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

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201310052	ANALYSIS NO. :	07
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	OCTOBER 10, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 7, 2013
PRODUCER :		CYLINDER NO. :	5041
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	SEPARATOR @ 14:40		EMPACT
	SPEAKER 2-27-31-8-61		
FIELD DATA		SAMPLE TEMP. :	123
SAMPLE PRES. :	19	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
NITROGEN (AIR)	0.0807	0.0214	0.0195
CARBON DIOXIDE	0.0225	0.0094	0.0085
METHANE	0.0724	0.0110	0.0271
ETHANE	0.3073	0.0875	0.1812
PROPANE	1.2306	0.5136	0.7474
I-BUTANE	0.4570	0.2514	0.3295
N-BUTANE	1.8792	1.0337	1.3059
I-PENTANE	1.1596	0.7918	0.9358
N-PENTANE	1.6336	1.1155	1.3040
HEXANES PLUS	93.1571	96.1647	95.1411
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	MOLE%	MASS%
BENZENE	1.6796	1.2417
TOLUENE	3.0807	2.6865
ETHYLBENZENE	0.5509	0.5536
XYLENE	1.7661	1.7746
TOTAL BTEX	7.0773	6.2564

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

	TOTAL SAMPLE	C6+ FRACTION	
Specific Gravity (H2O=1) =	0.7378	0.7451	60/60
API Gravity =	60.29	58.41	60/60
Molecular Weight =	105.66	109.863	
Absolute Density =	6.15	6.22	LBS/GAL
Heating Value Liq. Idl Gas=	125530	126760	BTU/GAL
Vapor/Liquid =	22.16	21.55	CUFT/GAL
Vapor Pressure =	12.14	2.02	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. :	201310052	ANALYSIS NO. :	07
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	OCTOBER 10, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 7, 2013
PRODUCER :		CYLINDER NO. :	5041
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	SEPARATOR @ 14:40		EMPACT
	SPEAKER 2-27-31-8-61		
FIELD DATA		SAMPLE TEMP. :	123
SAMPLE PRES. :	19	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0225		0.0094		0.0085	
NITROGEN (AIR)	0.0807		0.0214		0.0195	
METHANE	0.0724		0.0110		0.0271	
ETHANE	0.3073		0.0875		0.1812	
PROPANE	1.2306		0.5136		0.7474	
I-BUTANE	0.4570		0.2514		0.3295	
N-BUTANE	1.8792		1.0337		1.3059	
I-PENTANE	1.1596		0.7918		0.9358	
N-PENTANE	1.6336		1.1155		1.3040	
CYCLOPENTANE (N-C5)	1.8672		1.2393		1.2028	
N-HEXANE	8.4126		6.8622		7.6282	
CYCLOHEXANE (OTHER C6)	3.3342		2.6558		2.5010	
OTHER HEXANES	12.8091		10.3425		10.9314	
OTHER HEPTANES	14.9696		14.0987		14.6300	
METHYLCYCLOHEXANE (OTHER C7)	4.5428		4.2217		4.0205	
2,2,4 TRIMETHYLPENTANE	0.8924		0.8293		0.8120	
BENZENE	1.6796		1.2417		1.0376	
TOLUENE	3.0807		2.6865		2.2671	
ETHYLBENZENE	0.5509		0.5536		0.4671	
XYLENES	1.7661		1.7746		1.5001	
OTHER OCTANES	10.8275		11.7396		11.7345	
OCTANES PLUS	----	42.4613	----	52.8163	----	50.9225
NONANES	10.4208		12.5266		12.2518	
DECANES PLUS	18.0036		25.3926		24.1570	
SUB TOTAL	100.0000		100.0000		100.0000	
TOTAL	100.0000		100.0000		100.0000	

API Gravity =	**60.29**	60/60
Vapor Pressure =	**12.14**	PSIA & 100 F
Average Molecular Weight of Decanes plus =	**149.02**	
Average Specific Gravity of Decanes plus =	**0.7770**	

