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

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201412066	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	2081
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	OIL TREATER 14:55		EMPACT
	BRINGLESON RANCH 5-34-9-58		
FIELD DATA		SAMPLE TEMP. :	138
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
NITROGEN (AIR)	0.1160	0.0288	0.0266
CARBON DIOXIDE	0.0050	0.0020	0.0018
METHANE	0.0210	0.0030	0.0075
ETHANE	0.1380	0.0368	0.0771
PROPANE	1.6540	0.6468	0.9522
I-BUTANE	0.3120	0.1608	0.2132
N-BUTANE	1.6230	0.8365	1.0691
I-PENTANE	0.8157	0.5219	0.6240
N-PENTANE	1.3260	0.8484	1.0034
HEXANES PLUS	93.9893	96.9150	96.0251
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	**MOLE%**	**MASS%**
BENZENE	1.7347	1.2016
TOLUENE	3.0117	2.4609
ETHYLBENZENE	0.9233	0.8693
XYLENE	1.7905	1.6858
TOTAL BTEX	7.4602	6.2176

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

	TOTAL SAMPLE	**C6+ FRACTION**	
Specific Gravity (H2O=1) =	0.7467	0.7539	60/60
API Gravity =	58	56.19	60/60
Molecular Weight =	112.76	117.121	
Absolute Density =	6.23	6.28	LBS/GAL
Heating Value Liq. Idl Gas=	125947	127311	BTU/GAL
Vapor/Liquid =	21.07	20.54	CUFT/GAL
Vapor Pressure =	8.41	1.77	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. :	201412066	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	2081
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	OIL TREATER 14:55		EMPACT
	BRINGLESON RANCH 5-34-9-58		
FIELD DATA		SAMPLE TEMP. :	138
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0050		0.0020		0.0018	
NITROGEN (AIR)	0.1160		0.0288		0.0266	
METHANE	0.0210		0.0030		0.0075	
ETHANE	0.1380		0.0368		0.0771	
PROPANE	1.6540		0.6468		0.9522	
I-BUTANE	0.3120		0.1608		0.2132	
N-BUTANE	1.6230		0.8365		1.0691	
I-PENTANE	0.8157		0.5219		0.6240	
N-PENTANE	1.3260		0.8484		1.0034	
CYCLOPENTANE (N-C5)	1.6918		1.0522		1.0331	
N-HEXANE	7.1191		5.4411		6.1191	
CYCLOHEXANE (OTHER C6)	2.7952		2.0862		1.9875	
OTHER HEXANES	11.2709		8.5230		9.0890	
OTHER HEPTANES	13.7112		12.0948		12.6719	
METHYLCYCLOHEXANE (OTHER C7)	3.8903		3.3875		3.2638	
2,2,4 TRIMETHYLPENTANE	0.8514		0.7414		0.7345	
BENZENE	1.7347		1.2016		1.0159	
TOLUENE	3.0117		2.4609		2.1010	
ETHYLBENZENE	0.9233		0.8693		0.7421	
XYLENES	1.7905		1.6858		1.4389	
OTHER OCTANES	10.6687		10.8374		10.9783	
OCTANES PLUS	----	48.7644	----	60.6677	----	58.7438
NONANES	10.8680		12.1991		11.9367	
DECANES PLUS	23.6625		34.3347		32.9133	
SUB TOTAL	100.0000		100.0000		100.0000	
TOTAL	100.0000		100.0000		100.0000	

API Gravity	=	**58.00**	60/60
Vapor Pressure	=	**8.41**	PSIA & 100 F
Average Molecular Weight of Decanes plus	=	**163.63**	
Average Specific Gravity of Decanes plus	=	**0.7780**	

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BY CARBON NUMBER

PROJECT NO. :	201412066	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	2081
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	OIL TREATER 14:55		EMPACT
	BRINGLESON RANCH 5-34-9-58		
FIELD DATA		SAMPLE TEMP. :	138
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER	MOLE%	MASS %	VOLUME %
NITROGEN	0.1160	0.0288	0.0266
CARBON DIOXIDE	0.0050	0.0020	0.0018
C1	0.0210	0.0030	0.0075
C2	0.1380	0.0368	0.0771
C3	1.6540	0.6468	0.9522
C4	1.9350	0.9973	1.2823
C5	3.8335	2.4225	2.6605
C6	22.9199	17.2519	18.2115
C7	20.6132	17.9432	18.0367
C8	14.2339	14.1339	13.8938
C9	10.8680	12.1991	11.9367
C10	9.9917	12.1760	11.6742
C11	4.6553	6.1408	5.7765
C12	2.2265	3.1985	3.0949
C13	1.6875	2.6849	2.6045
C14	1.3319	2.3433	2.2914
C15	1.3510	2.5449	2.4599
C16	0.9204	1.8482	1.7749
C17	0.6024	1.2846	1.2298
C18	0.4638	1.0468	0.9993
C19	0.2535	0.6036	0.5726
C20	0.0872	0.2185	0.2061
C21	0.0610	0.1605	0.1506
C22	0.0252	0.0694	0.0649
C23	0.0051	0.0147	0.0137
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. :	201412066	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	2081
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	OIL TREATER 14:55		EMPACT
	BRINGLESON RANCH 5-34-9-58		
FIELD DATA		SAMPLE TEMP. :	138
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.1160	0.0288	0.0266
Carbon Dioxide	NHC	0.0050	0.0020	0.0018
Methane	P1	0.0210	0.0030	0.0075
Ethane	P2	0.1380	0.0368	0.0771
Propane	P3	1.6540	0.6468	0.9522
i-Butane	I4	0.3120	0.1608	0.2132
n-Butane	P4	1.6230	0.8365	1.0691
2,2-Dimethylpropane	I5	0.0127	0.0081	0.0101
i-Pentane	I5	0.8030	0.5138	0.6139
n-Pentane	P5	1.3260	0.8484	1.0034
2,2-Dimethylbutane	I6	0.0276	0.0211	0.0241
Cyclopentane	N5	1.6918	1.0522	1.0331
2,3-Dimethylbutane	I6	0.3261	0.2492	0.2789
2-Methylpentane	I6	3.6726	2.8068	3.1851
3-Methylpentane	I6	2.1777	1.6643	1.8571
n-Hexane	P6	7.1191	5.4411	6.1191
2,2-Dimethylpentane	I7	0.0121	0.0107	0.0117
Methylcyclopentane	N6	5.0669	3.7816	3.7438
2,4-Dimethylpentane	I7	0.2236	0.1987	0.2193
Benzene	A6	1.7347	1.2016	1.0159
3,3-Dimethylpentane	I7	0.0228	0.0203	0.0218
Cyclohexane	N6	2.7952	2.0862	1.9875
2-Methylhexane	I7	1.3059	1.1604	1.2693
2,3-Dimethylpentane	I7	0.6770	0.6016	0.6393
1,1-Dimethylcyclopentane	N7	0.2668	0.2323	0.2284
3-Methylhexane	I7	1.7340	1.5408	1.6601
1c,3-Dimethylcyclopentane	N7	0.9357	0.8148	0.8114
1t,3-Dimethylcyclopentane	N7	0.8514	0.7414	0.7345
3-Ethylpentane	I7	0.1631	0.1449	0.1536
1t,2-Dimethylcyclopentane	N7	1.8745	1.6322	1.6113
2,2,4-Trimethylpentane	I8	0.0518	0.0525	0.0561
n-Heptane	P7	4.5943	4.0824	4.4275
1c,2-Dimethylcyclopentane	N7	0.1944	0.1693	0.1626
Methylcyclohexane	N7	3.8903	3.3875	3.2638
2,2-Dimethylhexane	I8	0.2786	0.2822	0.3009
Ethylcyclopentane	N7	0.8556	0.7450	0.7211
2,5-Dimethylhexane	I8	0.1452	0.1471	0.1572
2,2,3-Trimethylpentane	I8	0.0144	0.0146	0.0151
2,4-Dimethylhexane	I8	0.2135	0.2163	0.2301
1c,2t,4-Trimethylcyclopentane	N8	0.5326	0.5300	0.5151
3,3-Dimethylhexane	I8	0.0364	0.0369	0.0386
2,3,4-Trimethylpentane	I8	0.1034	0.1047	0.1079

