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. :	07
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 5, 2013
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 4, 2013
PRODUCER :		CYLINDER NO. :	7043
LEASE NO. :		SAMPLED BY :	BURL MCENDREE
NAME/DESCRIP :	SEPARATOR		EMPACT
	NELSON 3-17-9-60		
FIELD DATA		SAMPLE TEMP. :	168
SAMPLE PRES. :	12	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; ONLY ABOUT 140CC VOLUME		

COMPONENT	MOLE %	MASS %	VOL %
ALCOHOLS	1.3598	0.6836	0.6414
NITROGEN (AIR)	0.0461	0.0112	0.0104
CARBON DIOXIDE	0.0215	0.0082	0.0075
METHANE	0.0206	0.0029	0.0072
ETHANE	0.1369	0.0356	0.0748
PROPANE	0.7413	0.2830	0.4175
I-BUTANE	0.2258	0.1136	0.1510
N-BUTANE	1.2626	0.6351	0.8135
I-PENTANE	0.6063	0.3786	0.4534
N-PENTANE	1.0736	0.6704	0.7946
HEXANES PLUS	94.5055	97.1778	96.6287
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	**MOLE%**	**MASS%**
BENZENE	1.4981	1.0128
TOLUENE	3.1623	2.5219
ETHYLBENZENE	0.7961	0.7316
XYLENE	2.2927	2.1069
TOTAL BTEX	7.7492	6.3732

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

	TOTAL SAMPLE	**C6+ FRACTION**	
Specific Gravity (H2O=1) =	0.7481	0.7525	60/60
API Gravity =	57.65	56.54	60/60
Molecular Weight =	115.54	119.546	
Absolute Density =	6.24	6.27	LBS/GAL
Heating Value Liq. Idl Gas=	127202	127387	BTU/GAL
Vapor/Liquid =	20.83	20.08	CUFT/GAL
Vapor Pressure =	6.36	1.69	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. :	07
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 5, 2013
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 4, 2013
PRODUCER :		CYLINDER NO. :	7043
LEASE NO. :		SAMPLED BY :	BURL MCENDREE
NAME/DESCRIP :	SEPARATOR		EMPACT
	NELSON 3-17-9-60		
FIELD DATA		SAMPLE TEMP. :	168
SAMPLE PRES. :	12	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; ONLY ABOUT 140CC VOLUME		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0215		0.0082		0.0075	
NITROGEN (AIR)	0.0461		0.0112		0.0104	
METHANE	0.0206		0.0029		0.0072	
ETHANE	0.1369		0.0356		0.0748	
PROPANE	0.7413		0.2830		0.4175	
I-BUTANE	0.2258		0.1136		0.1510	
N-BUTANE	1.2626		0.6351		0.8135	
I-PENTANE	0.6063		0.3786		0.4534	
N-PENTANE	1.0736		0.6704		0.7946	
CYCLOPENTANE (N-C5)	1.4256		0.8653		0.8514	
N-HEXANE	6.7606		5.0436		5.6834	
CYCLOHEXANE (OTHER C6)	2.8808		2.0985		2.0036	
OTHER HEXANES	10.4856		7.7392		8.2725	
OTHER HEPTANES	13.8407		11.9203		12.5376	
METHYLCYCLOHEXANE (OTHER C7)	4.1270		3.5074		3.3866	
2,2,4 TRIMETHYLPENTANE	0.8419		0.7155		0.7103	
BENZENE	1.4981		1.0128		0.8581	
TOLUENE	3.1623		2.5219		2.1578	
ETHYLBENZENE	0.7961		0.7316		0.6259	
XYLENES	2.2927		2.1069		1.8047	
OTHER OCTANES	11.1845		11.0840		11.2567	
OCTANES PLUS	----	50.3248	----	62.4688	----	60.8777
NONANES	10.7516		11.7980		11.6276	
DECANES PLUS	24.4580		36.0328		34.8525	
SUB TOTAL	98.6402		99.3164		99.3586	
ALCOHOLS	1.3598		0.6836		0.6414	
TOTAL	100.0000		100.0000		100.0000	

API Gravity	=	**57.65**	60/60
Vapor Pressure	=	**6.36**	PSIA & 100 F
Average Molecular Weight of Decanes plus	=	**170.22**	
Average Specific Gravity of Decanes plus	=	**0.7750**	

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EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

BY CARBON NUMBER

PROJECT NO. :	201308014	ANALYSIS NO. :	07
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 5, 2013
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 4, 2013
PRODUCER :		CYLINDER NO. :	7043
LEASE NO. :		SAMPLED BY :	BURL MCENDREE
NAME/DESCRIP :	SEPARATOR		EMPACT
	NELSON 3-17-9-60		
FIELD DATA		SAMPLE TEMP. :	168
SAMPLE PRES. :	12	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; ONLY ABOUT 140CC VOLUME		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
ALCOHOLS		1.3598	0.6836	0.6414
NITROGEN		0.0461	0.0112	0.0104
CARBON DIOXIDE		0.0215	0.0082	0.0075
	C1	0.0206	0.0029	0.0072
	C2	0.1369	0.0356	0.0748
	C3	0.7413	0.2830	0.4175
	C4	1.4884	0.7487	0.9645
	C5	3.1055	1.9143	2.0994
	C6	21.6251	15.8941	16.8176
	C7	21.1300	17.9496	18.0820
	C8	15.1152	14.6380	14.3976
	C9	10.7516	11.7980	11.6276
	C10	8.7363	10.3789	10.0824
	C11	4.2447	5.5226	5.2712
	C12	2.5421	3.5815	3.4846
	C13	1.5506	2.4294	2.3697
	C14	1.4369	2.4673	2.4179
	C15	2.3353	4.2935	4.1591
	C16	2.1045	4.1246	3.9696
	C17	0.7972	1.6592	1.5919
	C18	0.6309	1.3897	1.3295
	C19	0.0716	0.1664	0.1581
	C20	0.0050	0.0122	0.0115
	C21	0.0025	0.0064	0.0060
	C22	0.0004	0.0011	0.0010
	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. :	07
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 5, 2013
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 4, 2013
PRODUCER :		CYLINDER NO. :	7043
LEASE NO. :		SAMPLED BY :	BURL MCENDREE
NAME/DESCRIP :	SEPARATOR		EMPACT
	NELSON 3-17-9-60		
FIELD DATA		SAMPLE TEMP. :	168
SAMPLE PRES. :	12	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; ONLY ABOUT 140CC VOLUME		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0461	0.0112	0.0104
Carbon Dioxide	NHC	0.0215	0.0082	0.0075
Methane	P1	0.0206	0.0029	0.0072
Ethane	P2	0.1369	0.0356	0.0748
Propane	P3	0.7413	0.2830	0.4175
i-Butane	I4	0.2258	0.1136	0.1510
n-Butane	P4	1.2626	0.6351	0.8135
i-Pentane	I5	0.6063	0.3786	0.4534
Acetone	X2	1.3598	0.6836	0.6414
n-Pentane	P5	1.0736	0.6704	0.7946
2,2-Dimethylbutane	I6	0.0336	0.0251	0.0287
Cyclopentane	N5	1.4256	0.8653	0.8514
2,3-Dimethylbutane	I6	0.3258	0.2430	0.2725
2-Methylpentane	I6	3.4115	2.5447	2.8939
3-Methylpentane	I6	2.0166	1.5042	1.6821
n-Hexane	P6	6.7606	5.0436	5.6834
2,2-Dimethylpentane	I7	0.0036	0.0031	0.0034
Methylcyclopentane	N6	4.6981	3.4222	3.3953
2,4-Dimethylpentane	I7	0.2235	0.1938	0.2143
Benzene	A6	1.4981	1.0128	0.8581
3,3-Dimethylpentane	I7	0.0226	0.0196	0.0211
Cyclohexane	N6	2.8808	2.0985	2.0036
2-Methylhexane	I7	1.2604	1.0931	1.1983
2,3-Dimethylpentane	I7	0.7278	0.6312	0.6722
1,1-Dimethylcyclopentane	N7	0.3037	0.2581	0.2543
3-Methylhexane	I7	1.7701	1.5351	1.6575
1c,3-Dimethylcyclopentane	N7	0.9072	0.7710	0.7695
1t,3-Dimethylcyclopentane	N7	0.8419	0.7155	0.7103
3-Ethylpentane	I7	0.1285	0.1114	0.1183
1t,2-Dimethylcyclopentane	N7	1.7470	1.4847	1.4688
2,2,4-Trimethylpentane	I8	0.0777	0.0768	0.0822
n-Heptane	P7	4.9323	4.2776	4.6492
1c,2-Dimethylcyclopentane	N7	0.1689	0.1435	0.1382
Methylcyclohexane	N7	4.1270	3.5074	3.3866
2,2-Dimethylhexane	I8	0.3289	0.3252	0.3475
Ethylcyclopentane	N7	0.8032	0.6826	0.6622
2,5-Dimethylhexane	I8	0.1273	0.1259	0.1349
2,2,3-Trimethylpentane	I8	0.0200	0.0198	0.0206
2,4-Dimethylhexane	I8	0.2313	0.2287	0.2438
1c,2t,4-Trimethylcyclopentane	N8	0.4155	0.4035	0.3930
3,3-Dimethylhexane	I8	0.0440	0.0435	0.0456