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BY CARBON NUMBER

PROJECT NO. :	201310052	ANALYSIS NO. :	07
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	OCTOBER 10, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 7, 2013
PRODUCER :		CYLINDER NO. :	5041
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	SEPARATOR @ 14:40		EMPACT
	SPEAKER 2-27-31-8-61		
FIELD DATA		SAMPLE TEMP. :	123
SAMPLE PRES. :	19	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
NITROGEN		0.0807	0.0214	0.0195
CARBON DIOXIDE		0.0225	0.0094	0.0085
	C1	0.0724	0.0110	0.0271
	C2	0.3073	0.0875	0.1812
	C3	1.2306	0.5136	0.7474
	C4	2.3362	1.2851	1.6354
	C5	4.6604	3.1466	3.4426
	C6	26.2355	21.1022	22.0982
	C7	22.5931	21.0069	20.9176
	C8	14.0369	14.8971	14.5137
	C9	10.4208	12.5266	12.2518
	C10	8.9766	11.6507	11.1061
	C11	4.6596	6.6148	6.2262
	C12	2.5665	3.8916	3.7098
	C13	1.0551	1.8071	1.7384
	C14	0.6069	1.1396	1.1015
	C15	0.0743	0.1493	0.1426
	C16	0.0583	0.1249	0.1186
	C17	0.0052	0.0119	0.0113
	C18	0.0011	0.0027	0.0025
	C19	0.0000	0.0000	0.0000
	C20	0.0000	0.0000	0.0000
	C21	0.0000	0.0000	0.0000
	C22	0.0000	0.0000	0.0000
	C23	0.0000	0.0000	0.0000
	C24	0.0000	0.0000	0.0000
	C25	0.0000	0.0000	0.0000
	C26	0.0000	0.0000	0.0000
	C27	0.0000	0.0000	0.0000
	C28	0.0000	0.0000	0.0000
	C29	0.0000	0.0000	0.0000
	C30+	0.0000	0.0000	0.0000
	Total	100.0000	100.0000	100.0000

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EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201310052	ANALYSIS NO. :	07
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	OCTOBER 10, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 7, 2013
PRODUCER :		CYLINDER NO. :	5041
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	SEPARATOR @ 14:40 SPEAKER 2-27-31-8-61		EMPACT
FIELD DATA		SAMPLE TEMP. :	123
SAMPLE PRES. :	19	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0807	0.0214	0.0195
Carbon Dioxide	NHC	0.0225	0.0094	0.0085
Methane	P1	0.0724	0.0110	0.0271
Ethane	P2	0.3073	0.0875	0.1812
Propane	P3	1.2306	0.5136	0.7474
i-Butane	I4	0.4570	0.2514	0.3295
n-Butane	P4	1.8792	1.0337	1.3059
2,2-Dimethylpropane	I5	0.0148	0.0101	0.0125
i-Pentane	I5	1.1448	0.7817	0.9233
n-Pentane	P5	1.6336	1.1155	1.3040
2,2-Dimethylbutane	I6	0.0409	0.0334	0.0377
Cyclopentane	N5	1.8672	1.2393	1.2028
2,3-Dimethylbutane	I6	0.4078	0.3326	0.3679
2-Methylpentane	I6	4.3900	3.5807	4.0163
3-Methylpentane	I6	2.4717	2.0160	2.2236
n-Hexane	P6	8.4126	6.8622	7.6282
2,2-Dimethylpentane	I7	0.0272	0.0258	0.0279
Methylcyclopentane	N6	5.4987	4.3798	4.2859
2,4-Dimethylpentane	I7	0.2528	0.2397	0.2615
Benzene	A6	1.6796	1.2417	1.0376
3,3-Dimethylpentane	I7	0.0188	0.0178	0.0189
Cyclohexane	N6	3.3342	2.6558	2.5010
2-Methylhexane	I7	1.3426	1.2732	1.3766
2,3-Dimethylpentane	I7	0.8693	0.8244	0.8660
1,1-Dimethylcyclopentane	N7	0.4056	0.3769	0.3663
3-Methylhexane	I7	1.9195	1.8203	1.9385
1c,3-Dimethylcyclopentane	N7	0.9898	0.9198	0.9054
1t,3-Dimethylcyclopentane	N7	0.8924	0.8293	0.8120
3-Ethylpentane	I7	0.1418	0.1345	0.1409
1t,2-Dimethylcyclopentane	N7	1.9006	1.7662	1.7234
2,2,4-Trimethylpentane	I8	0.0609	0.0658	0.0694
n-Heptane	P7	5.2808	5.0080	5.3686
1c,2-Dimethylcyclopentane	N7	0.2376	0.2208	0.2097
Methylcyclohexane	N7	4.5428	4.2217	4.0205
2,2-Dimethylhexane	I8	0.4279	0.4626	0.4875
Ethylcyclopentane	N7	0.6908	0.6420	0.6143
2,5-Dimethylhexane	I8	0.1194	0.1291	0.1364
2,2,3-Trimethylpentane	I8	0.0270	0.0292	0.0299
2,4-Dimethylhexane	I8	0.2244	0.2426	0.2551
1c,2t,4-Trimethylcyclopentane	N8	0.3889	0.4130	0.3968
3,3-Dimethylhexane	I8	0.0446	0.0482	0.0498