2,3,3-Trimethylpentane	I8	0.0112	0.0113	0.0116
Toluene	A7	3.0117	2.4609	2.1010
2,3-Dimethylhexane	I8	0.1383	0.1401	0.1460
2-Methyl-3-ethylpentane	I8	0.1504	0.1524	0.1571
1,1,2-Trimethylcyclopentane	N8	0.0117	0.0116	0.0111
2-Methylheptane	I8	1.2713	1.2878	1.3662
4-Methylheptane	I8	0.4065	0.4118	0.4263
3-Methyl-3-ethylpentane	I8	0.0514	0.0521	0.0532
3,4-Dimethylhexane	I8	0.0753	0.0763	0.0786
1c,2c,4-Trimethylcyclopentane	N8	0.0405	0.0403	0.0388
1c,3-Dimethylcyclohexane	N8	0.0183	0.0182	0.0176
3-Methylheptane	I8	0.6331	0.6413	0.6745
1c,2t,3-Trimethylcyclopentane	N8	0.8374	0.8333	0.8026
3-Ethylhexane	I8	0.1488	0.1507	0.1568
1t,4-Dimethylcyclohexane	N8	0.3320	0.3304	0.3215
1,1-Dimethylcyclohexane	N8	0.0991	0.0986	0.0937
3t-Ethylmethylcyclopentane	N8	0.2647	0.2634	0.2549
2t-Ethylmethylcyclopentane	N8	0.2305	0.2294	0.2214
1,1-Methylethylcyclopentane	N8	0.7908	0.7869	0.7479
2,2,4-Trimethylhexane	I9	0.0354	0.0403	0.0418
1t,2-Dimethylcyclohexane	N8	0.5073	0.5048	0.4829
1t,3-Dimethylcyclohexane	N8	0.0208	0.0207	0.0196
n-Octane	P8	2.6326	2.6668	2.8157
1c,4-Dimethylcyclohexane	N8	0.2863	0.2849	0.2701
i-Propylcyclopentane	I8	0.0743	0.0739	0.0706
2,4,4-Trimethylhexane	I9	0.0163	0.0185	0.0190
2,2,3,4-Tetramethylpentane	I9	0.0155	0.0176	0.0182
2,3,4-Trimethylhexane	I9	0.0081	0.0092	0.0095
1c,2-Dimethylcyclohexane	N8	0.2232	0.2221	0.2071
2,3,5-Trimethylhexane	I9	0.0424	0.0482	0.0495
2,2-Dimethylheptane	I9	0.0158	0.0180	0.0188
1,1,4-Trimethylcyclohexane	N9	0.8730	0.9773	0.9397
2,2,3-Trimethylhexane	I9	0.4136	0.4704	0.4786
2,4-Dimethylheptane	I9	0.1959	0.2228	0.2311
4,4-Dimethylheptane	I9	0.0521	0.0593	0.0615
Ethylcyclohexane	N8	0.5829	0.5800	0.5466
n-Propylcyclopentane	N8	0.2304	0.2293	0.2191
1c,3c,5-Trimethylcyclohexane	N9	0.0452	0.0506	0.0487
2,5-Dimethylheptane	I9	0.0811	0.0922	0.0955
3,3-Dimethylheptane	I9	0.0833	0.0947	0.0980
3,5-Dimethylheptane	I9	0.0683	0.0777	0.0804
2,6-Dimethylheptane	I9	0.0755	0.0859	0.0899
1,1,3-Trimethylcyclohexane	N9	0.1349	0.1510	0.1452
Ethylbenzene	A8	0.9233	0.8693	0.7421
1c,2t,4t-Trimethylcyclohexane	N9	0.1741	0.1949	0.1838
2,3-Dimethylheptane	I9	0.4710	0.5357	0.5476
1,3-Dimethylbenzene (m-Xylene)	A8	0.6974	0.6566	0.5638
1,4-Dimethylbenzene (p-Xylene)	A8	0.4104	0.3864	0.3328
3,4-Dimethylheptane	I9	0.0591	0.0672	0.0682
3,4-Dimethylheptane (2)	I9	0.1531	0.1741	0.1767
4-Ethylheptane	I9	0.0384	0.0437	0.0453
4-Methyloctane	I9	0.2766	0.3146	0.3240
2-Methyloctane	I9	0.3450	0.3924	0.4081
1c,2t,4c-Trimethylcyclohexane	I9	0.0374	0.0425	0.0435
3-Ethylheptane	I9	0.1149	0.1307	0.1335
3-Methyloctane	I9	0.4424	0.5032	0.5181
3,3-Diethylpentane	I9	0.0452	0.0514	0.0506
1c,2t,3-Trimethylcyclohexane	N9	0.1061	0.1188	0.1121
1,1,2-Trimethylcyclohexane	N9	0.0161	0.0180	0.0170
1,2-Dimethylbenzene (o-Xylene)	A8	0.6827	0.6428	0.5423
i-Butylcyclopentane	N9	0.3026	0.3388	0.3220
UnknownC8s	U8	0.0751	0.0761	0.0803
n-Nonane	P9	1.8981	2.1589	2.2325
1,1-Methylethylcyclohexane	N9	0.2629	0.2990	0.3101
i-Propylbenzene	A9	0.3136	0.3343	0.2873
i-Propylcyclohexane	N9	0.1299	0.1454	0.1346
2,2-Dimethyloctane	I10	0.0893	0.1127	0.1131
2,4-Dimethyloctane	I10	0.1139	0.1437	0.1442
2,6-Dimethyloctane	I10	0.0121	0.0153	0.0159
2,5-Dimethyloctane	I10	0.0366	0.0462	0.0464
n-Butylcyclopentane	N9	0.3377	0.4201	0.3903
3,3-Dimethyloctane	I10	0.1851	0.2336	0.2346
n-Propylbenzene	A9	0.2716	0.2895	0.2489
3,6-Dimethyloctane	I10	0.4370	0.5514	0.5535