2,3,4-Trimethylpentane	I8	0.1208	0.1194	0.1234
2,3,3-Trimethylpentane	I8	0.0044	0.0044	0.0045
Toluene	A7	3.1623	2.5219	2.1578
2,3-Dimethylhexane	I8	0.2352	0.2325	0.2428
2-Methyl-3-ethylpentane	I8	0.1607	0.1589	0.1642
1,1,2-Trimethylcyclopentane	N8	0.0142	0.0138	0.0133
2-Methylheptane	I8	1.3717	1.3562	1.4419
4-Methylheptane	I8	0.4389	0.4339	0.4502
3-Methyl-3-ethylpentane	I8	0.0622	0.0615	0.0629
3,4-Dimethylhexane	I8	0.0655	0.0648	0.0669
1c,2c,4-Trimethylcyclopentane	N8	0.0344	0.0334	0.0322
1c,3-Dimethylcyclohexane	N8	0.0315	0.0306	0.0297
3-Methylheptane	I8	0.4090	0.4044	0.4262
1c,2t,3-Trimethylcyclopentane	N8	0.8956	0.8698	0.8396
3-Ethylhexane	I8	0.3618	0.3577	0.3730
1t,4-Dimethylcyclohexane	N8	0.3870	0.3759	0.3666
1,1-Dimethylcyclohexane	N8	0.1138	0.1105	0.1052
3t-Ethylmethylcyclopentane	N8	0.2570	0.2496	0.2421
2t-Ethylmethylcyclopentane	N8	0.2136	0.2075	0.2007
1,1-Methylethylcyclopentane	N8	0.7559	0.7341	0.6992
2,2,4-Trimethylhexane	I9	0.0482	0.0535	0.0556
1t,2-Dimethylcyclohexane	N8	0.5781	0.5615	0.5383
1t,3-Dimethylcyclohexane	N8	0.0100	0.0097	0.0092
n-Octane	P8	2.7565	2.7253	2.8837
1c,4-Dimethylcyclohexane	N8	0.5157	0.5009	0.4759
i-Propylcyclopentane	I8	0.0363	0.0353	0.0338
2,4,4-Trimethylhexane	I9	0.0237	0.0263	0.0271
2,2,3,4-Tetramethylpentane	I9	0.0164	0.0182	0.0188
2,3,4-Trimethylhexane	I9	0.0145	0.0161	0.0166
1c,2-Dimethylcyclohexane	N8	0.1693	0.1644	0.1536
2,3,5-Trimethylhexane	I9	0.0415	0.0461	0.0475
2,2-Dimethylheptane	I9	0.0070	0.0078	0.0082
1,1,4-Trimethylcyclohexane	N9	1.0878	1.1886	1.1454
2,2,3-Trimethylhexane	I9	0.3800	0.4219	0.4302
2,4-Dimethylheptane	I9	0.0622	0.0691	0.0718
4,4-Dimethylheptane	I9	0.0605	0.0672	0.0698
Ethylcyclohexane	N8	0.5867	0.5698	0.5381
n-Propylcyclopentane	N8	0.1959	0.1903	0.1822
1c,3c,5-Trimethylcyclohexane	N9	0.0277	0.0303	0.0292
2,5-Dimethylheptane	I9	0.0937	0.1040	0.1079
3,3-Dimethylheptane	I9	0.0917	0.1018	0.1056
3,5-Dimethylheptane	I9	0.0764	0.0848	0.0880
2,6-Dimethylheptane	I9	0.0659	0.0732	0.0768
1,1,3-Trimethylcyclohexane	N9	0.0896	0.0979	0.0943
Ethylbenzene	A8	0.7961	0.7316	0.6259
1c,2t,4t-Trimethylcyclohexane	N9	0.2859	0.3124	0.2953
2,3-Dimethylheptane	I9	0.0350	0.0389	0.0399
1,3-Dimethylbenzene (m-Xylene)	A8	0.7919	0.7277	0.6261
1,4-Dimethylbenzene (p-Xylene)	A8	0.7714	0.7089	0.6119
3,4-Dimethylheptane	I9	0.2895	0.3214	0.3268
3,4-Dimethylheptane (2)	I9	0.1755	0.1948	0.1981
4-Ethylheptane	I9	0.0720	0.0799	0.0831
4-Methyloctane	I9	0.2859	0.3174	0.3276
2-Methyloctane	I9	0.3178	0.3528	0.3677
1c,2t,4c-Trimethylcyclohexane	I9	0.0508	0.0564	0.0578
3-Ethylheptane	I9	0.0652	0.0724	0.0741
3-Methyloctane	I9	0.4130	0.4585	0.4731
3,3-Diethylpentane	I9	0.0480	0.0533	0.0525
1c,2t,3-Trimethylcyclohexane	N9	0.1002	0.1095	0.1035
1,1,2-Trimethylcyclohexane	N9	0.0308	0.0337	0.0319
1,2-Dimethylbenzene (o-Xylene)	A8	0.7294	0.6703	0.5667
i-Butylcyclopentane	N9	0.2634	0.2878	0.2742
n-Nonane	P9	1.6883	1.8742	1.9423
1,1-Methylethylcyclohexane	N9	0.3864	0.4289	0.4458
i-Propylbenzene	A9	0.4317	0.4491	0.3869
i-Propylcyclohexane	N9	0.1080	0.1180	0.1095
2,2-Dimethyloctane	I10	0.0693	0.0853	0.0858
2,4-Dimethyloctane	I10	0.0531	0.0654	0.0658
2,6-Dimethyloctane	I10	0.0080	0.0098	0.0102
2,5-Dimethyloctane	I10	0.0439	0.0541	0.0544
n-Butylcyclopentane	N9	0.3090	0.3751	0.3493
3,3-Dimethyloctane	I10	0.0589	0.0725	0.0730
n-Propylbenzene	A9	0.3782	0.3934	0.3389