2,3,4-Trimethylpentane	I8	0.1222	0.1321	0.1346
2,3,3-Trimethylpentane	I8	0.0045	0.0049	0.0050
Toluene	A7	3.0807	2.6865	2.2671
2,3-Dimethylhexane	I8	0.1857	0.2008	0.2069
2-Methyl-3-ethylpentane	I8	0.1605	0.1735	0.1768
1,1,2-Trimethylcyclopentane	N8	0.0085	0.0090	0.0085
2-Methylheptane	I8	1.2909	1.3956	1.4634
4-Methylheptane	I8	0.4405	0.4762	0.4873
3-Methyl-3-ethylpentane	I8	0.0997	0.1078	0.1087
3,4-Dimethylhexane	I8	0.0721	0.0779	0.0794
1c,2c,4-Trimethylcyclopentane	N8	0.0345	0.0366	0.0348
1c,3-Dimethylcyclohexane	N8	0.0216	0.0229	0.0219
3-Methylheptane	I8	0.5181	0.5601	0.5823
1c,2t,3-Trimethylcyclopentane	N8	0.9073	0.9636	0.9174
3-Ethylhexane	I8	0.2452	0.2651	0.2727
1t,4-Dimethylcyclohexane	N8	0.4405	0.4678	0.4500
1,1-Dimethylcyclohexane	N8	0.1165	0.1237	0.1162
3t-Ethylmethylcyclopentane	N8	0.2126	0.2258	0.2160
2t-Ethylmethylcyclopentane	N8	0.1694	0.1799	0.1716
1,1-Methylethylcyclopentane	N8	0.6574	0.6982	0.6559
2,2,4-Trimethylhexane	I9	0.0571	0.0693	0.0710
1t,2-Dimethylcyclohexane	N8	0.5702	0.6056	0.5727
1t,3-Dimethylcyclohexane	N8	0.0033	0.0035	0.0033
n-Octane	P8	2.3252	2.5138	2.6235
1c,4-Dimethylcyclohexane	N8	0.7856	0.8343	0.7818
i-Propylcyclopentane	I8	0.0778	0.0826	0.0780
2,4,4-Trimethylhexane	I9	0.0355	0.0431	0.0438
2,2,3,4-Tetramethylpentane	I9	0.0242	0.0294	0.0300
2,3,4-Trimethylhexane	I9	0.0329	0.0399	0.0405
1c,2-Dimethylcyclohexane	N8	0.2115	0.2246	0.2070
2,3,5-Trimethylhexane	I9	0.0804	0.0976	0.0992
1,1,4-Trimethylcyclohexane	N9	0.9530	1.1387	1.0823
2,2,3-Trimethylhexane	I9	0.4287	0.5204	0.5234
2,4-Dimethylheptane	I9	0.0420	0.0510	0.0523
4,4-Dimethylheptane	I9	0.0972	0.1180	0.1210
Ethylcyclohexane	N8	0.5003	0.5313	0.4949
n-Propylcyclopentane	N8	0.2058	0.2186	0.2065
1c,3c,5-Trimethylcyclohexane	N9	0.0496	0.0593	0.0564
2,5-Dimethylheptane	I9	0.0772	0.0937	0.0959
3,3-Dimethylheptane	I9	0.1017	0.1235	0.1264
3,5-Dimethylheptane	I9	0.0636	0.0772	0.0790
2,6-Dimethylheptane	I9	0.0584	0.0709	0.0733
1,1,3-Trimethylcyclohexane	N9	0.0974	0.1164	0.1106
Ethylbenzene	A8	0.5509	0.5536	0.4671
1c,2t,4t-Trimethylcyclohexane	N9	0.3229	0.3858	0.3597
2,3-Dimethylheptane	I9	0.0026	0.0032	0.0032
1,3-Dimethylbenzene (m-Xylene)	A8	0.4390	0.4411	0.3743
1,4-Dimethylbenzene (p-Xylene)	A8	0.7844	0.7882	0.6711
3,4-Dimethylheptane	I9	0.4216	0.5118	0.5133
3,4-Dimethylheptane (2)	I9	0.2162	0.2624	0.2632
4-Ethylheptane	I9	0.0670	0.0813	0.0833
4-Methyloctane	I9	0.2401	0.2915	0.2967
2-Methyloctane	I9	0.2703	0.3281	0.3373
1c,2t,4c-Trimethylcyclohexane	I9	0.0501	0.0608	0.0615
3-Ethylheptane	I9	0.0721	0.0875	0.0883
3-Methyloctane	I9	0.3826	0.4644	0.4726
3,3-Diethylpentane	I9	0.0390	0.0473	0.0460
1c,2t,3-Trimethylcyclohexane	N9	0.1011	0.1208	0.1126
1,1,2-Trimethylcyclohexane	N9	0.0219	0.0262	0.0244
1,2-Dimethylbenzene (o-Xylene)	A8	0.5427	0.5453	0.4547
i-Butylcyclopentane	N9	0.2167	0.2589	0.2432
UnknownC8s	U8	0.0394	0.0426	0.0445
n-Nonane	P9	1.5118	1.8352	1.8758
1,1-Methylethylcyclohexane	N9	0.5484	0.6657	0.6825
i-Propylbenzene	A9	0.3527	0.4012	0.3409
i-Propylcyclohexane	N9	0.1021	0.1220	0.1116
2,2-Dimethyloctane	I10	0.0626	0.0843	0.0836
2,4-Dimethyloctane	I10	0.0766	0.1032	0.1024
2,6-Dimethyloctane	I10	0.0136	0.0183	0.0188
2,5-Dimethyloctane	I10	0.0387	0.0521	0.0517
n-Butylcyclopentane	N9	0.2572	0.3414	0.3135
3,3-Dimethyloctane	I10	0.1339	0.1803	0.1790
n-Propylbenzene	A9	0.1895	0.2156	0.1832