3-Methyl-5-ethylheptane	I10	0.3922	0.4461	0.4562
1,3-Methylethylbenzene	A9	0.4928	0.5253	0.4478
1,4-Methylethylbenzene	A9	0.2067	0.2203	0.1878
1,3,5-Trimethylbenzene	A9	0.1940	0.2068	0.1775
2,3-Dimethyloctane	I10	0.0675	0.0852	0.0855
5-Methylnonane	I10	0.2816	0.3553	0.3600
1,2-Methylethylbenzene	A9	0.5700	0.6076	0.5152
2-Methylnonane	I10	0.0570	0.0719	0.0735
3-Ethyloctane	I10	0.0673	0.0849	0.0852
3-Methylnonane	I10	0.2247	0.2835	0.2869
1,2,4-Trimethylbenzene	A9	0.0329	0.0351	0.0298
t-Butylbenzene	A10	0.5738	0.6830	0.5855
i-Butylcyclohexane	N10	0.2479	0.3084	0.2821
1t-Methyl-2-n-propylcyclohexane	I10	0.0507	0.0577	0.0590
i-Butylbenzene	A10	0.0729	0.0868	0.0756
sec-Butylbenzene	A10	0.0507	0.0603	0.0520
UnknownC9s	U9	1.1772	1.3390	1.3846
n-Decane	P10	1.2984	1.6382	1.6655
1,2,3-Trimethylbenzene	A9	0.2422	0.2581	0.2144
1,3-Methyl-i-propylbenzene	A10	0.1123	0.1197	0.1015
1,4-Methyl-i-propylbenzene	A10	0.1277	0.1361	0.1154
Sec-Butylcyclohexane	N10	0.3164	0.3936	0.3595
1,2-Methyl-i-propylbenzene	A10	0.2112	0.2514	0.2130
3-Ethylnonane	I10	0.0440	0.0555	0.0567
1,3-Diethylbenzene	A10	0.1616	0.1923	0.1653
1,3-Methyl-n-propylbenzene	A10	0.0314	0.0374	0.0323
1,4-Diethylbenzene	A10	0.1899	0.2260	0.1947
1,4-Methyl-n-propylbenzene	A10	0.1175	0.1399	0.1210
n-Butylbenzene	A10	0.0708	0.0843	0.0727
1,3-Dimethyl-5-ethylbenzene	A10	0.0850	0.1012	0.0869
1,2-Diethylbenzene	A10	0.1141	0.1358	0.1147
1,2-Methyl-n-propylbenzene	A10	0.1052	0.1252	0.1064
1,4-Dimethyl-2-ethylbenzene	A10	0.1223	0.1456	0.1233
1,3-Dimethyl-4-ethylbenzene	A10	0.0433	0.0515	0.0436
1,2-Dimethyl-4-ethylbenzene	A10	0.2115	0.2517	0.2138
1,3-Dimethyl-2-ethylbenzene	A10	0.1702	0.2026	0.1690
1t,2c,4-Trimethylcyclopentane	A10	0.4020	0.4000	0.3971
1,2-Dimethyl-3-ethylbenzene	A10	0.1026	0.1221	0.1016
1,2-Ethyl-i-propylbenzene	A10	0.1268	0.1509	0.1278
1,4-Methyl-t-butylbenzene	A11	0.1160	0.1381	0.1170
UnknownC10s	U10	2.5373	3.2014	3.2548
n-Undecane	P11	0.9116	1.2636	1.2669
1,4-Ethyl-i-propylbenzene	A11	0.0634	0.0755	0.0640
1,2,4,5-Tetramethylbenzene	A11	0.1783	0.2122	0.1779
1,2-Methyl-n-butylbenzene	A11	0.0815	0.0970	0.0822
1,2,3,5-Tetramethylbenzene	A11	0.1051	0.1251	0.1044
1,2-Methyl-t-butylbenzene	A11	0.1350	0.1607	0.1361
5-Methylindan	A11	0.0163	0.0246	0.0244
4-Methylindan	A11	0.0076	0.0115	0.0114
1,2-Ethyl-n-propylbenzene	A11	0.1473	0.1753	0.1485
2-Methylindan	A11	0.1098	0.1659	0.1645
1,3-Methyl-n-butylbenzene	A11	0.0819	0.0975	0.0826
1,3-Di-i-propylbenzene	A11	0.1170	0.1393	0.1180
sec-Pentylbenzene	A11	0.0811	0.0965	0.0818
n-Pentylbenzene	A11	0.0661	0.0869	0.0752
1t-M-2-(4MP)cyclopentane	P12	0.0769	0.1162	0.1152
1,2-Di-n-propylbenzene	A11	0.1024	0.1219	0.1033
1,4-Di-i-propylbenzene	A11	0.1096	0.1305	0.1106
Tetrahydronaphthalene	A10	0.0466	0.0555	0.0470
t-Decahydronaphthalene	A10	0.1886	0.2245	0.1902
Naphthalene	A10	0.0947	0.1076	0.0912
1-t-Butyl-3,5-dimethylbenzene	A12	0.0675	0.0803	0.0680
1,4-Ethyl-t-butylbenzene	A11	0.0886	0.1055	0.0894
UnknownC11s	U11	1.7486	2.4238	2.4301
n-Dodecane	P12	0.6708	1.0133	1.0048
1,3-Di-n-propylbenzene	A12	0.0831	0.0989	0.0838
1,3,5-Triethylbenzene	A12	0.0261	0.0278	0.0239
1,2,4-Triethylbenzene	A12	0.2077	0.2214	0.1877
1,4-Methyl-n-pentylbenzene	A12	0.0258	0.0307	0.0260
n-Hexylbenzene	A12	0.0599	0.0862	0.0746
1,2,3,4,5-Pentamethylbenzene	A13	0.1665	0.1982	0.1679
2-Methylnaphthalene	A11	0.2119	0.2672	0.2264
1-Methylnaphthalene	A11	0.1762	0.2222	0.1618
UnknownC12s	U12	1.0087	1.5237	1.5109

n-Tridecane	P13	0.5305	0.8673	0.8498
UnknownC13s	U13	0.9905	1.6194	1.5868
n-Tetradecane	P14	0.4488	0.7896	0.7721
UnknownC14s	U14	0.8831	1.5537	1.5193
n-Pentadecane	P15	0.4207	0.7925	0.7660
UnknownC15s	U15	0.9303	1.7524	1.6939
n-Hexadecane	P16	0.3604	0.7237	0.6950
UnknownC16s	U16	0.5600	1.1245	1.0799
n-Heptadecane	P17	0.2275	0.4851	0.4644
UnknownC17s	U17	0.3749	0.7995	0.7654
n-Octadecane	P18	0.1306	0.2948	0.2814
UnknownC18s	U18	0.3332	0.7520	0.7179
n-Nonadecane	P19	0.0607	0.1445	0.1371
UnknownC19s	U19	0.1928	0.4591	0.4355
n-Eicosane	P20	0.0238	0.0596	0.0562
UnknownC20s	U20	0.0634	0.1589	0.1499
n-Heneicosane	P21	0.0112	0.0295	0.0277
UnknownC21s	U21	0.0498	0.1310	0.1229
n-Docosane	P22	0.0065	0.0179	0.0167
UnknownC22s	U22	0.0187	0.0515	0.0482
n-Tricosane	P23	0.0034	0.0098	0.0091
UnknownC23s	U23	0.0017	0.0049	0.0046
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. :	201412066	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 11, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	1814
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS 15:05 BRINGLESON RANCH 5-34-9-58		
FIELD DATA		SAMPLE TEMP. :	76
SAMPLE PRES. :	76	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN 1.0 PPM (1-7PPM) 15:10		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
HELIUM	0.01	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.01	0.01	---	---
NITROGEN	1.07	1.21	---	---
CARBON DIOXIDE	2.41	4.29	---	---
METHANE	67.93680	44.04680	---	---
ETHANE	11.2568	13.6795	3.0078	3.0243
PROPANE	10.0996	17.9984	2.7795	2.7946
I-BUTANE	1.0653	2.5024	0.3486	0.3505
N-BUTANE	3.7118	8.7189	1.1689	1.1753
I-PENTANE	0.7870	2.2891	0.2834	0.2849
N-PENTANE	0.9804	2.8587	0.3546	0.3565
HEXANES PLUS	0.6523	2.3962	0.2582	0.2595
TOTALS	100.00000	100.00000	8.2010	8.2456