3,6-Dimethyloctane	I10	0.2100	0.2586	0.2601
3-Methyl-5-ethylheptane	I10	0.4323	0.4799	0.4918
1,3-Methylethylbenzene	A9	0.3874	0.4030	0.3443
1,4-Methylethylbenzene	A9	0.1299	0.1351	0.1154
1,3,5-Trimethylbenzene	A9	0.1140	0.1186	0.1020
2,3-Dimethyloctane	I10	0.0693	0.0853	0.0858
5-Methylnonane	I10	0.2880	0.3547	0.3602
1,2-Methylethylbenzene	A9	0.2309	0.2402	0.2041
2-Methylnonane	I10	0.0613	0.0755	0.0773
3-Ethyloctane	I10	0.0935	0.1152	0.1159
3-Methylnonane	I10	0.1598	0.1968	0.1996
1,2,4-Trimethylbenzene	A9	0.0594	0.0618	0.0525
t-Butylbenzene	A10	0.2355	0.2736	0.2351
i-Butylcyclohexane	N10	0.1878	0.2280	0.2090
1t-Methyl-2-n-propylcyclohexane	I10	0.0702	0.0779	0.0798
i-Butylbenzene	A10	0.0823	0.0956	0.0834
sec-Butylbenzene	A10	0.1382	0.1605	0.1386
UnknownC9s	U9	1.7065	1.8944	1.9632
n-Decane	P10	1.1574	1.4253	1.4522
1,2,3-Trimethylbenzene	A9	0.2021	0.2102	0.1750
1,3-Methyl-i-propylbenzene	A10	0.0931	0.0969	0.0823
1,4-Methyl-i-propylbenzene	A10	0.0321	0.0334	0.0284
Sec-Butylcyclohexane	N10	0.2906	0.3528	0.3229
1,2-Methyl-i-propylbenzene	A10	0.1411	0.1639	0.1392
3-Ethylnonane	I10	0.0407	0.0501	0.0513
1,3-Diethylbenzene	A10	0.1317	0.1530	0.1318
1,3-Methyl-n-propylbenzene	A10	0.0309	0.0359	0.0310
1,4-Diethylbenzene	A10	0.1262	0.1466	0.1266
1,4-Methyl-n-propylbenzene	A10	0.0546	0.0634	0.0550
n-Butylbenzene	A10	0.1057	0.1228	0.1061
1,3-Dimethyl-5-ethylbenzene	A10	0.0134	0.0156	0.0134
1,2-Diethylbenzene	A10	0.1228	0.1427	0.1208
1,2-Methyl-n-propylbenzene	A10	0.0932	0.1083	0.0923
1,4-Dimethyl-2-ethylbenzene	A10	0.1157	0.1344	0.1140
1,3-Dimethyl-4-ethylbenzene	A10	0.0598	0.0695	0.0590
1,2-Dimethyl-4-ethylbenzene	A10	0.1387	0.1611	0.1371
1,3-Dimethyl-2-ethylbenzene	A10	0.0277	0.0322	0.0269
1t,2c,4-Trimethylcyclopentane	A10	0.5360	0.5206	0.5180
1,2-Dimethyl-3-ethylbenzene	A10	0.1324	0.1538	0.1283
1,2-Ethyl-i-propylbenzene	A10	0.0768	0.0892	0.0757
1,4-Methyl-t-butylbenzene	A11	0.0533	0.0619	0.0526
UnknownC10s	U10	2.7343	3.3672	3.4307
n-Undecane	P11	0.8136	1.1007	1.1059
1,4-Ethyl-i-propylbenzene	A11	0.1191	0.1384	0.1175
1,2,4,5-Tetramethylbenzene	A11	0.0665	0.0773	0.0649
1,2-Methyl-n-butylbenzene	A11	0.1215	0.1412	0.1199
1,2,3,5-Tetramethylbenzene	A11	0.0416	0.0483	0.0404
1,2-Methyl-t-butylbenzene	A11	0.0636	0.0739	0.0627
5-Methylindan	A11	0.0201	0.0296	0.0294
4-Methylindan	A11	0.0186	0.0274	0.0272
1,2-Ethyl-n-propylbenzene	A11	0.0779	0.0905	0.0768
2-Methylindan	A11	0.0577	0.0851	0.0846
1,3-Methyl-n-butylbenzene	A11	0.0686	0.0797	0.0677
1,3-Di-i-propylbenzene	A11	0.0732	0.0850	0.0722
sec-Pentylbenzene	A11	0.0567	0.0659	0.0560
n-Pentylbenzene	A11	0.0961	0.1233	0.1069
1t-M-2-(4MP)cyclopentane	P12	0.0128	0.0189	0.0188
1,2-Di-n-propylbenzene	A11	0.0657	0.0763	0.0648
1,4-Di-i-propylbenzene	A11	0.1233	0.1432	0.1216
Tetrahydronaphthalene	A10	0.0183	0.0213	0.0181
t-Decahydronaphthalene	A10	0.1233	0.1432	0.1216
Naphthalene	A10	0.0784	0.0870	0.0739
1-t-Butyl-3,5-dimethylbenzene	A12	0.0542	0.0630	0.0535
1,4-Ethyl-t-butylbenzene	A11	0.0637	0.0740	0.0628
UnknownC11s	U11	1.9587	2.6499	2.6625
n-Dodecane	P12	0.7084	1.0444	1.0378
1,3-Di-n-propylbenzene	A12	0.0396	0.0460	0.0391
1,3,5-Triethylbenzene	A12	0.0282	0.0293	0.0252
1,2,4-Triethylbenzene	A12	0.2475	0.2575	0.2187
1,4-Methyl-n-pentylbenzene	A12	0.0428	0.0497	0.0422
n-Hexylbenzene	A12	0.0585	0.0822	0.0713
1,2,3,4,5-Pentamethylbenzene	A13	0.1034	0.1201	0.1020
2-Methylnaphthalene	A11	0.1270	0.1563	0.1327