3,6-Dimethyloctane	I10	0.1753	0.2361	0.2342
3-Methyl-5-ethylheptane	I10	0.3674	0.4460	0.4508
1,3-Methylethylbenzene	A9	0.2216	0.2521	0.2124
1,4-Methylethylbenzene	A9	0.0865	0.0984	0.0829
1,3,5-Trimethylbenzene	A9	0.1188	0.1351	0.1146
2,3-Dimethyloctane	I10	0.0781	0.1052	0.1044
5-Methylnonane	I10	0.1928	0.2596	0.2600
1,2-Methylethylbenzene	A9	0.3353	0.3814	0.3197
2-Methylnonane	I10	0.0702	0.0945	0.0954
3-Ethyloctane	I10	0.1045	0.1407	0.1396
3-Methylnonane	I10	0.1270	0.1710	0.1711
1,2,4-Trimethylbenzene	A9	0.0329	0.0374	0.0313
t-Butylbenzene	A10	0.4136	0.5254	0.4452
i-Butylcyclohexane	N10	0.2212	0.2937	0.2655
1t-Methyl-2-n-propylcyclohexane	I10	0.0943	0.1145	0.1157
i-Butylbenzene	A10	0.0692	0.0879	0.0756
sec-Butylbenzene	A10	0.1067	0.1355	0.1154
UnknownC9s	U9	1.8479	2.2432	2.2928
n-Decane	P10	1.0193	1.3726	1.3794
1,2,3-Trimethylbenzene	A9	0.1930	0.2195	0.1802
1,3-Methyl-i-propylbenzene	A10	0.1147	0.1305	0.1094
1,4-Methyl-i-propylbenzene	A10	0.0828	0.0942	0.0790
Sec-Butylcyclohexane	N10	0.2712	0.3600	0.3250
1,2-Methyl-i-propylbenzene	A10	0.1355	0.1721	0.1441
3-Ethylnonane	I10	0.0539	0.0726	0.0733
1,3-Diethylbenzene	A10	0.1267	0.1610	0.1368
1,3-Methyl-n-propylbenzene	A10	0.0376	0.0478	0.0408
1,4-Diethylbenzene	A10	0.1114	0.1415	0.1205
1,4-Methyl-n-propylbenzene	A10	0.0391	0.0497	0.0425
n-Butylbenzene	A10	0.0840	0.1067	0.0909
1,3-Dimethyl-5-ethylbenzene	A10	0.0696	0.0884	0.0750
1,2-Diethylbenzene	A10	0.0946	0.1202	0.1003
1,2-Methyl-n-propylbenzene	A10	0.0943	0.1198	0.1007
1,4-Dimethyl-2-ethylbenzene	A10	0.1087	0.1381	0.1156
1,3-Dimethyl-4-ethylbenzene	A10	0.0299	0.0380	0.0318
1,2-Dimethyl-4-ethylbenzene	A10	0.1284	0.1631	0.1369
1,3-Dimethyl-2-ethylbenzene	A10	0.1715	0.2179	0.1797
1t,2c,4-Trimethylcyclopentane	A10	0.5087	0.5402	0.5301
1,2-Dimethyl-3-ethylbenzene	A10	0.1065	0.1353	0.1113
1,2-Ethyl-i-propylbenzene	A10	0.0753	0.0957	0.0801
1,4-Methyl-t-butylbenzene	A11	0.1452	0.1845	0.1545
UnknownC10s	U10	2.8657	3.8589	3.8779
n-Undecane	P11	0.8792	1.3007	1.2890
1,4-Ethyl-i-propylbenzene	A11	0.0944	0.1199	0.1004
1,2,4,5-Tetramethylbenzene	A11	0.1644	0.2088	0.1730
1,2-Methyl-n-butylbenzene	A11	0.0734	0.0932	0.0780
1,2,3,5-Tetramethylbenzene	A11	0.0639	0.0812	0.0670
1,2-Methyl-t-butylbenzene	A11	0.0907	0.1152	0.0965
5-Methylindan	A11	0.0271	0.0437	0.0428
4-Methylindan	A11	0.0140	0.0226	0.0222
1,2-Ethyl-n-propylbenzene	A11	0.0877	0.1114	0.0933
2-Methylindan	A11	0.1023	0.1649	0.1616
1,3-Methyl-n-butylbenzene	A11	0.1093	0.1388	0.1162
1,3-Di-i-propylbenzene	A11	0.0535	0.0680	0.0569
sec-Pentylbenzene	A11	0.1515	0.1924	0.1611
n-Pentylbenzene	A11	0.0563	0.0790	0.0675
1t-M-2-(4MP)cyclopentane	P12	0.0123	0.0198	0.0194
1,2-Di-n-propylbenzene	A11	0.0916	0.1164	0.0975
1,4-Di-i-propylbenzene	A11	0.0947	0.1203	0.1007
Tetrahydronaphthalene	A10	0.1129	0.1434	0.1201
t-Decahydronaphthalene	A10	0.1039	0.1320	0.1105
Naphthalene	A10	0.0847	0.1027	0.0860
1-t-Butyl-3,5-dimethylbenzene	A12	0.1205	0.1531	0.1282
1,4-Ethyl-t-butylbenzene	A11	0.0308	0.0391	0.0327
UnknownC11s	U11	2.0926	3.0957	3.0679
n-Dodecane	P12	0.6321	1.0190	0.9987
1,3-Di-n-propylbenzene	A12	0.0735	0.0934	0.0782
1,3,5-Triethylbenzene	A12	0.0405	0.0461	0.0391
1,2,4-Triethylbenzene	A12	0.3069	0.3491	0.2925
1,4-Methyl-n-pentylbenzene	A12	0.0352	0.0447	0.0374
n-Hexylbenzene	A12	0.0367	0.0564	0.0483
1,2,3,4,5-Pentamethylbenzene	A13	0.0714	0.0907	0.0760
2-Methylnaphthalene	A11	0.1125	0.1514	0.1268

