10.5021	10.9616
	C7	14.9481	12.3115	12.2558
	C8	11.5290	10.8165	10.4913
	C9	9.1239	9.7102	9.4519
	C10	9.1341	10.5307	10.0437
	C11	4.9939	6.2757	5.9306
	C12	3.2073	4.3772	4.2221
	C13	2.4870	3.7967	3.6816
	C14	1.9205	3.2021	3.1156
	C15	1.8165	3.2430	3.1192
	C16	1.2075	2.2980	2.1959
	C17	0.9999	2.0209	1.9252
	C18	0.8677	1.8558	1.7628
	C19	0.6152	1.3885	1.3105
	C20	0.4654	1.1053	1.0375
	C21	0.3326	0.8291	0.7743
	C22	0.3457	0.9023	0.8397
	C23	0.2977	0.8121	0.7536
	C24	0.2017	0.5741	0.5314
	C25	0.1806	0.5356	0.4956
	C26	0.1680	0.5177	0.4759
	C27	0.1278	0.4091	0.3758
	C28	0.0901	0.2992	0.2743
	C29	0.0899	0.3091	0.2828
	C30+	0.2123	0.7546	0.6892
	Total	100.0000	100.0000	100.0000

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

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201308014	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 6, 2013
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 4, 2013
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	BURL MCENDREE
NAME/DESCRIP :	SALES OIL		EMPACT
	NELSON 2-17-9-60		
FIELD DATA		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0000	0.0000	0.0000
Carbon Dioxide	NHC	0.0000	0.0000	0.0000
Methane	P1	0.0440	0.0059	0.0146
Ethane	P2	0.2276	0.0575	0.1199
Propane	P3	2.2165	0.8215	1.2034
i-Butane	I4	0.9575	0.4677	0.6171
n-Butane	P4	5.7707	2.8187	3.5847
2,2-Dimethylpropane	I5	0.0057	0.0034	0.0042
i-Pentane	I5	3.3349	2.0222	2.4043
n-Pentane	P5	6.0351	3.6603	4.3059
t-Butanol	X4	0.0019	0.0012	0.0011
2,2-Dimethylbutane	I6	0.0188	0.0136	0.0154
Cyclopentane	N5	1.2971	0.7645	0.7469
2,3-Dimethylbutane	I6	0.0698	0.0505	0.0562
2-Methylpentane	I6	2.2453	1.6263	1.8363
3-Methylpentane	I6	1.3608	0.9857	1.0944
n-Hexane	P6	4.3747	3.1685	3.5453
2,2-Dimethylpentane	I7	0.0027	0.0023	0.0025
Methylcyclopentane	N6	3.3895	2.3974	2.3616
2,4-Dimethylpentane	I7	0.1365	0.1149	0.1262
2,2,3-Trimethylbutane	I7	0.0035	0.0029	0.0031
Benzene	A6	1.2851	0.8436	0.7096
3,3-Dimethylpentane	I7	0.0125	0.0105	0.0112
Cyclohexane	N6	2.0026	1.4165	1.3428
2-Methylhexane	I7	0.8214	0.6917	0.7529
2,3-Dimethylpentane	I7	0.5400	0.4548	0.4809
1,1-Dimethylcyclopentane	N7	0.1993	0.1645	0.1609
3-Methylhexane	I7	1.2049	1.0147	1.0878
1c,3-Dimethylcyclopentane	N7	0.6651	0.5489	0.5439
1t,3-Dimethylcyclopentane	N7	0.6220	0.5133	0.5060
3-Ethylpentane	I7	0.0112	0.0094	0.0099