1-Methylnaphthalene	A11	0.1582	0.1947	0.1421
UnknownC12s	U12	1.3501	1.9905	1.9780
n-Tridecane	P13	0.5186	0.8275	0.8126
UnknownC13s	U13	0.9286	1.4818	1.4551
n-Tetradecane	P14	0.5959	1.0232	1.0027
UnknownC14s	U14	0.8410	1.4441	1.4152
n-Pentadecane	P15	0.8564	1.5745	1.5252
UnknownC15s	U15	1.4789	2.7190	2.6339
n-Hexadecane	P16	0.6611	1.2957	1.2470
UnknownC16s	U16	1.4434	2.8289	2.7226
n-Heptadecane	P17	0.0731	0.1521	0.1459
UnknownC17s	U17	0.7241	1.5071	1.4460
n-Octadecane	P18	0.0296	0.0652	0.0624
UnknownC18s	U18	0.6013	1.3245	1.2671
n-Nonadecane	P19	0.0215	0.0500	0.0475
UnknownC19s	U19	0.0501	0.1164	0.1106
n-Eicosane	P20	0.0050	0.0122	0.0115
n-Heneicosane	P21	0.0025	0.0064	0.0060
n-Docosane	P22	0.0004	0.0011	0.0010
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. :	08
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 9, 2013
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 4, 2013
PRODUCER :		CYLINDER NO. :	0739
LEASE NO. :		SAMPLED BY :	BURL MCENDREE - EMPACT
NAME/DESCRIP :	SALES GAS NELSON 3-17-9-60		
FIELD DATA		SAMPLE TEMP. :	112
SAMPLE PRES. :	133	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 11 PPM		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0007	0.0017		
HELIUM	0.02	0.00	---	---
OXYGEN/ARGON	0.01	0.01	---	---
NITROGEN	1.24	1.46	---	---
CARBON DIOXIDE	2.88	5.32	---	---
METHANE	70.56030	47.49160	---	---
ETHANE	10.6780	13.4712	2.8512	2.8668
PROPANE	8.7438	16.1768	2.4057	2.4189
I-BUTANE	0.8581	2.0926	0.2803	0.2818
N-BUTANE	2.9613	7.2214	0.9321	0.9371
I-PENTANE	0.6121	1.8475	0.2202	0.2214
N-PENTANE	0.7351	2.2252	0.2663	0.2678
HEXANES PLUS	0.7006	2.6820	0.2812	0.2826
TOTALS	100.00000	100.00000	7.2370	7.2764

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0251	0.0823
TOLUENE	0.0137	0.0530
ETHYLBENZENE	0.0015	0.0067
XYLENES	0.0021	0.0093
TOTAL BTEX	0.0424	0.1513

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1214.7 **/scf**	1221.3 **/scf**
	NET WET REAL :	1193.5 **/scf**	1200.1 **/scf**
HIGH	GROSS DRY REAL :	1335.4 **/scf**	1342.7 **/scf**
	GROSS WET REAL :	1312.1 **/scf**	1319.4 **/scf**
	NET DRY REAL :	19354.6 **/lb**	19460.3 **/lb**
	GROSS DRY REAL :	21280.6 **/lb**	21396.8 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8219
	COMPRESSIBILITY FACTOR :		0.99574

(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
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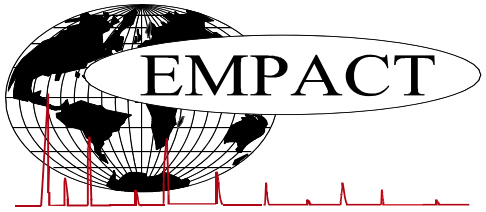
303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201308014	ANALYSIS NO. :	08
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 9, 2013
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 4, 2013
PRODUCER :		CYLINDER NO. :	0739
LEASE NO. :		SAMPLED BY :	BURL MCENDREE - EMPACT
NAME/DESCRIP :	SALES GAS NELSON 3-17-9-60		
FIELD DATA		SAMPLE TEMP. :	112
SAMPLE PRES. :	133	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 11 PPM		

Componet	Mole %	Wt %
Helium	0.02	0.00
Carbon Dioxide	2.88	5.32
Nitrogen	1.24	1.46
Methane	70.56030	47.49160
Ethane	10.6780	13.4712
Propane	8.7438	16.1768
Isobutane	0.8581	2.0926
n-Butane	2.9613	7.2214
Isopentane	0.5491	1.6621
n-Pentane	0.7351	2.2252
Cyclopentane	0.0630	0.1854
n-Hexane	0.1550	0.5604
Cyclohexane	0.0357	0.1261
Other Hexanes	0.2679	0.9614
Heptanes	0.1227	0.5123
Methycyclohexane	0.0236	0.0972
2,2,4 Trimethylpentane	0.0001	0.0005
Benzene	0.0251	0.0823
Toluene	0.0137	0.0530
Ethylbenzene	0.0015	0.0067
Xylenes	0.0021	0.0093
C8+ Heavies	0.0532	0.2728
Subtotal	99.98930	99.98830
Oxygen/Argon	0.01	0.01
Alcohols	0.0007	0.0017
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201308014	ANALYSIS NO. :	08
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 9, 2013
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 4, 2013
PRODUCER :		CYLINDER NO. :	0739
LEASE NO. :		SAMPLED BY :	BURL MCENDREE - EMPACT
NAME/DESCRIP :	SALES GAS NELSON 3-17-9-60		
FIELD DATA		SAMPLE TEMP. :	112
SAMPLE PRES. :	133	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 11 PPM		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.02	0.00	---	---
Oxygen/Argon	---	0.01	0.01	---	---
Nitrogen	---	1.24	1.46	---	---
Carbon Dioxide	---	2.88	5.32	---	---
Methane	P1	70.56030	47.49160	---	---
Ethane	P2	10.6780	13.4712	2.851	2.867
Propane	P3	8.7438	16.1768	2.406	2.419
i-Butane	I4	0.8581	2.0926	0.280	0.282
n-Butane	P4	2.9613	7.2214	0.932	0.937
2,2-Dimethylpropane	I5	0.0020	0.0060	0.001	0.001
Ethanol	X2	0.0004	0.0008	0.000	0.000
i-Pentane	I5	0.5471	1.6561	0.200	0.201
i-Propanol	X3	0.0001	0.0003	0.000	0.000
n-Pentane	P5	0.7351	2.2252	0.266	0.268
t-Butanol	X4	0.0002	0.0006	0.000	0.000
2,2-Dimethylbutane	I6	0.0013	0.0047	0.001	0.001
Cyclopentane	N5	0.0630	0.1854	0.019	0.019
2,3-Dimethylbutane	I6	0.0089	0.0322	0.004	0.004
2-Methylpentane	I6	0.1126	0.4071	0.047	0.047
3-Methylpentane	I6	0.0582	0.2105	0.024	0.024
n-Hexane	P6	0.1550	0.5604	0.064	0.064
2,2-Dimethylpentane	I7	0.0004	0.0017	0.000	0.000
Methylcyclopentane	N6	0.0869	0.3069	0.031	0.031
2,4-Dimethylpentane	I7	0.0033	0.0139	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0251	0.0823	0.007	0.007
3,3-Dimethylpentane	I7	0.0002	0.0008	0.000	0.000
Cyclohexane	N6	0.0357	0.1261	0.012	0.012
2-Methylhexane	I7	0.0150	0.0631	0.007	0.007
2,3-Dimethylpentane	I7	0.0072	0.0303	0.003	0.003
1,1-Dimethylcyclopentane	N7	0.0025	0.0103	0.001	0.001
3-Methylhexane	I7	0.0177	0.0744	0.008	0.008
1c,3-Dimethylcyclopentane	N7	0.0087	0.0358	0.004	0.004
1t,3-Dimethylcyclopentane	N7	0.0077	0.0317	0.004	0.004
3-Ethylpentane	I7	0.0012	0.0050	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0168	0.0692	0.008	0.008
2,2,4-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
n-Heptane	P7	0.0357	0.1501	0.016	0.016
1c,2-Dimethylcyclopentane	N7	0.0012	0.0050	0.001	0.001
Methylcyclohexane	N7	0.0236	0.0972	0.009	0.009
2,2-Dimethylhexane	I8	0.0014	0.0067	0.001	0.001