1-Methylnaphthalene	A11	0.1245	0.1676	0.1206
UnknownC12s	U12	1.3088	2.1100	2.0680
n-Tridecane	P13	0.1696	0.2959	0.2866
UnknownC13s	U13	0.8141	1.4205	1.3758
n-Tetradecane	P14	0.0143	0.0269	0.0260
UnknownC14s	U14	0.5926	1.1127	1.0755
n-Pentadecane	P15	0.0218	0.0438	0.0418
UnknownC15s	U15	0.0525	0.1055	0.1008
n-Hexadecane	P16	0.0129	0.0276	0.0262
UnknownC16s	U16	0.0454	0.0973	0.0924
n-Heptadecane	P17	0.0028	0.0064	0.0061
UnknownC17s	U17	0.0024	0.0055	0.0052
UnknownC18s	U18	0.0011	0.0027	0.0025
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. :	201310052	ANALYSIS NO. :	08
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	OCTOBER 15, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 7, 2013
PRODUCER :		CYLINDER NO. :	0533
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS @ 14:55 SPEAKER 2-27-31-8-61		
FIELD DATA		SAMPLE TEMP. :	91
SAMPLE PRES. :	90	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 8 PPM @ 15:00		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0018	0.0044		
HELIUM	0.02	0.00	---	---
OXYGEN/ARGON	0.01	0.01	---	---
NITROGEN	0.87	1.01	---	---
CARBON DIOXIDE	2.66	4.88	---	---
METHANE	69.38450	46.35810	---	---
ETHANE	12.2513	15.3424	3.2721	3.2900
PROPANE	8.8601	16.2714	2.4381	2.4514
I-BUTANE	0.9264	2.2425	0.3024	0.3040
N-BUTANE	2.9980	7.2571	0.9442	0.9493
I-PENTANE	0.6106	1.8294	0.2192	0.2204
N-PENTANE	0.7067	2.1235	0.2563	0.2577
HEXANES PLUS	0.7006	2.6712	0.2832	0.2845
TOTALS	100.00000	100.00000	7.7155	7.7573