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0209	0.0660
TOLUENE	0.0097	0.0361
ETHYLBENZENE	0.0012	0.0051
XYLENES	0.0025	0.0107
TOTAL BTEX	0.0343	0.1179

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1273.8 **/scf**	1280.8 **/scf**
	NET WET REAL :	1251.5 **/scf**	1258.5 **/scf**
HIGH	GROSS DRY REAL :	1399.0 **/scf**	1406.7 **/scf**
	GROSS WET REAL :	1374.5 **/scf**	1382.2 **/scf**
	NET DRY REAL :	19555.7 **/lb**	19662.5 **/lb**
	GROSS DRY REAL :	21479.9 **/lb**	21597.2 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8535
	COMPRESSIBILITY FACTOR :		0.99527

(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

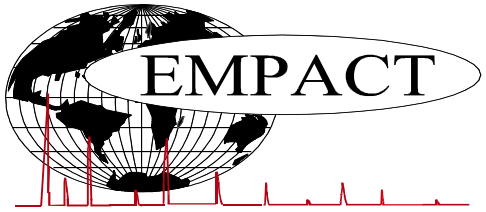
303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201412066	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 11, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	1814
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS 15:05 BRINGLESON RANCH 5-34-9-58		
FIELD DATA		SAMPLE TEMP. :	76
SAMPLE PRES. :	76	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN 1.0 PPM (1-7PPM) 15:10		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	2.41	4.29
Nitrogen	1.07	1.21
Methane	67.93680	44.04680
Ethane	11.2568	13.6795
Propane	10.0996	17.9984
Isobutane	1.0653	2.5024
n-Butane	3.7118	8.7189
Isopentane	0.7173	2.0916
n-Pentane	0.9804	2.8587
Cyclopentane	0.0697	0.1975
n-Hexane	0.1452	0.5057
Cyclohexane	0.0311	0.1058
Other Hexanes	0.2777	0.9604
Heptanes	0.0905	0.3641
Methycyclohexane	0.0209	0.0829
2,2,4 Trimethylpentane	0.0009	0.0042
Benzene	0.0209	0.0660
Toluene	0.0097	0.0361
Ethylbenzene	0.0012	0.0051
Xylenes	0.0025	0.0107
C8+ Heavies	0.0517	0.2552
Subtotal	99.99000	99.99000
Oxygen/Argon	0.01	0.01
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201412066	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 11, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	1814
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS 15:05 BRINGLESON RANCH 5-34-9-58		
FIELD DATA		SAMPLE TEMP. :	76
SAMPLE PRES. :	76	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN 1.0 PPM (1-7PPM) 15:10		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.01	0.00	---	---
Hydrogen	---	0.01	0.00	---	---
Oxygen/Argon	---	0.01	0.01	---	---
Nitrogen	---	1.07	1.21	---	---
Carbon Dioxide	---	2.41	4.29	---	---
Methane	P1	67.93680	44.04680	---	---
Ethane	P2	11.2568	13.6795	3.008	3.024
Propane	P3	10.0996	17.9984	2.780	2.795
i-Butane	I4	1.0653	2.5024	0.349	0.351
n-Butane	P4	3.7118	8.7189	1.169	1.175
2,2-Dimethylpropane	I5	0.0028	0.0082	0.001	0.001
i-Pentane	I5	0.7145	2.0834	0.261	0.263
n-Pentane	P5	0.9803	2.8584	0.355	0.357
2,2-Dimethylbutane	I6	0.0019	0.0066	0.001	0.001
Cyclopentane	N5	0.0697	0.1975	0.021	0.021
2,3-Dimethylbutane	I6	0.0057	0.0198	0.002	0.002
2-Methylpentane	I6	0.1212	0.4221	0.050	0.050
3-Methylpentane	I6	0.0613	0.2135	0.025	0.025
UnknownC5s	U5	0.0001	0.0003	0.000	0.000
n-Hexane	P6	0.1452	0.5057	0.060	0.060
2,2-Dimethylpentane	I7	0.0004	0.0016	0.000	0.000
Methylcyclopentane	N6	0.0822	0.2796	0.029	0.029
2,4-Dimethylpentane	I7	0.0030	0.0122	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0209	0.0660	0.006	0.006
3,3-Dimethylpentane	I7	0.0001	0.0004	0.000	0.000
Cyclohexane	N6	0.0311	0.1058	0.011	0.011
2-Methylhexane	I7	0.0052	0.0211	0.002	0.002
2,3-Dimethylpentane	I7	0.0045	0.0182	0.002	0.002
1,1-Dimethylcyclopentane	N7	0.0064	0.0254	0.003	0.003
3-Methylhexane	I7	0.0114	0.0462	0.005	0.005
1c,3-Dimethylcyclopentane	N7	0.0067	0.0266	0.003	0.003
1t,3-Dimethylcyclopentane	N7	0.0044	0.0175	0.002	0.002
3-Ethylpentane	I7	0.0022	0.0089	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0130	0.0516	0.006	0.006
2,2,4-Trimethylpentane	I8	0.0009	0.0042	0.000	0.000
UnknownC6s	U6	0.0054	0.0188	0.002	0.002
n-Heptane	P7	0.0233	0.0944	0.011	0.011
1c,2-Dimethylcyclopentane	N7	0.0009	0.0036	0.000	0.000
Methylcyclohexane	N7	0.0209	0.0829	0.008	0.008
2,2-Dimethylhexane	I8	0.0016	0.0074	0.001	0.001