1t,2-Dimethylcyclopentane	N7	1.4198	1.1716	1.1508
2,2,4-Trimethylpentane	I8	0.0076	0.0073	0.0078
n-Heptane	P7	3.2268	2.7173	2.9324
1c,2-Dimethylcyclopentane	N7	0.1395	0.1151	0.1100
Methylcyclohexane	N7	2.8578	2.3583	2.2609
2,2-Dimethylhexane	I8	0.1945	0.1867	0.1981
Ethylcyclopentane	N7	0.6316	0.5213	0.5021
2,5-Dimethylhexane	I8	0.0855	0.0821	0.0873
2,2,3-Trimethylpentane	I8	0.0172	0.0165	0.0170
2,4-Dimethylhexane	I8	0.1575	0.1512	0.1600

1c,2t,4-Trimethylcyclopentane	N8	0.3210	0.3028	0.2928
3,3-Dimethylhexane	I8	0.0179	0.0171	0.0178
2,3,4-Trimethylpentane	I8	0.0798	0.0766	0.0786
2,3,3-Trimethylpentane	I8	0.0004	0.0004	0.0004
Toluene	A7	2.4525	1.8991	1.6133
2,3-Dimethylhexane	I8	0.1473	0.1414	0.1466
2-Methyl-3-ethylpentane	I8	0.1027	0.0986	0.1011
1,1,2-Trimethylcyclopentane	N8	0.0017	0.0016	0.0015
2-Methylheptane	I8	1.0274	0.9863	1.0411
4-Methylheptane	I8	0.3142	0.3016	0.3107
3-Methyl-3-ethylpentane	I8	0.0240	0.0230	0.0234
3,4-Dimethylhexane	I8	0.0264	0.0253	0.0259
1c,2c,4-Trimethylcyclopentane	N8	0.0250	0.0236	0.0226
1c,3-Dimethylcyclohexane	N8	0.0164	0.0155	0.0149
3-Methylheptane	I8	0.1996	0.1916	0.2005
1c,2t,3-Trimethylcyclopentane	N8	0.9217	0.8692	0.8330
3-Ethylhexane	I8	0.1646	0.1581	0.1637
1t,4-Dimethylcyclohexane	N8	0.2543	0.2398	0.2322
1,1-Dimethylcyclohexane	N8	0.0907	0.0856	0.0810
3t-Ethylmethylcyclopentane	N8	0.1979	0.1867	0.1798
2t-Ethylmethylcyclopentane	N8	0.1693	0.1596	0.1533
1,1-Methylethylcyclopentane	N8	0.5892	0.5556	0.5254
2,2,4-Trimethylhexane	I9	0.0236	0.0254	0.0262
1t,2-Dimethylcyclohexane	N8	0.4486	0.4231	0.4028
1t,3-Dimethylcyclohexane	N8	0.0047	0.0044	0.0041
UnknownC7s	U7	0.0010	0.0009	0.0010
n-Octane	P8	2.0762	1.9932	2.0940
1c,4-Dimethylcyclohexane	N8	0.3245	0.3060	0.2887
i-Propylcyclopentane	I8	0.0720	0.0679	0.0646
2,4,4-Trimethylhexane	I9	0.0182	0.0196	0.0200
2,2,3,4-Tetramethylpentane	I9	0.0157	0.0169	0.0174
2,3,4-Trimethylhexane	I9	0.0124	0.0134	0.0137
1c,2-Dimethylcyclohexane	N8	0.1030	0.0972	0.0902
2,3,5-Trimethylhexane	I9	0.0642	0.0692	0.0708
2,2-Dimethylheptane	I9	0.0114	0.0123	0.0128
1,1,4-Trimethylcyclohexane	N9	0.9008	0.9558	0.9145
2,2,3-Trimethylhexane	I9	0.2992	0.3225	0.3265
2,4-Dimethylheptane	I9	0.0036	0.0039	0.0040
4,4-Dimethylheptane	I9	0.0283	0.0305	0.0315
Ethylcyclohexane	N8	0.4868	0.4591	0.4305
n-Propylcyclopentane	N8	0.1565	0.1476	0.1404
1c,3c,5-Trimethylcyclohexane	N9	0.0251	0.0266	0.0254