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0259	0.0843
TOLUENE	0.0158	0.0606
ETHYLBENZENE	0.0016	0.0071
XYLENES	0.0047	0.0208
TOTAL BTEX	0.0480	0.1728

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1233.8 **/scf**	1240.6 **/scf**
	NET WET REAL :	1212.2 **/scf**	1219.0 **/scf**
HIGH	GROSS DRY REAL :	1356.4 **/scf**	1363.8 **/scf**
	GROSS WET REAL :	1332.7 **/scf**	1340.1 **/scf**
	NET DRY REAL :	19524.8 **/lb**	19631.4 **/lb**
	GROSS DRY REAL :	21461.9 **/lb**	21579.1 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8280
	COMPRESSIBILITY FACTOR :		0.99562

(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

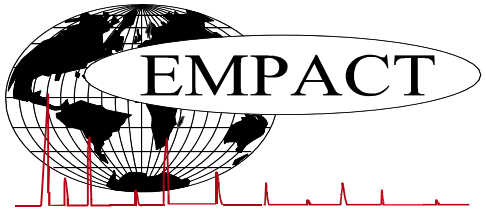
303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201310052	ANALYSIS NO. :	08
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	OCTOBER 15, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 7, 2013
PRODUCER :		CYLINDER NO. :	0533
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS @ 14:55 SPEAKER 2-27-31-8-61		
FIELD DATA		SAMPLE TEMP. :	91
SAMPLE PRES. :	90	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 8 PPM @ 15:00		