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1,1,3-Trimethylcyclopentane	N7	0.0003	0.0014	0.000	0.000
Ethylcyclopentane	N7	0.0027	0.0107	0.001	0.001
2,5-Dimethylhexane	I8	0.0003	0.0014	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0002	0.0009	0.000	0.000
2,4-Dimethylhexane	I8	0.0007	0.0032	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0017	0.0077	0.001	0.001
3,3-Dimethylhexane	I8	0.0001	0.0004	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0017	0.0077	0.001	0.001
2,3,4-Trimethylpentane	I8	0.0001	0.0004	0.000	0.000
Toluene	A7	0.0097	0.0361	0.003	0.003
2,3-Dimethylhexane	I8	0.0006	0.0028	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0002	0.0009	0.000	0.000
2-Methylheptane	I8	0.0034	0.0157	0.002	0.002
4-Methylheptane	I8	0.0010	0.0046	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0002	0.0009	0.000	0.000
3,4-Dimethylhexane	I8	0.0001	0.0004	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0002	0.0009	0.000	0.000
3-Methylheptane	I8	0.0020	0.0092	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0022	0.0100	0.001	0.001
3-Ethylhexane	I8	0.0004	0.0019	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0014	0.0063	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0003	0.0014	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0004	0.0018	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0003	0.0014	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0014	0.0063	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0014	0.0063	0.001	0.001
UnknownC7s	U7	0.0059	0.0239	0.003	0.003
n-Octane	P8	0.0021	0.0097	0.001	0.001
1c,4-Dimethylcyclohexane	N8	0.0037	0.0168	0.002	0.002
i-Propylcyclopentane	I8	0.0001	0.0004	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
2,3,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0002	0.0009	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0017	0.0087	0.001	0.001
2,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
4,4-Dimethylheptane	I9	0.0003	0.0015	0.000	0.000
Ethylcyclohexane	N8	0.0010	0.0045	0.000	0.000
n-Propylcyclopentane	N8	0.0003	0.0014	0.000	0.000
2,5-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
3,3-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
Ethylbenzene	I8	0.0012	0.0051	0.000	0.000
2,3-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0012	0.0051	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0004	0.0017	0.000	0.000
3,4-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0005	0.0026	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
4-Methyloctane	I9	0.0003	0.0015	0.000	0.000
2-Methyloctane	I9	0.0004	0.0021	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
3-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
3-Methyloctane	I9	0.0004	0.0021	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	0.0009	0.0039	0.000	0.000
i-Butylcyclopentane	N9	0.0004	0.0020	0.000	0.000
UnknownC8s	U8	0.0005	0.0023	0.000	0.000
n-Nonane	P9	0.0012	0.0062	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0010	0.0051	0.001	0.001
i-Propylbenzene	A9	0.0005	0.0024	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
2,6-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Butylcyclopentane	N9	0.0003	0.0015	0.000	0.000
3,3-Dimethyloctane	I10	0.0002	0.0011	0.000	0.000
n-Propylbenzene	A9	0.0002	0.0010	0.000	0.000
3,6-Dimethyloctane	I10	0.0003	0.0017	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0002	0.0011	0.000	0.000
1,3-Methylethylbenzene	A9	0.0004	0.0019	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
2,3-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
5-Methylnonane	I10	0.0004	0.0023	0.000	0.000
1,2-Methylethylbenzene	A9	0.0002	0.0010	0.000	0.000
3-Methylnonane	I10	0.0002	0.0011	0.000	0.000
t-Butylbenzene	A10	0.0004	0.0022	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0006	0.000	0.000
i-Butylbenzene	A10	0.0001	0.0005	0.000	0.000
UnknownC9s	U9	0.0027	0.0140	0.002	0.002
n-Decane	P10	0.0010	0.0057	0.001	0.001
1,2,3-Trimethylbenzene	A9	0.0002	0.0010	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0001	0.0005	0.000	0.000
Sec-Butylcyclohexane	A10	0.0002	0.0011	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,3-Diethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Methyl-n-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,2-Diethylbenzene	A10	0.0001	0.0005	0.000	0.000
t-Decahydronaphthalene	A9	0.0001	0.0006	0.000	0.000
1,2-Methyl-n-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Dimethyl-2-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0002	0.0011	0.000	0.000
1,2-Dimethyl-3-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
UnknownC10s	U10	0.0016	0.0092	0.001	0.001
n-Undecane	P11	0.0005	0.0032	0.000	0.000
1,2,4,5-Tetramethylbenzene	A11	0.0001	0.0005	0.000	0.000
1,2,3,5-Tetramethylbenzene	A11	0.0001	0.0005	0.000	0.000
1,2-Ethyl-n-propylbenzene	A11	0.0001	0.0006	0.000	0.000
1,2-Di-n-propylbenzene	A11	0.0001	0.0007	0.000	0.000
1,4-Di-i-propylbenzene	A11	0.0001	0.0007	0.000	0.000
UnknownC11s	U11	0.0006	0.0038	0.000	0.000
n-Dodecane	P12	0.0003	0.0021	0.000	0.000
1,2,4-Triethylbenzene	A12	0.0001	0.0007	0.000	0.000
2-Methylnaphthalene	A11	0.0001	0.0006	0.000	0.000
UnknownC12s	U12	0.0004	0.0026	0.000	0.000
n-Tridecane	P13	0.0001	0.0007	0.000	0.000
UnknownC13s	U13	0.0004	0.0030	0.000	0.000
UnknownC14s	U14	0.0001	0.0008	0.000	0.000
TOTAL		100.00000	100.00000	8.2010	8.2456

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0209	0.0660
TOLUENE	0.0097	0.0361
ETHYLBENZENE	0.0012	0.0051
XYLENES	0.0025	0.0107
TOTAL BTEX	0.0343	0.1179

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1273.8 **/scf**	1280.8 **/scf**
	NET WET REAL :	1251.5 **/scf**	1258.5 **/scf**
HIGH	GROSS DRY REAL :	1399.0 **/scf**	1406.7 **/scf**
	GROSS WET REAL :	1374.5 **/scf**	1382.2 **/scf**
	NET DRY REAL :	19555.7 **/lb**	19662.5 **/lb**
	GROSS DRY REAL :	21479.9 **/lb**	21597.2 **/lb**

RELATIVE DENSITY (AIR=1): 0.8535

COMPRESSIBILITY FACTOR : 0.99527

(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.

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

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201412066	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	PRODUCTION TANK 15:40		EMPACT
	BRINGLESON RANCH 5-34-9-58		
FIELD DATA		SAMPLE TEMP. :	61
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

COMPONENT	MOLE %	MASS %	VOL %
NITROGEN (AIR)	0.0580	0.0133	0.0123
CARBON DIOXIDE	0.0030	0.0011	0.0010
METHANE	0.0070	0.0009	0.0022
ETHANE	0.1240	0.0305	0.0642
PROPANE	1.2040	0.4346	0.6424
I-BUTANE	0.4350	0.2069	0.2754
N-BUTANE	2.3790	1.1317	1.4521
I-PENTANE	1.1009	0.6502	0.7802
N-PENTANE	1.7330	1.0234	1.2151
HEXANES PLUS	92.9561	96.5074	95.5551
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	**MOLE%**	**MASS%**
BENZENE	1.0773	0.6888
TOLUENE	2.1407	1.6145
ETHYLBENZENE	0.4592	0.3990
XYLENE	1.5747	1.3685
TOTAL BTEX	5.2519	4.0708

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

	TOTAL SAMPLE	**C6+ FRACTION**	
Specific Gravity (H2O=1) =	0.7499	0.7571	60/60
API Gravity =	57.19	55.4	60/60
Molecular Weight =	122.17	127.671	
Absolute Density =	6.25	6.31	LBS/GAL
Heating Value Liq. Idl Gas=	125825	126906	BTU/GAL
Vapor/Liquid =	19.78	19.15	CUFT/GAL
Vapor Pressure =	7.13	1.56	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. :	201412066	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	PRODUCTION TANK 15:40		EMPACT
	BRINGLESON RANCH 5-34-9-58		
FIELD DATA		SAMPLE TEMP. :	61
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0030		0.0011		0.0010	
NITROGEN (AIR)	0.0580		0.0133		0.0123	
METHANE	0.0070		0.0009		0.0022	
ETHANE	0.1240		0.0305		0.0642	
PROPANE	1.2040		0.4346		0.6424	
I-BUTANE	0.4350		0.2069		0.2754	
N-BUTANE	2.3790		1.1317		1.4521	
I-PENTANE	1.1009		0.6502		0.7802	
N-PENTANE	1.7330		1.0234		1.2151	
CYCLOPENTANE (N-C5)	1.3358		0.7668		0.7559	
N-HEXANE	6.2539		4.4105		4.9799	
CYCLOHEXANE (OTHER C6)	2.3131		1.5934		1.5240	
OTHER HEXANES	9.7889		6.8371		7.3480	
OTHER HEPTANES	12.0926		9.8455		10.3609	
METHYLCYCLOHEXANE (OTHER C7)	3.8802		3.1185		3.0165	
2,2,4 TRIMETHYLPENTANE	0.7986		0.6418		0.6383	
BENZENE	1.0773		0.6888		0.5846	
TOLUENE	2.1407		1.6145		1.3838	
ETHYLBENZENE	0.4592		0.3990		0.3420	
XYLENES	1.5747		1.3685		1.1729	
OTHER OCTANES	9.9838		9.3549		9.4860	
OCTANES PLUS	----	54.0736	----	67.6323	----	65.6015
NONANES	10.4501		10.8352		10.6603	
DECANES PLUS	30.8072		45.0329		43.3020	
SUB TOTAL	100.0000		100.0000		100.0000	
TOTAL	100.0000		100.0000		100.0000	