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Ethylcyclopentane	N7	0.0050	0.0206	0.002	0.002
2,5-Dimethylhexane	I8	0.0007	0.0034	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
2,4-Dimethylhexane	I8	0.0012	0.0058	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0021	0.0099	0.001	0.001
3,3-Dimethylhexane	I8	0.0001	0.0005	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0025	0.0118	0.001	0.001
2,3,4-Trimethylpentane	I8	0.0005	0.0024	0.000	0.000
Toluene	A7	0.0137	0.0530	0.005	0.005
2,3-Dimethylhexane	I8	0.0009	0.0043	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0006	0.0029	0.000	0.000
2-Methylheptane	I8	0.0051	0.0245	0.003	0.003
4-Methylheptane	I8	0.0015	0.0072	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0001	0.0005	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	0.0022	0.0105	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0027	0.0127	0.001	0.001
3-Ethylhexane	I8	0.0005	0.0024	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0009	0.0042	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0003	0.0014	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	0.0022	0.0104	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0013	0.0061	0.001	0.001
n-Octane	P8	0.0066	0.0316	0.003	0.003
1c,4-Dimethylcyclohexane	N8	0.0010	0.0047	0.001	0.001
i-Propylcyclopentane	I8	0.0002	0.0009	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0006	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0006	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0001	0.0006	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0003	0.0014	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0019	0.0101	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0007	0.0038	0.000	0.000
Ethylcyclohexane	N8	0.0009	0.0042	0.000	0.000
n-Propylcyclopentane	N8	0.0003	0.0014	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0006	0.000	0.000
2,5-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
3,3-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
2,6-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0006	0.000	0.000
Ethylbenzene	I8	0.0015	0.0067	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0002	0.0011	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0011	0.0049	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0003	0.0013	0.000	0.000
3,4-Dimethylheptane	I9	0.0008	0.0043	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0002	0.0011	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0006	0.000	0.000
4-Methyloctane	I9	0.0004	0.0021	0.000	0.000
2-Methyloctane	I9	0.0004	0.0021	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0006	0.000	0.000
3-Ethylheptane	I9	0.0001	0.0006	0.000	0.000
3-Methyloctane	I9	0.0005	0.0027	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0001	0.0006	0.000	0.000
3,3-Diethylpentane	I9	0.0001	0.0006	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0007	0.0031	0.000	0.000
i-Butylcyclopentane	N9	0.0002	0.0011	0.000	0.000
n-Nonane	P9	0.0012	0.0065	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0003	0.0016	0.000	0.000
i-Propylbenzene	A9	0.0002	0.0010	0.000	0.000
n-Butylcyclopentane	N9	0.0002	0.0011	0.000	0.000

3,3-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Propylbenzene	A9	0.0002	0.0010	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0002	0.0012	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	0.0006	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0014	0.0076	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	0.0008	0.0048	0.000	0.000
n-Undecane	P11	0.0001	0.0007	0.000	0.000
UnknownC11s	U11	0.0001	0.0007	0.000	0.000
n-Tridecane	P13	0.0001	0.0008	0.000	0.000
n-Tetradecane	P14	0.0002	0.0017	0.000	0.000
UnknownC14s	U14	0.0002	0.0017	0.000	0.000
n-Pentadecane	P15	0.0002	0.0018	0.000	0.000
UnknownC15s	U15	0.0004	0.0036	0.000	0.000
n-Hexadecane	P16	0.0002	0.0019	0.000	0.000
UnknownC16s	U16	0.0002	0.0019	0.000	0.000
n-Heptadecane	P17	0.0001	0.0010	0.000	0.000
UnknownC17s	U17	0.0001	0.0010	0.000	0.000
n-Octadecane	P18	0.0001	0.0011	0.000	0.000
UnknownC18s	U18	0.0001	0.0011	0.000	0.000
UnknownC19s	U19	0.0001	0.0011	0.000	0.000
TOTAL		100.00000	100.00000	7.2370	7.2764

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0251	0.0823
TOLUENE	0.0137	0.0530
ETHYLBENZENE	0.0015	0.0067
XYLENES	0.0021	0.0093
TOTAL BTEX	0.0424	0.1513

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1214.7 **/scf**	1221.3 **/scf**
	NET WET REAL :	1193.5 **/scf**	1200.1 **/scf**
HIGH	GROSS DRY REAL :	1335.4 **/scf**	1342.7 **/scf**
	GROSS WET REAL :	1312.1 **/scf**	1319.4 **/scf**
	NET DRY REAL :	19354.6 **/lb**	19460.3 **/lb**
	GROSS DRY REAL :	21280.6 **/lb**	21396.8 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8219
	COMPRESSIBILITY FACTOR :		0.99574

(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. :	09
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 3-17-9-60		
FIELD DATA		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

COMPONENT	MOLE %	MASS %	VOL %
ALCOHOLS	0.0082	0.0052	0.0049
NITROGEN (AIR)	0.0000	0.0000	0.0000
CARBON DIOXIDE	0.0000	0.0000	0.0000
METHANE	0.0838	0.0115	0.0284
ETHANE	0.2682	0.0691	0.1438
PROPANE	2.3413	0.8852	1.2941
I-BUTANE	0.9303	0.4635	0.6103
N-BUTANE	5.4077	2.6944	3.4196
I-PENTANE	3.0823	1.9064	2.2629
N-PENTANE	5.6146	3.4733	4.0775
HEXANES PLUS	82.2636	90.4914	88.1585
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	**MOLE%**	**MASS%**
BENZENE	1.2834	0.8594
TOLUENE	2.5783	2.0366
ETHYLBENZENE	0.6331	0.5763
XYLENE	2.2605	2.0574
TOTAL BTEX	6.7553	5.5297