Componet	Mole %	Wt %
Helium	0.02	0.00
Carbon Dioxide	2.66	4.88
Nitrogen	0.87	1.01
Methane	69.38450	46.35810
Ethane	12.2513	15.3424
Propane	8.8601	16.2714
Isobutane	0.9264	2.2425
n-Butane	2.9980	7.2571
Isopentane	0.5479	1.6463
n-Pentane	0.7067	2.1235
Cyclopentane	0.0627	0.1831
n-Hexane	0.1452	0.5211
Cyclohexane	0.0388	0.1360
Other Hexanes	0.2561	0.9120
Heptanes	0.1201	0.4976
Methycyclohexane	0.0290	0.1186
2,2,4 Trimethylpentane	0.0001	0.0005
Benzene	0.0259	0.0843
Toluene	0.0158	0.0606
Ethylbenzene	0.0016	0.0071
Xylenes	0.0047	0.0208
C8+ Heavies	0.0633	0.3126
Subtotal	99.98820	99.98560
Oxygen/Argon	0.01	0.01
Alcohols	0.0018	0.0044
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201310052	ANALYSIS NO. :	08
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	OCTOBER 15, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 7, 2013
PRODUCER :		CYLINDER NO. :	0533
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS @ 14:55 SPEAKER 2-27-31-8-61		
FIELD DATA		SAMPLE TEMP. :	91
SAMPLE PRES. :	90	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 8 PPM @ 15:00		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.02	0.00	---	---
Oxygen/Argon	---	0.01	0.01	---	---
Nitrogen	---	0.87	1.01	---	---
Carbon Dioxide	---	2.66	4.88	---	---
Methane	P1	69.38450	46.35810	---	---
Ethane	P2	12.2513	15.3424	3.272	3.290
Propane	P3	8.8601	16.2714	2.438	2.451
i-Butane	I4	0.9264	2.2425	0.302	0.304
n-Butane	P4	2.9980	7.2571	0.944	0.949
2,2-Dimethylpropane	I5	0.0025	0.0075	0.001	0.001
Ethanol	X2	0.0001	0.0002	0.000	0.000
i-Pentane	I5	0.5454	1.6388	0.199	0.200
Acetone	X3	0.0014	0.0034	0.001	0.001
i-Propanol	X3	0.0002	0.0005	0.000	0.000
n-Pentane	P5	0.7067	2.1235	0.256	0.258
t-Butanol	X4	0.0001	0.0003	0.000	0.000
2,2-Dimethylbutane	I6	0.0016	0.0058	0.001	0.001
Cyclopentane	N5	0.0627	0.1831	0.019	0.019
2,3-Dimethylbutane	I6	0.0078	0.0280	0.003	0.003
2-Methylpentane	I6	0.1077	0.3865	0.045	0.045
3-Methylpentane	I6	0.0544	0.1952	0.022	0.022
n-Hexane	P6	0.1452	0.5211	0.060	0.060
2,2-Dimethylpentane	I7	0.0005	0.0021	0.000	0.000
Methylcyclopentane	N6	0.0846	0.2965	0.030	0.030
2,4-Dimethylpentane	I7	0.0035	0.0146	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0259	0.0843	0.007	0.007
3,3-Dimethylpentane	I7	0.0004	0.0017	0.000	0.000
Cyclohexane	N6	0.0388	0.1360	0.013	0.013
2-Methylhexane	I7	0.0143	0.0597	0.007	0.007
2,3-Dimethylpentane	I7	0.0069	0.0288	0.003	0.003
1,1-Dimethylcyclopentane	N7	0.0037	0.0151	0.002	0.002
3-Methylhexane	I7	0.0165	0.0688	0.008	0.008
1c,3-Dimethylcyclopentane	N7	0.0090	0.0368	0.004	0.004
1t,3-Dimethylcyclopentane	N7	0.0081	0.0331	0.004	0.004
3-Ethylpentane	I7	0.0014	0.0058	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0164	0.0671	0.008	0.008
2,2,4-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
n-Heptane	P7	0.0342	0.1427	0.016	0.016
1c,2-Dimethylcyclopentane	N7	0.0011	0.0045	0.001	0.001
Methylcyclohexane	N7	0.0290	0.1186	0.012	0.012