API Gravity	=	**57.19**	60/60
Vapor Pressure	=	**7.13**	PSIA & 100 F
Average Molecular Weight of Decanes plus	=	**178.59**	
Average Specific Gravity of Decanes plus	=	**0.7810**	

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. :	201412066	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	PRODUCTION TANK 15:40		EMPACT
	BRINGLESON RANCH 5-34-9-58		
FIELD DATA		SAMPLE TEMP. :	61
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
NITROGEN		0.0580	0.0133	0.0123
CARBON DIOXIDE		0.0030	0.0011	0.0010
	C1	0.0070	0.0009	0.0022
	C2	0.1240	0.0305	0.0642
	C3	1.2040	0.4346	0.6424
	C4	2.8140	1.3386	1.7275
	C5	4.1697	2.4404	2.7512
	C6	19.4332	13.5298	14.4365
	C7	18.1135	14.5785	14.7612
	C8	12.8163	11.7642	11.6392
	C9	10.4501	10.8352	10.6603
	C10	10.2170	11.4667	11.0180
	C11	4.6814	5.7129	5.4363
	C12	3.4786	4.6129	4.4771
	C13	2.6700	3.9302	3.8310
	C14	2.1266	3.4533	3.3901
	C15	2.0108	3.4961	3.3928
	C16	1.3243	2.4545	2.3665
	C17	1.0040	1.9762	1.8995
	C18	0.9088	1.8932	1.8144
	C19	0.6541	1.4377	1.3690
	C20	0.4103	0.9489	0.8986
	C21	0.2978	0.7230	0.6812
	C22	0.2438	0.6199	0.5820
	C23	0.1857	0.4934	0.4619
	C24	0.1379	0.3823	0.3570
	C25	0.0981	0.2832	0.2644
	C26	0.1023	0.3071	0.2848
	C27	0.0727	0.2266	0.2100
	C28	0.0576	0.1861	0.1721
	C29	0.0463	0.1549	0.1430
	C30+	0.0791	0.2738	0.2523
	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. :	201412066	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	PRODUCTION TANK 15:40		EMPACT
	BRINGLESON RANCH 5-34-9-58		
FIELD DATA		SAMPLE TEMP. :	61
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0580	0.0133	0.0123
Carbon Dioxide	NHC	0.0030	0.0011	0.0010
Methane	P1	0.0070	0.0009	0.0022
Ethane	P2	0.1240	0.0305	0.0642
Propane	P3	1.2040	0.4346	0.6424
i-Butane	I4	0.4350	0.2069	0.2754
n-Butane	P4	2.3790	1.1317	1.4521
2,2-Dimethylpropane	I5	0.0069	0.0041	0.0051
i-Pentane	I5	1.0940	0.6461	0.7751
n-Pentane	P5	1.7330	1.0234	1.2151
2,2-Dimethylbutane	I6	0.0336	0.0237	0.0272
Cyclopentane	N5	1.3358	0.7668	0.7559
2,3-Dimethylbutane	I6	0.2950	0.2081	0.2338
2-Methylpentane	I6	3.3587	2.3692	2.6991
3-Methylpentane	I6	1.9939	1.4065	1.5756
n-Hexane	P6	6.2539	4.4105	4.9799
2,2-Dimethylpentane	I7	0.0242	0.0198	0.0218
Methylcyclopentane	N6	4.1077	2.8296	2.8123
2,4-Dimethylpentane	I7	0.2096	0.1719	0.1905
2,2,3-Trimethylbutane	I7	0.0069	0.0057	0.0061
Benzene	A6	1.0773	0.6888	0.5846
3,3-Dimethylpentane	I7	0.0140	0.0115	0.0124
Cyclohexane	N6	2.3131	1.5934	1.5240
2-Methylhexane	I7	1.0459	0.8578	0.9420
2,3-Dimethylpentane	I7	0.6193	0.5079	0.5419
1,1-Dimethylcyclopentane	N7	0.3571	0.2870	0.2833
3-Methylhexane	I7	1.5520	1.2729	1.3768
1c,3-Dimethylcyclopentane	N7	0.8639	0.6943	0.6942
1t,3-Dimethylcyclopentane	N7	0.7986	0.6418	0.6383
3-Ethylpentane	I7	0.0609	0.0499	0.0531
1t,2-Dimethylcyclopentane	N7	1.6911	1.3591	1.3469
2,2,4-Trimethylpentane	I8	0.0412	0.0385	0.0413
n-Heptane	P7	4.1135	3.3737	3.6733
1c,2-Dimethylcyclopentane	N7	0.1301	0.1046	0.1009
Methylcyclohexane	N7	3.8802	3.1185	3.0165
2,2-Dimethylhexane	I8	0.4118	0.3850	0.4121
Ethylcyclopentane	N7	0.5482	0.4406	0.4282
2,5-Dimethylhexane	I8	0.0875	0.0818	0.0878
2,2,3-Trimethylpentane	I8	0.0436	0.0408	0.0424
2,4-Dimethylhexane	I8	0.1990	0.1861	0.1987
1c,2t,4-Trimethylcyclopentane	N8	0.4006	0.3679	0.3590
3,3-Dimethylhexane	I8	0.0369	0.0345	0.0362