2,5-Dimethylheptane	I9	0.0688	0.0741	0.0763
3,3-Dimethylheptane	I9	0.0784	0.0845	0.0870
3,5-Dimethylheptane	I9	0.0580	0.0625	0.0644
2,6-Dimethylheptane	I9	0.0613	0.0661	0.0688
1,1,3-Trimethylcyclohexane	N9	0.1404	0.1490	0.1426
Ethylbenzene	A8	0.5393	0.4812	0.4087
1c,2t,4t-Trimethylcyclohexane	N9	0.3400	0.3607	0.3385
2,3-Dimethylheptane	I9	0.0084	0.0091	0.0093
1,3-Dimethylbenzene (m-Xylene)	A8	0.6707	0.5985	0.5113
1,4-Dimethylbenzene (p-Xylene)	A8	0.7708	0.6878	0.5895
3,4-Dimethylheptane	I9	0.1106	0.1192	0.1204
3,4-Dimethylheptane (2)	I9	0.0945	0.1019	0.1029
4-Ethylheptane	I9	0.0545	0.0587	0.0606
4-Methyloctane	I9	0.2483	0.2677	0.2743
2-Methyloctane	I9	0.2923	0.3151	0.3261
1c,2t,4c-Trimethylcyclohexane	I9	0.0784	0.0845	0.0860
3-Ethylheptane	I9	0.0539	0.0581	0.0590
3-Methyloctane	I9	0.3506	0.3779	0.3872
3,3-Diethylpentane	I9	0.0607	0.0654	0.0640
1c,2t,3-Trimethylcyclohexane	N9	0.0824	0.0874	0.0820
1,1,2-Trimethylcyclohexane	N9	0.0180	0.0191	0.0179
1,2-Dimethylbenzene (o-Xylene)	A8	0.6869	0.6129	0.5145
i-Butylcyclopentane	N9	0.2576	0.2733	0.2585
UnknownC8s	U8	0.0352	0.0338	0.0355
n-Nonane	P9	1.6573	1.7865	1.8382
1,1-Methylethylcyclohexane	N9	0.2041	0.2200	0.2270
i-Propylbenzene	A9	0.4762	0.4810	0.4114
i-Propylcyclohexane	N9	0.0824	0.0874	0.0805
2,2-Dimethyloctane	I10	0.0242	0.0290	0.0290
2,4-Dimethyloctane	I10	0.0524	0.0627	0.0626
2,6-Dimethyloctane	I10	0.0040	0.0048	0.0050

2,5-Dimethyloctane	I10	0.0389	0.0465	0.0464
n-Butylcyclopentane	N9	0.2986	0.3520	0.3254
3,3-Dimethyloctane	I10	0.0771	0.0922	0.0921
n-Propylbenzene	A9	0.3177	0.3209	0.2745
3,6-Dimethyloctane	I10	0.3318	0.3968	0.3963
3-Methyl-5-ethylheptane	I10	0.3836	0.4135	0.4208
1,3-Methylethylbenzene	A9	0.3806	0.3844	0.3261
1,4-Methylethylbenzene	A9	0.0364	0.0368	0.0312
1,3,5-Trimethylbenzene	A9	0.1313	0.1326	0.1133
2,3-Dimethyloctane	I10	0.0678	0.0810	0.0809
5-Methylnonane	I10	0.1923	0.2300	0.2319
1,2-Methylethylbenzene	A9	0.2316	0.2340	0.1974
2-Methylnonane	I10	0.0325	0.0388	0.0394
3-Ethyloctane	I10	0.0693	0.0828	0.0827
3-Methylnonane	I10	0.1749	0.2092	0.2107
1,2,4-Trimethylbenzene	A9	0.0109	0.0110	0.0093
t-Butylbenzene	A10	0.4489	0.5064	0.4320
i-Butylcyclohexane	N10	0.1532	0.1806	0.1644
1t-Methyl-2-n-propylcyclohexane	I10	0.0787	0.0848	0.0863
i-Butylbenzene	A10	0.0792	0.0894	0.0774
sec-Butylbenzene	A10	0.1279	0.1442	0.1237