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2,2-Dimethylhexane	I8	0.0020	0.0095	0.001	0.001
Ethylcyclopentane	N7	0.0040	0.0164	0.002	0.002
2,5-Dimethylhexane	I8	0.0007	0.0033	0.000	0.000
2,4-Dimethylhexane	I8	0.0012	0.0057	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0023	0.0107	0.001	0.001
3,3-Dimethylhexane	I8	0.0001	0.0005	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0026	0.0122	0.001	0.001
2,3,4-Trimethylpentane	I8	0.0005	0.0024	0.000	0.000
Toluene	A7	0.0158	0.0606	0.005	0.005
2,3-Dimethylhexane	I8	0.0007	0.0033	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0011	0.0053	0.001	0.001
2-Methylheptane	I8	0.0053	0.0252	0.003	0.003
4-Methylheptane	I8	0.0015	0.0071	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0002	0.0010	0.000	0.000
3,4-Dimethylhexane	I8	0.0002	0.0010	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	0.0025	0.0119	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0036	0.0168	0.002	0.002
3-Ethylhexane	I8	0.0004	0.0019	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0012	0.0056	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0005	0.0023	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0008	0.0038	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0007	0.0033	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0023	0.0107	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0002	0.0011	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0020	0.0093	0.001	0.001
n-Octane	P8	0.0073	0.0347	0.004	0.004
1c,4-Dimethylcyclohexane	N8	0.0011	0.0051	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	0.0004	0.0021	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0004	0.0019	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0024	0.0126	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0008	0.0043	0.000	0.000
2,4-Dimethylheptane	I9	0.0004	0.0021	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
Ethylcyclohexane	N8	0.0013	0.0061	0.001	0.001
n-Propylcyclopentane	N8	0.0005	0.0023	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	0.0001	0.0005	0.000	0.000
2,6-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0005	0.0026	0.000	0.000
Ethylbenzene	I8	0.0016	0.0071	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0029	0.0128	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0006	0.0027	0.000	0.000
3,4-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0003	0.0016	0.000	0.000
4-Methyloctane	I9	0.0005	0.0027	0.000	0.000
2-Methyloctane	I9	0.0005	0.0027	0.000	0.000
3-Ethylheptane	I9	0.0002	0.0011	0.000	0.000
3-Methyloctane	I9	0.0006	0.0032	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	0.0012	0.0053	0.000	0.000
i-Butylcyclopentane	N9	0.0005	0.0026	0.000	0.000
n-Nonane	P9	0.0018	0.0096	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0005	0.0026	0.000	0.000
i-Propylbenzene	A9	0.0004	0.0020	0.000	0.000
i-Propylcyclohexane	N9	0.0001	0.0005	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	0.0005	0.0026	0.000	0.000
3,3-Dimethyloctane	I10	0.0002	0.0012	0.000	0.000
n-Propylbenzene	A9	0.0004	0.0020	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0005	0.0030	0.000	0.000
1,3-Methylethylbenzene	A9	0.0002	0.0010	0.000	0.000
1,4-Methylethylbenzene	A9	0.0002	0.0010	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
2-Methylnonane	I10	0.0002	0.0012	0.000	0.000
3-Ethyloctane	I10	0.0001	0.0006	0.000	0.000
3-Methylnonane	I10	0.0001	0.0006	0.000	0.000
t-Butylbenzene	A10	0.0003	0.0017	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0021	0.0112	0.001	0.001
n-Decane	P10	0.0003	0.0018	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	0.0005	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
1,3-Dimethyl-5-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
UnknownC10s	U10	0.0016	0.0095	0.001	0.001
UnknownC11s	U11	0.0003	0.0020	0.000	0.000
TOTAL		100.00000	100.00000	7.7165	7.7583

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0259	0.0843
TOLUENE	0.0158	0.0606
ETHYLBENZENE	0.0016	0.0071
XYLENES	0.0047	0.0208
TOTAL BTEX	0.0480	0.1728

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1233.8 **/scf**	1240.6 **/scf**
	NET WET REAL :	1212.2 **/scf**	1219.0 **/scf**
HIGH	GROSS DRY REAL :	1356.4 **/scf**	1363.8 **/scf**
	GROSS WET REAL :	1332.7 **/scf**	1340.1 **/scf**
	NET DRY REAL :	19524.8 **/lb**	19631.4 **/lb**
	GROSS DRY REAL :	21461.9 **/lb**	21579.1 **/lb**

RELATIVE DENSITY (AIR=1): 0.8280

COMPRESSIBILITY FACTOR : 0.99562

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

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

CRUDE OIL ASSAY

PROJECT NO. :	201310052	ANALYSIS NO. :	09
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	OCTOBER 17, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 7, 2013
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	PRODUTION TANK @ 14:50 SPEAKER 2-27-31-8-61		EMPACT
FIELD DATA		SAMPLE TEMP. :	94
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

SPECIFICATION	TEST METHOD	UNITS	RESULTS
API GRAVITY		API 60/60	37.4
RVP @100 DEG F	D323	PSIG	7.4
TOTAL SULFUR	D2622	WT %	0.297
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