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

	TOTAL SAMPLE	**C6+ FRACTION**	
Specific Gravity (H2O=1) =	0.7416	0.7614	60/60
API Gravity =	59.3	54.34	60/60
Molecular Weight =	100.00	129.087	
Absolute Density =	6.18	6.34	LBS/GAL
Heating Value Liq. Idl Gas=	124863	128043	BTU/GAL
Vapor/Liquid =	20.32	18.95	CUFT/GAL
Vapor Pressure =	16.81	1.31	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. :	09
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 NELSON 3-17-9-60		EMPACT
FIELD DATA		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0000		0.0000		0.0000	
NITROGEN (AIR)	0.0000		0.0000		0.0000	
METHANE	0.0838		0.0115		0.0284	
ETHANE	0.2682		0.0691		0.1438	
PROPANE	2.3413		0.8852		1.2941	
I-BUTANE	0.9303		0.4635		0.6103	
N-BUTANE	5.4077		2.6944		3.4196	
I-PENTANE	3.0823		1.9064		2.2629	
N-PENTANE	5.6146		3.4733		4.0775	
CYCLOPENTANE (N-C5)	1.0850		0.6523		0.6360	
N-HEXANE	4.1868		3.0933		3.4541	
CYCLOHEXANE (OTHER C6)	1.9641		1.4171		1.3406	
OTHER HEXANES	6.8228		4.9847		5.2616	
OTHER HEPTANES	9.4119		8.0242		8.3400	
METHYLCYCLOHEXANE (OTHER C7)	2.8517		2.4004		2.2965	
2,2,4 TRIMETHYLPENTANE	0.5831		0.4908		0.4828	
BENZENE	1.2834		0.8594		0.7215	
TOLUENE	2.5783		2.0366		1.7266	
ETHYLBENZENE	0.6331		0.5763		0.4885	
XYLENES	2.2605		2.0574		1.7459	
OTHER OCTANES	8.4557		8.2862		8.3023	
OCTANES PLUS	----	52.0796	----	67.0234	----	64.3816
NONANES	9.6187		10.4576		10.2345	
DECANES PLUS	30.5285		45.1551		43.1276	
SUB TOTAL	99.9918		99.9948		99.9951	
ALCOHOLS	0.0082		0.0052		0.0049	
TOTAL	100.0000		100.0000		100.0000	

API Gravity =	**59.30**	60/60
Vapor Pressure =	**16.81**	PSIA & 100 F
Average Molecular Weight of Decanes plus =	**172.54**	
Average Specific Gravity of Decanes plus =	**0.7770**	

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. :	09
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 3-17-9-60		
FIELD DATA		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
ALCOHOLS		0.0082	0.0052	0.0049
NITROGEN		0.0000	0.0000	0.0000
CARBON DIOXIDE		0.0000	0.0000	0.0000
	C1	0.0838	0.0115	0.0284
	C2	0.2682	0.0691	0.1438
	C3	2.3413	0.8852	1.2941
	C4	6.3380	3.1579	4.0299
	C5	9.7819	6.0320	6.9764
	C6	14.2571	10.3545	10.7778
	C7	14.8419	12.4612	12.3631
	C8	11.9324	11.4107	11.0195
	C9	9.6187	10.4576	10.2345
	C10	10.1865	12.0102	11.4769
	C11	5.4370	6.9594	6.5642
	C12	3.7240	5.1945	5.0058
	C13	2.7821	4.3358	4.1972
	C14	2.1478	3.6530	3.5471
	C15	1.9706	3.5886	3.4446
	C16	1.2433	2.4137	2.3018
	C17	0.9496	1.9576	1.8611
	C18	0.7498	1.6360	1.5508
	C19	0.4443	1.0227	0.9633
	C20	0.2944	0.7132	0.6681
	C21	0.1689	0.4293	0.4001
	C22	0.1470	0.3917	0.3638
	C23	0.0987	0.2747	0.2544
	C24	0.0597	0.1731	0.1599
	C25	0.0397	0.1198	0.1106
	C26	0.0319	0.1001	0.0918
	C27	0.0205	0.0669	0.0613
	C28	0.0090	0.0305	0.0279
	C29	0.0130	0.0455	0.0415
	C30+	0.0107	0.0388	0.0354
	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. :	09
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 3-17-9-60		
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	0.0838	0.0115	0.0284
Ethane	P2	0.2682	0.0691	0.1438
Propane	P3	2.3413	0.8852	1.2941
i-Butane	I4	0.9303	0.4635	0.6103
n-Butane	P4	5.4077	2.6944	3.4196
2,2-Dimethylpropane	I5	0.0256	0.0158	0.0196
i-Pentane	I5	3.0567	1.8906	2.2433
n-Pentane	P5	5.6146	3.4733	4.0775
t-Butanol	X4	0.0082	0.0052	0.0049
2,2-Dimethylbutane	I6	0.0172	0.0127	0.0144
Cyclopentane	N5	1.0850	0.6523	0.6360
2,3-Dimethylbutane	I6	0.1873	0.1384	0.1538
2-Methylpentane	I6	2.1121	1.5604	1.7583
3-Methylpentane	I6	1.2708	0.9389	1.0403
n-Hexane	P6	4.1868	3.0933	3.4541
2,2-Dimethylpentane	I7	0.0029	0.0025	0.0027
Methylcyclopentane	N6	3.2354	2.3343	2.2948
2,4-Dimethylpentane	I7	0.1385	0.1190	0.1304
2,2,3-Trimethylbutane	I7	0.0070	0.0060	0.0064
Benzene	A6	1.2834	0.8594	0.7215
3,3-Dimethylpentane	I7	0.0122	0.0105	0.0112
Cyclohexane	N6	1.9641	1.4171	1.3406
2-Methylhexane	I7	0.8037	0.6904	0.7499
2,3-Dimethylpentane	I7	0.5222	0.4485	0.4733
1,1-Dimethylcyclopentane	N7	0.1716	0.1445	0.1411
3-Methylhexane	I7	1.1704	1.0054	1.0756
1c,3-Dimethylcyclopentane	N7	0.6193	0.5213	0.5155
1t,3-Dimethylcyclopentane	N7	0.5831	0.4908	0.4828
3-Ethylpentane	I7	0.0057	0.0049	0.0052
1t,2-Dimethylcyclopentane	N7	1.3852	1.1660	1.1430
2,2,4-Trimethylpentane	I8	0.0136	0.0133	0.0141
n-Heptane	P7	3.2318	2.7761	2.9897
1c,2-Dimethylcyclopentane	N7	0.0852	0.0718	0.0685
Methylcyclohexane	N7	2.8517	2.4004	2.2965
2,2-Dimethylhexane	I8	0.1714	0.1678	0.1776
Ethylcyclopentane	N7	0.6721	0.5657	0.5438
2,5-Dimethylhexane	I8	0.0859	0.0841	0.0893
2,2,3-Trimethylpentane	I8	0.0175	0.0171	0.0176
2,4-Dimethylhexane	I8	0.1588	0.1555	0.1643