2,3,4-Trimethylpentane	I8	0.0864	0.0808	0.0836
2,3,3-Trimethylpentane	I8	0.0023	0.0022	0.0023
Toluene	A7	2.1407	1.6145	1.3838
2,3-Dimethylhexane	I8	0.2064	0.1930	0.2019
2-Methyl-3-ethylpentane	I8	0.0940	0.0879	0.0910
1,1,2-Trimethylcyclopentane	N8	0.0122	0.0112	0.0108
2-Methylheptane	I8	1.2238	1.1442	1.2186
4-Methylheptane	I8	0.3703	0.3462	0.3598
3-Methyl-3-ethylpentane	I8	0.0366	0.0342	0.0350
3,4-Dimethylhexane	I8	0.0335	0.0313	0.0324
1c,2c,4-Trimethylcyclopentane	N8	0.0341	0.0313	0.0302
1c,3-Dimethylcyclohexane	N8	0.0213	0.0196	0.0191
3-Methylheptane	I8	0.3169	0.2963	0.3129
1c,2t,3-Trimethylcyclopentane	N8	1.2444	1.1429	1.1052
3-Ethylhexane	I8	0.1545	0.1445	0.1510
1t,4-Dimethylcyclohexane	N8	0.3926	0.3606	0.3523
1,1-Dimethylcyclohexane	N8	0.1023	0.0940	0.0897
3t-Ethylmethylcyclopentane	N8	0.1737	0.1595	0.1550
2t-Ethylmethylcyclopentane	N8	0.1495	0.1373	0.1330
1,1-Methylethylcyclopentane	N8	0.5032	0.4622	0.4410
2,2,4-Trimethylhexane	I9	0.0351	0.0368	0.0383
1t,2-Dimethylcyclohexane	N8	0.5559	0.5106	0.4904
1t,3-Dimethylcyclohexane	N8	0.0033	0.0030	0.0028
UnknownC7s	U7	0.0573	0.0470	0.0512
n-Octane	P8	2.2736	2.1258	2.2533
1c,4-Dimethylcyclohexane	N8	0.6224	0.5716	0.5441
i-Propylcyclopentane	I8	0.0719	0.0660	0.0633
2,4,4-Trimethylhexane	I9	0.0208	0.0218	0.0225
2,2,3,4-Tetramethylpentane	I9	0.0176	0.0185	0.0192
2,3,4-Trimethylhexane	I9	0.0194	0.0204	0.0211
1c,2-Dimethylcyclohexane	N8	0.1193	0.1096	0.1026
2,3,5-Trimethylhexane	I9	0.0862	0.0905	0.0934
2,2-Dimethylheptane	I9	0.0133	0.0140	0.0147
1,1,4-Trimethylcyclohexane	N9	0.9536	0.9854	0.9513
2,2,3-Trimethylhexane	I9	0.3430	0.3601	0.3678
2,4-Dimethylheptane	I9	0.0095	0.0100	0.0104
4,4-Dimethylheptane	I9	0.0390	0.0409	0.0426
Ethylcyclohexane	N8	0.5138	0.4719	0.4464
n-Propylcyclopentane	N8	0.2034	0.1868	0.1792
1c,3c,5-Trimethylcyclohexane	N9	0.0251	0.0259	0.0250
2,5-Dimethylheptane	I9	0.0739	0.0776	0.0807
3,3-Dimethylheptane	I9	0.0856	0.0899	0.0934
3,5-Dimethylheptane	I9	0.0564	0.0592	0.0615
2,6-Dimethylheptane	I9	0.0518	0.0544	0.0572
1,1,3-Trimethylcyclohexane	N9	0.1280	0.1323	0.1277
Ethylbenzene	A8	0.4592	0.3990	0.3420
1c,2t,4t-Trimethylcyclohexane	N9	0.3930	0.4061	0.3846
2,3-Dimethylheptane	I9	0.4659	0.4891	0.5019
1,3-Dimethylbenzene (m-Xylene)	A8	0.5810	0.5049	0.4352
1,4-Dimethylbenzene (p-Xylene)	A8	0.4071	0.3538	0.3059
3,4-Dimethylheptane	I9	0.0426	0.0447	0.0455
3,4-Dimethylheptane (2)	I9	0.1359	0.1427	0.1454
4-Ethylheptane	I9	0.0604	0.0634	0.0660
4-Methyloctane	I9	0.2770	0.2908	0.3006
2-Methyloctane	I9	0.3630	0.3811	0.3979
1c,2t,4c-Trimethylcyclohexane	I9	0.0586	0.0615	0.0631
3-Ethylheptane	I9	0.0567	0.0595	0.0610
3-Methyloctane	I9	0.3946	0.4143	0.4283
3,3-Diethylpentane	I9	0.0581	0.0610	0.0602
1c,2t,3-Trimethylcyclohexane	N9	0.0585	0.0604	0.0572
1,1,2-Trimethylcyclohexane	N9	0.0291	0.0301	0.0285
1,2-Dimethylbenzene (o-Xylene)	A8	0.5866	0.5098	0.4318
i-Butylcyclopentane	N9	0.2528	0.2612	0.2493
UnknownC8s	U8	0.0402	0.0376	0.0399
n-Nonane	P9	1.4943	1.5687	1.6286
1,1-Methylethylcyclohexane	N9	0.5343	0.5609	0.5840
i-Propylbenzene	A9	0.2989	0.2940	0.2537
i-Propylcyclohexane	N9	0.1106	0.1143	0.1062
2,2-Dimethyloctane	I10	0.0823	0.0958	0.0965
2,4-Dimethyloctane	I10	0.0750	0.0873	0.0880
2,6-Dimethyloctane	I10	0.0060	0.0070	0.0073
2,5-Dimethyloctane	I10	0.0475	0.0553	0.0557
n-Butylcyclopentane	N9	0.3218	0.3695	0.3447
3,3-Dimethyloctane	I10	0.0602	0.0701	0.0707