UnknownC9s	U9	1.1997	1.2932	1.3306
n-Decane	P10	1.2308	1.4718	1.4889
1,2,3-Trimethylbenzene	A9	0.2375	0.2400	0.1984
1,3-Methyl-i-propylbenzene	A10	0.0947	0.0957	0.0808
1,4-Methyl-i-propylbenzene	A10	0.0809	0.0817	0.0689
Sec-Butylcyclohexane	N10	0.3413	0.4024	0.3657
1,2-Methyl-i-propylbenzene	A10	0.1643	0.1853	0.1562
3-Ethylnonane	I10	0.0396	0.0474	0.0482
1,3-Diethylbenzene	A10	0.1482	0.1672	0.1430
1,3-Methyl-n-propylbenzene	A10	0.0026	0.0029	0.0025
1,4-Diethylbenzene	A10	0.2534	0.2858	0.2450
1,4-Methyl-n-propylbenzene	A10	0.0704	0.0794	0.0683
n-Butylbenzene	A10	0.0798	0.0900	0.0772
1,3-Dimethyl-5-ethylbenzene	A10	0.2028	0.2288	0.1955
1,2-Diethylbenzene	A10	0.0536	0.0605	0.0508
1,2-Methyl-n-propylbenzene	A10	0.1211	0.1366	0.1156
1,4-Dimethyl-2-ethylbenzene	A10	0.1439	0.1623	0.1367
1,3-Dimethyl-4-ethylbenzene	A10	0.0917	0.1035	0.0873
1,2-Dimethyl-4-ethylbenzene	A10	0.1614	0.1821	0.1539
1,3-Dimethyl-2-ethylbenzene	A10	0.0262	0.0295	0.0245
1t,2c,4-Trimethylcyclopentane	A10	0.4169	0.3932	0.3884
1,2-Dimethyl-3-ethylbenzene	A10	0.1637	0.1846	0.1529
1,2-Ethyl-i-propylbenzene	A10	0.0754	0.0850	0.0717
1,4-Methyl-t-butylbenzene	A11	0.0852	0.0962	0.0811
UnknownC10s	U10	2.5075	2.9985	3.0334
n-Undecane	P11	1.0399	1.3662	1.3629
1,4-Ethyl-i-propylbenzene	A11	0.1398	0.1578	0.1330
1,2,4,5-Tetramethylbenzene	A11	0.0536	0.0604	0.0504
1,2-Methyl-n-butylbenzene	A11	0.0580	0.0654	0.0551
1,2,3,5-Tetramethylbenzene	A11	0.2045	0.2307	0.1915
1,2-Methyl-t-butylbenzene	A11	0.0913	0.1030	0.0868
5-Methylindan	A11	0.0160	0.0230	0.0227
4-Methylindan	A11	0.0189	0.0270	0.0266
1,2-Ethyl-n-propylbenzene	A11	0.1186	0.1337	0.1127
2-Methylindan	A11	0.0909	0.1301	0.1284
1,3-Methyl-n-butylbenzene	A11	0.1152	0.1300	0.1096
1,3-Di-i-propylbenzene	A11	0.0457	0.0516	0.0435
sec-Pentylbenzene	A11	0.0681	0.0768	0.0647
n-Pentylbenzene	A11	0.0756	0.0942	0.0811
1t-M-2-(4MP)cyclopentane	P12	0.0032	0.0046	0.0045
1,2-Di-n-propylbenzene	A11	0.1783	0.2011	0.1695
1,4-Di-i-propylbenzene	A11	0.1487	0.1677	0.1414
Tetrahydronaphthalene	A10	0.0444	0.0500	0.0421
t-Decahydronaphthalene	A10	0.1815	0.2047	0.1726
Naphthalene	A10	0.1013	0.1091	0.0920
1-t-Butyl-3,5-dimethylbenzene	A12	0.0419	0.0472	0.0398
1,4-Ethyl-t-butylbenzene	A11	0.0715	0.0806	0.0679
UnknownC11s	U11	2.0471	2.6893	2.6829
n-Dodecane	P12	0.8558	1.2252	1.2088