1c,2t,4-Trimethylcyclopentane	N8	0.3111	0.2993	0.2889
3,3-Dimethylhexane	I8	0.0184	0.0180	0.0187
2,3,4-Trimethylpentane	I8	0.0829	0.0812	0.0831
2,3,3-Trimethylpentane	I8	0.0006	0.0006	0.0006
Toluene	A7	2.5783	2.0366	1.7266
2,3-Dimethylhexane	I8	0.1417	0.1388	0.1436
2-Methyl-3-ethylpentane	I8	0.1028	0.1007	0.1031
1,1,2-Trimethylcyclopentane	N8	0.0025	0.0025	0.0024
2-Methylheptane	I8	1.0349	1.0134	1.0676
4-Methylheptane	I8	0.3174	0.3108	0.3195
3-Methyl-3-ethylpentane	I8	0.0280	0.0274	0.0278
3,4-Dimethylhexane	I8	0.0344	0.0337	0.0345
1c,2c,4-Trimethylcyclopentane	N8	0.0231	0.0222	0.0212
1c,3-Dimethylcyclohexane	N8	0.0213	0.0205	0.0197
3-Methylheptane	I8	0.2423	0.2373	0.2478
1c,2t,3-Trimethylcyclopentane	N8	0.8443	0.8122	0.7768
3-Ethylhexane	I8	0.1793	0.1756	0.1815
1t,4-Dimethylcyclohexane	N8	0.2496	0.2401	0.2320
1,1-Dimethylcyclohexane	N8	0.0898	0.0863	0.0814
3c-Ethylmethylcyclopentane	N8	0.0009	0.0008	0.0008
3t-Ethylmethylcyclopentane	N8	0.2204	0.2121	0.2038
2t-Ethylmethylcyclopentane	N8	0.1884	0.1813	0.1738
1,1-Methylethylcyclopentane	N8	0.6403	0.6160	0.5813
2,2,4-Trimethylhexane	I9	0.0261	0.0287	0.0296
1t,2-Dimethylcyclohexane	N8	0.4324	0.4159	0.3951
1t,3-Dimethylcyclohexane	N8	0.0058	0.0056	0.0053
UnknownC7s	U7	0.0010	0.0008	0.0009
n-Octane	P8	2.0670	2.0242	2.1223
1c,4-Dimethylcyclohexane	N8	0.4287	0.4124	0.3882
i-Propylcyclopentane	I8	0.0754	0.0725	0.0688
2,4,4-Trimethylhexane	I9	0.0177	0.0195	0.0199
2,2,3,4-Tetramethylpentane	I9	0.0162	0.0178	0.0182
2,3,4-Trimethylhexane	I9	0.0110	0.0121	0.0124
1c,2-Dimethylcyclohexane	N8	0.1026	0.0987	0.0914
2,3,5-Trimethylhexane	I9	0.0689	0.0757	0.0773
2,2-Dimethylheptane	I9	0.0118	0.0130	0.0135
2,2,3-Trimethylhexane	I9	0.3178	0.3494	0.3530
2,4-Dimethylheptane	I9	0.0048	0.0053	0.0055
4,4-Dimethylheptane	I9	0.0272	0.0299	0.0308
Ethylcyclohexane	N8	0.5104	0.4910	0.4594
n-Propylcyclopentane	N8	0.1609	0.1548	0.1469
1c,3c,5-Trimethylcyclohexane	N9	0.0224	0.0242	0.0231
2,5-Dimethylheptane	I9	0.0747	0.0821	0.0844
3,3-Dimethylheptane	I9	0.0762	0.0838	0.0862
3,5-Dimethylheptane	I9	0.0614	0.0675	0.0694
2,6-Dimethylheptane	I9	0.0662	0.0728	0.0757
1,1,3-Trimethylcyclohexane	N9	0.1455	0.1575	0.1504
Ethylbenzene	A8	0.6331	0.5763	0.4885
1c,2t,4t-Trimethylcyclohexane	N9	0.3085	0.3339	0.3127
2,3-Dimethylheptane	I9	0.0012	0.0013	0.0013
1,3-Dimethylbenzene (m-Xylene)	A8	0.7343	0.6683	0.5698
1,4-Dimethylbenzene (p-Xylene)	A8	0.7763	0.7066	0.6044
3,4-Dimethylheptane	I9	0.1532	0.1684	0.1697
3,4-Dimethylheptane (2)	I9	0.1256	0.1382	0.1393
4-Ethylheptane	I9	0.0685	0.0753	0.0776
4-Methyloctane	I9	0.2662	0.2927	0.2993
2-Methyloctane	I9	0.3103	0.3412	0.3524
1c,2t,4c-Trimethylcyclohexane	I9	0.0629	0.0691	0.0702
3-Ethylheptane	I9	0.0570	0.0626	0.0635
3-Methyloctane	I9	0.3899	0.4287	0.4383
3,3-Diethylpentane	I9	0.0626	0.0688	0.0672
1c,2t,3-Trimethylcyclohexane	N9	0.0896	0.0970	0.0909
1,1,2-Trimethylcyclohexane	N9	0.0179	0.0193	0.0181
1,2-Dimethylbenzene (o-Xylene)	A8	0.7499	0.6825	0.5717
i-Butylcyclopentane	N9	0.2625	0.2841	0.2682
UnknownC8s	U8	0.0340	0.0333	0.0349
n-Nonane	P9	1.5967	1.7556	1.8027
1,1-Methylethylcyclohexane	N9	0.3397	0.3735	0.3847
i-Propylbenzene	A9	0.4770	0.4914	0.4194
i-Propylcyclohexane	N9	0.0820	0.0887	0.0815
2,2-Dimethyloctane	I10	0.0213	0.0260	0.0259
2,4-Dimethyloctane	I10	0.0497	0.0606	0.0604
2,6-Dimethyloctane	I10	0.0039	0.0048	0.0049