n-Propylbenzene	A9	0.3418	0.3363	0.2902
3,6-Dimethyloctane	I10	0.2945	0.3430	0.3456
3-Methyl-5-ethylheptane	I10	0.3772	0.3960	0.4066
1,3-Methylethylbenzene	A9	0.3552	0.3494	0.2990
1,4-Methylethylbenzene	A9	0.2796	0.2751	0.2354
1,3,5-Trimethylbenzene	A9	0.1972	0.1940	0.1672
2,3-Dimethyloctane	I10	0.0938	0.1092	0.1100
5-Methylnonane	I10	0.2393	0.2787	0.2835
1,2-Methylethylbenzene	A9	0.2849	0.2803	0.2386
2-Methylnonane	I10	0.0532	0.0620	0.0636
3-Ethyloctane	I10	0.0629	0.0733	0.0739
3-Methylnonane	I10	0.2012	0.2343	0.2381
1,2,4-Trimethylbenzene	A9	0.0462	0.0455	0.0387
t-Butylbenzene	A10	0.5106	0.5609	0.4828
i-Butylcyclohexane	N10	0.2128	0.2443	0.2243
1t-Methyl-2-n-propylcyclohexane	I10	0.0852	0.0894	0.0918
i-Butylbenzene	A10	0.0388	0.0426	0.0372
sec-Butylbenzene	A10	0.0906	0.0995	0.0861
UnknownC9s	U9	1.3392	1.4059	1.4595
n-Decane	P10	1.5082	1.7564	1.7927
1,2,3-Trimethylbenzene	A9	0.2416	0.2377	0.1982
1,3-Methyl-i-propylbenzene	A10	0.1185	0.1166	0.0993
1,4-Methyl-i-propylbenzene	A10	0.0926	0.0911	0.0776
Sec-Butylcyclohexane	N10	0.3928	0.4510	0.4136
1,2-Methyl-i-propylbenzene	A10	0.1926	0.2116	0.1800
3-Ethylnonane	I10	0.0719	0.0837	0.0859
1,3-Diethylbenzene	A10	0.1629	0.1790	0.1545
1,3-Methyl-n-propylbenzene	A10	0.0884	0.0971	0.0841
1,4-Diethylbenzene	A10	0.2614	0.2872	0.2484
1,4-Methyl-n-propylbenzene	A10	0.0835	0.0917	0.0796
n-Butylbenzene	A10	0.0707	0.0777	0.0672
1,3-Dimethyl-5-ethylbenzene	A10	0.2126	0.2336	0.2014
1,2-Diethylbenzene	A10	0.0407	0.0447	0.0379
1,2-Methyl-n-propylbenzene	A10	0.1310	0.1439	0.1228
1,4-Dimethyl-2-ethylbenzene	A10	0.1514	0.1663	0.1414
1,3-Dimethyl-4-ethylbenzene	A10	0.0837	0.0920	0.0783
1,2-Dimethyl-4-ethylbenzene	A10	0.2668	0.2931	0.2499
1,3-Dimethyl-2-ethylbenzene	A10	0.0396	0.0435	0.0364
1t,2c,4-Trimethylcyclopentane	A10	0.4838	0.4443	0.4429
1,2-Dimethyl-3-ethylbenzene	A10	0.2424	0.2663	0.2226
1,2-Ethyl-i-propylbenzene	A10	0.0984	0.1081	0.0919
1,4-Methyl-t-butylbenzene	A11	0.0950	0.1044	0.0888
UnknownC10s	U10	2.5632	2.9850	3.0468
n-Undecane	P11	1.2380	1.5839	1.5943
1,4-Ethyl-i-propylbenzene	A11	0.1363	0.1497	0.1273
1,2,4,5-Tetramethylbenzene	A11	0.0692	0.0760	0.0640
1,2-Methyl-n-butylbenzene	A11	0.1387	0.1524	0.1296
1,2,3,5-Tetramethylbenzene	A11	0.0766	0.0842	0.0705
1,2-Methyl-t-butylbenzene	A11	0.1077	0.1183	0.1006
5-Methylindan	A11	0.0231	0.0322	0.0321
4-Methylindan	A11	0.0127	0.0177	0.0176
1,2-Ethyl-n-propylbenzene	A11	0.1464	0.1608	0.1368
2-Methylindan	A11	0.0678	0.0945	0.0941
1,3-Methyl-n-butylbenzene	A11	0.0169	0.0186	0.0158
1,3-Di-i-propylbenzene	A11	0.0441	0.0484	0.0412
sec-Pentylbenzene	A11	0.1738	0.1909	0.1624
n-Pentylbenzene	A11	0.0704	0.0854	0.0742
1t-M-2-(4MP)cyclopentane	P12	0.0150	0.0209	0.0208
1,2-Di-n-propylbenzene	A11	0.1074	0.1180	0.1004
1,4-Di-i-propylbenzene	A11	0.1852	0.2035	0.1731
Tetrahydronaphthalene	A10	0.0139	0.0153	0.0130
t-Decahydronaphthalene	A10	0.1716	0.1885	0.1603
Naphthalene	A10	0.1433	0.1503	0.1278
1-t-Butyl-3,5-dimethylbenzene	A12	0.0695	0.0764	0.0650
1,4-Ethyl-t-butylbenzene	A11	0.0899	0.0988	0.0840
UnknownC11s	U11	1.5968	2.0430	2.0564
n-Dodecane	P12	1.0116	1.4104	1.4040
1,3-Di-n-propylbenzene	A12	0.0639	0.0702	0.0597
1,3,5-Triethylbenzene	A12	0.0279	0.0274	0.0236
1,2,4-Triethylbenzene	A12	0.3609	0.3550	0.3021
1,4-Methyl-n-pentylbenzene	A12	0.0977	0.1073	0.0913
n-Hexylbenzene	A12	0.1380	0.1833	0.1593
1,2,3,4,5-Pentamethylbenzene	A13	0.2407	0.2644	0.2249
2-Methylnaphthalene	A11	0.2178	0.2535	0.2156

1-Methylnaphthalene	A11	0.0676	0.0787	0.0575
UnknownC12s	U12	1.6941	2.3620	2.3513
n-Tridecane	P13	1.0344	1.5609	1.5355
UnknownC13s	U13	1.3949	2.1049	2.0706
n-Tetradecane	P14	0.7766	1.2611	1.2380
UnknownC14s	U14	1.3500	2.1922	2.1521
n-Pentadecane	P15	0.7011	1.2190	1.1830
UnknownC15s	U15	1.3097	2.2771	2.2098
n-Hexadecane	P16	0.5148	0.9541	0.9199
UnknownC16s	U16	0.8095	1.5004	1.4466
n-Heptadecane	P17	0.4006	0.7885	0.7579
UnknownC17s	U17	0.6034	1.1877	1.1416
n-Octadecane	P18	0.3029	0.6310	0.6047
UnknownC18s	U18	0.6059	1.2622	1.2097
n-Nonadecane	P19	0.2596	0.5706	0.5433
UnknownC19s	U19	0.3945	0.8671	0.8257
n-Eicosane	P20	0.1851	0.4281	0.4054
UnknownC20s	U20	0.2252	0.5208	0.4932
n-Heneicosane	P21	0.1559	0.3785	0.3566
UnknownC21s	U21	0.1419	0.3445	0.3246
n-Docosane	P22	0.1253	0.3186	0.2991
UnknownC22s	U22	0.1185	0.3013	0.2829
n-Tricosane	P23	0.0973	0.2585	0.2420
UnknownC23s	U23	0.0884	0.2349	0.2199
n-Tetracosane	P24	0.0712	0.1974	0.1843
UnknownC24s	U24	0.0667	0.1849	0.1727
n-Pentacosane	P25	0.0546	0.1576	0.1471
UnknownC25s	U25	0.0435	0.1256	0.1173
n-Hexacosane	P26	0.0458	0.1375	0.1275
UnknownC26s	U26	0.0565	0.1696	0.1573
n-Heptacosane	P27	0.0327	0.1019	0.0944
UnknownC27s	U27	0.0400	0.1247	0.1156
n-Octacosane	P28	0.0243	0.0785	0.0726
UnknownC28s	U28	0.0333	0.1076	0.0995
n-Nonacosane	P29	0.0214	0.0716	0.0661
UnknownC29s	U29	0.0249	0.0833	0.0769
n-Triacontane Plus	P30	0.0791	0.2738	0.2523
TOTAL		100.0000	100.0000	100.0000

CRUDE OIL ASSAY

PROJECT NO. :	201412066	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 9, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	PRODUCTION TANK 15:40 BRINGLESON RANCH 5-34-9-58		EMPACT
FIELD DATA		SAMPLE TEMP. :	61
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

SPECIFICATION	TEST METHOD	UNITS	RESULTS
API GRAVITY		API 60/60	36.8
RVP @100 DEG F	D323	PSIG	10.4
TOTAL SULFUR	D2622	WT %	0.372
TOTAL CHLORIDE	D4929	ug/g	N/A
ORGANIC CHLORIDE	D4929	ug/g	N/A
FLASH POINT	D93	° F	N/A
HEATING VALUE	D4809	BTU/ LB	N/A
VISUAL APPEARANCE			BLACK
BS&W	D96		
Crude Oil		VOL %	N/A
Water		VOL %	N/A
Emulsion		VOL %	N/A
Sediment		VOL %	N/A
DISTILLATION:	D86		
INITIAL POINT		DEG F	N/A
50%		DEG F	N/A
90%		DEG F	N/A
END POINT		DEG F	N/A
DISTILLATION:	@TEMP D445		
Average Centipoise	20°C		N/A
Average Centipoise	30°C		N/A
Average Centipoise	80°C		N/A
Kinetic Viscosity	20°C	cSt (mm2/s)	N/A
Kinetic Viscosity	30°C	cSt (mm2/s)	N/A
Kinetic Viscosity	80°C	cSt (mm2/s)	N/A

ND: NOT DETECTED

N/A: NO TEST PREFORMED FOR THIS PARAMETER