1,3-Di-n-propylbenzene	A12	0.0519	0.0586	0.0494
1,3,5-Triethylbenzene	A12	0.0712	0.0719	0.0614
1,2,4-Triethylbenzene	A12	0.2885	0.2915	0.2458

1,4-Methyl-n-pentylbenzene	A12	0.0946	0.1067	0.0899
n-Hexylbenzene	A12	0.0858	0.1171	0.1009
1,2,3,4,5-Pentamethylbenzene	A13	0.1352	0.1526	0.1286
2-Methylnaphthalene	A11	0.2507	0.2997	0.2527
1-Methylnaphthalene	A11	0.0763	0.0912	0.0661
UnknownC12s	U12	1.7144	2.4544	2.4216
n-Tridecane	P13	0.7364	1.1411	1.1126
UnknownC13s	U13	1.6154	2.5030	2.4404
n-Tetradecane	P14	0.6877	1.1466	1.1156
UnknownC14s	U14	1.2328	2.0555	2.0000
n-Pentadecane	P15	0.5855	1.0453	1.0054
UnknownC15s	U15	1.2310	2.1977	2.1138
n-Hexadecane	P16	0.4672	0.8892	0.8497
UnknownC16s	U16	0.7403	1.4088	1.3462
n-Heptadecane	P17	0.3752	0.7583	0.7224
UnknownC17s	U17	0.6247	1.2626	1.2028
n-Octadecane	P18	0.3049	0.6521	0.6194
UnknownC18s	U18	0.5628	1.2037	1.1434
n-Nonadecane	P19	0.2809	0.6340	0.5984
UnknownC19s	U19	0.3343	0.7545	0.7121
n-Eicosane	P20	0.2113	0.5018	0.4710
UnknownC20s	U20	0.2541	0.6035	0.5665
n-Heneicosane	P21	0.1711	0.4265	0.3983
UnknownC21s	U21	0.1615	0.4026	0.3760
n-Docosane	P22	0.1746	0.4557	0.4241
UnknownC22s	U22	0.1711	0.4466	0.4156
n-Tricosane	P23	0.1386	0.3781	0.3509
UnknownC23s	U23	0.1591	0.4340	0.4027
n-Tetracosane	P24	0.1157	0.3294	0.3049
UnknownC24s	U24	0.0860	0.2447	0.2265
n-Pentacosane	P25	0.0857	0.2542	0.2352
UnknownC25s	U25	0.0949	0.2814	0.2604
n-Hexacosane	P26	0.0780	0.2403	0.2209
UnknownC26s	U26	0.0900	0.2774	0.2550
n-Heptacosane	P27	0.0518	0.1658	0.1523
UnknownC27s	U27	0.0760	0.2433	0.2235
n-Octacosane	P28	0.0398	0.1321	0.1211
UnknownC28s	U28	0.0503	0.1671	0.1532
n-Nonacosane	P29	0.0349	0.1200	0.1098
UnknownC29s	U29	0.0550	0.1891	0.1730
n-Triacontane Plus	P30	0.2123	0.7546	0.6892
TOTAL		100.0000	100.0000	100.0000

CRUDE OIL ASSAY

PROJECT NO. :	201308014	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 6, 2013
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 4, 2013
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	BURL MCENDREE
NAME/DESCRIP :	NELSON 2-17-9-60		EMPACT
FIELD DATA		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

SPECIFICATION	TEST METHOD	UNITS	RESULTS
API GRAVITY		API 60/60	32.7
RVP @100 DEG F	D323	PSIG	4.9
TOTAL SULFUR	D2622	WT %	0.515
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			VISCOUS, 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