2,5-Dimethyloctane	I10	0.0404	0.0493	0.0491
n-Butylcyclopentane	N9	0.3162	0.3802	0.3508
3,3-Dimethyloctane	I10	0.0835	0.1019	0.1016
n-Propylbenzene	A9	0.3147	0.3243	0.2768
3,6-Dimethyloctane	I10	0.3747	0.4571	0.4556
3-Methyl-5-ethylheptane	I10	0.4251	0.4674	0.4747
1,3-Methylethylbenzene	A9	0.4359	0.4491	0.3802
1,4-Methylethylbenzene	A9	0.0440	0.0453	0.0383
1,3,5-Trimethylbenzene	A9	0.1516	0.1563	0.1332
2,3-Dimethyloctane	I10	0.0743	0.0907	0.0904
5-Methylnonane	I10	0.2108	0.2571	0.2587
1,2-Methylethylbenzene	A9	0.2698	0.2780	0.2341
2-Methylnonane	I10	0.0364	0.0444	0.0450
3-Ethyloctane	I10	0.0688	0.0840	0.0837
3-Methylnonane	I10	0.1930	0.2355	0.2367
1,2,4-Trimethylbenzene	A9	0.0097	0.0100	0.0084
t-Butylbenzene	A10	0.2122	0.2442	0.2079
i-Butylcyclohexane	N10	0.1664	0.2001	0.1817
1t-Methyl-2-n-propylcyclohexane	I10	0.0878	0.0966	0.0981
i-Butylbenzene	A10	0.0872	0.1003	0.0867
sec-Butylbenzene	A10	0.1557	0.1792	0.1534
UnknownC9s	U9	2.2118	2.4320	2.4973
n-Decane	P10	1.3586	1.6571	1.6730
1,2,3-Trimethylbenzene	A9	0.2458	0.2533	0.2090
1,3-Methyl-i-propylbenzene	A10	0.1061	0.1093	0.0920
1,4-Methyl-i-propylbenzene	A10	0.0851	0.0877	0.0739
Sec-Butylcyclohexane	N10	0.3625	0.4359	0.3954
1,2-Methyl-i-propylbenzene	A10	0.1808	0.2080	0.1750
3-Ethylnonane	I10	0.0419	0.0512	0.0519
1,3-Diethylbenzene	A10	0.1658	0.1908	0.1629
1,3-Methyl-n-propylbenzene	A10	0.0217	0.0249	0.0213
1,4-Diethylbenzene	A10	0.2860	0.3290	0.2815
1,4-Methyl-n-propylbenzene	A10	0.0784	0.0902	0.0775
n-Butylbenzene	A10	0.0915	0.1053	0.0901
1,3-Dimethyl-5-ethylbenzene	A10	0.2234	0.2571	0.2192
1,2-Diethylbenzene	A10	0.0601	0.0692	0.0580
1,2-Methyl-n-propylbenzene	A10	0.1340	0.1542	0.1302
1,4-Dimethyl-2-ethylbenzene	A10	0.1607	0.1849	0.1555
1,3-Dimethyl-4-ethylbenzene	A10	0.1062	0.1222	0.1028
1,2-Dimethyl-4-ethylbenzene	A10	0.1904	0.2191	0.1848
1,3-Dimethyl-2-ethylbenzene	A10	0.0227	0.0261	0.0216
1t,2c,4-Trimethylcyclopentane	A10	0.4088	0.3933	0.3877
1,2-Dimethyl-3-ethylbenzene	A10	0.1857	0.2137	0.1767
1,2-Ethyl-i-propylbenzene	A10	0.1020	0.1174	0.0988
1,4-Methyl-t-butylbenzene	A11	0.0920	0.1058	0.0890
UnknownC10s	U10	3.1422	3.8327	3.8694
n-Undecane	P11	1.1560	1.5490	1.5422
1,4-Ethyl-i-propylbenzene	A11	0.2038	0.2345	0.1973
1,2,4,5-Tetramethylbenzene	A11	0.0600	0.0690	0.0574
1,2-Methyl-n-butylbenzene	A11	0.0652	0.0750	0.0631
1,2,3,5-Tetramethylbenzene	A11	0.2183	0.2511	0.2081
1,2-Methyl-t-butylbenzene	A11	0.1107	0.1274	0.1072
5-Methylindan	A11	0.0151	0.0221	0.0218
4-Methylindan	A11	0.0168	0.0246	0.0242
1,2-Ethyl-n-propylbenzene	A11	0.1421	0.1635	0.1376
2-Methylindan	A11	0.0243	0.0355	0.0350
1,3-Methyl-n-butylbenzene	A11	0.1315	0.1513	0.1273
1,3-Di-i-propylbenzene	A11	0.0552	0.0635	0.0534
sec-Pentylbenzene	A11	0.0759	0.0874	0.0735
n-Pentylbenzene	A11	0.0887	0.1128	0.0969
1t-M-2-(4MP)cyclopentane	P12	0.0072	0.0105	0.0103
1,2-Di-n-propylbenzene	A11	0.0902	0.1038	0.0873
1,4-Di-i-propylbenzene	A11	0.1647	0.1895	0.1594
Tetrahydronaphthalene	A10	0.0473	0.0544	0.0458
t-Decahydronaphthalene	A10	0.2120	0.2439	0.2052
Naphthalene	A10	0.1214	0.1334	0.1122
1-t-Butyl-3,5-dimethylbenzene	A12	0.0461	0.0531	0.0447
1,4-Ethyl-t-butylbenzene	A11	0.0836	0.0962	0.0809
UnknownC11s	U11	2.2794	3.0544	3.0409
n-Dodecane	P12	0.9569	1.3974	1.3759
1,3-Di-n-propylbenzene	A12	0.0570	0.0656	0.0552
1,3,5-Triethylbenzene	A12	0.0825	0.0850	0.0724
1,2,4-Triethylbenzene	A12	0.3196	0.3293	0.2772

1,4-Methyl-n-pentylbenzene	A12	0.1047	0.1204	0.1013
n-Hexylbenzene	A12	0.0937	0.1304	0.1121
1,2,3,4,5-Pentamethylbenzene	A13	0.1426	0.1641	0.1381
2-Methylnaphthalene	A11	0.2873	0.3502	0.2946
1-Methylnaphthalene	A11	0.0762	0.0928	0.0671
UnknownC12s	U12	2.0563	3.0028	2.9567
n-Tridecane	P13	0.8182	1.2931	1.2582
UnknownC13s	U13	1.8213	2.8786	2.8009
n-Tetradecane	P14	0.7538	1.2821	1.2449
UnknownC14s	U14	1.3940	2.3709	2.3022
n-Pentadecane	P15	0.6134	1.1170	1.0722
UnknownC15s	U15	1.3572	2.4716	2.3724
n-Hexadecane	P16	0.4609	0.8948	0.8533
UnknownC16s	U16	0.7824	1.5189	1.4485
n-Heptadecane	P17	0.3343	0.6891	0.6551
UnknownC17s	U17	0.6153	1.2685	1.2060
n-Octadecane	P18	0.2447	0.5339	0.5061
UnknownC18s	U18	0.5051	1.1021	1.0447
n-Nonadecane	P19	0.1907	0.4390	0.4135
UnknownC19s	U19	0.2536	0.5837	0.5498
n-Eicosane	P20	0.1195	0.2895	0.2712
UnknownC20s	U20	0.1749	0.4237	0.3969
n-Heneicosane	P21	0.0777	0.1975	0.1841
UnknownC21s	U21	0.0912	0.2318	0.2160
n-Docosane	P22	0.0657	0.1751	0.1626
UnknownC22s	U22	0.0813	0.2166	0.2012
n-Tricosane	P23	0.0386	0.1074	0.0995
UnknownC23s	U23	0.0601	0.1673	0.1549
n-Tetracosane	P24	0.0288	0.0835	0.0771
UnknownC24s	U24	0.0309	0.0896	0.0828
n-Pentacosane	P25	0.0169	0.0510	0.0471
UnknownC25s	U25	0.0228	0.0688	0.0635
n-Hexacosane	P26	0.0138	0.0433	0.0397
UnknownC26s	U26	0.0181	0.0568	0.0521
n-Heptacosane	P27	0.0077	0.0250	0.0229
UnknownC27s	U27	0.0128	0.0419	0.0384
n-Octacosane	P28	0.0052	0.0175	0.0160
UnknownC28s	U28	0.0038	0.0130	0.0119
n-Nonacosane	P29	0.0042	0.0146	0.0133
UnknownC29s	U29	0.0088	0.0309	0.0282
n-Triacontane Plus	P30	0.0107	0.0388	0.0354
TOTAL		100.0000	100.0000	100.0000

CRUDE OIL ASSAY

PROJECT NO. :	201308014	ANALYSIS NO. :	09
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 3-17-9-60		EMPACT
FIELD DATA		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

SPECIFICATION	TEST METHOD	UNITS	RESULTS
API GRAVITY		API 60/60	32.1
RVP @100 DEG F	D323	PSIG	4.8
TOTAL SULFUR	D2622	WT %	0.550
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