



303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201310067	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	OCTOBER 12, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 9, 2013
PRODUCER :		CYLINDER NO. :	6021
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	TREATER @ 1:20		EMPACT
	NELSON RANCH 1-27-10-59		
FIELD DATA		SAMPLE TEMP. :	149
SAMPLE PRES. :	21	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
ALCOHOLS	0.0050	0.0035	0.0033
NITROGEN (AIR)	0.0330	0.0086	0.0079
CARBON DIOXIDE	0.0294	0.0121	0.0109
METHANE	0.0642	0.0096	0.0237
ETHANE	0.2204	0.0618	0.1283
PROPANE	1.0567	0.4349	0.6346
I-BUTANE	0.3212	0.1742	0.2290
N-BUTANE	1.6751	0.9086	1.1510
I-PENTANE	0.8187	0.5512	0.6530
N-PENTANE	1.4040	0.9454	1.1082
HEXANES PLUS	94.3723	96.8901	96.0501
TOTALS	100.0000	100.0000	100.0000

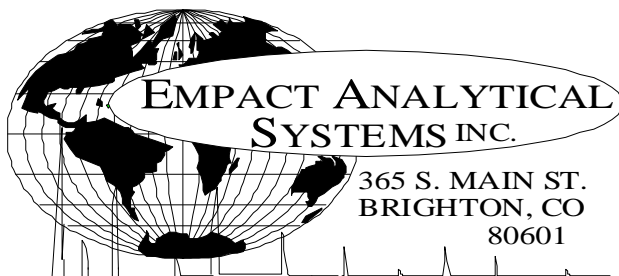
BTEX COMPONENTS	MOLE%	MASS%
BENZENE	1.6769	1.2224
TOLUENE	3.2554	2.7993
ETHYLBENZENE	0.6734	0.6672
XYLENE	1.8344	1.8175
TOTAL BTEX	7.4401	6.5064

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

	TOTAL SAMPLE	C6+ FRACTION
Specific Gravity (H2O=1) =	0.74	0.746 60/60
API Gravity =	59.72	58.18 60/60
Molecular Weight =	107.15	110.742
Absolute Density =	6.17	6.22 LBS/GAL
Heating Value Liq. Idl Gas=	125795	126896 BTU/GAL
Vapor/Liquid =	21.90	21.40 CUFT/GAL
Vapor Pressure =	10.32	1.94 PSIA @ 100 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 RESPONSIBILITY OF THE USER. EMPACT ANALYTICAL SYSTEMS, ASSUMES NO
RESPONSIBILITY FOR ACCURACY OF THE REPORTED INFORMATION NOR ANY CONSEQUENCES OF ITS APPLICATION.



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EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

E & P TANK / GLYCALC INFORMATION

PROJECT NO. :	201310067	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	OCTOBER 12, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 9, 2013
PRODUCER :		CYLINDER NO. :	6021
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	TREATER @ 1:20		EMPACT
	NELSON RANCH 1-27-10-59		
FIELD DATA		SAMPLE TEMP. :	149
SAMPLE PRES. :	21	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %	Wt %	LV %
CARBON DIOXIDE	0.0294	0.0121	0.0109
NITROGEN (AIR)	0.0330	0.0086	0.0079
METHANE	0.0642	0.0096	0.0237
ETHANE	0.2204	0.0618	0.1283
PROPANE	1.0567	0.4349	0.6346
I-BUTANE	0.3212	0.1742	0.2290
N-BUTANE	1.6751	0.9086	1.1510
I-PENTANE	0.8187	0.5512	0.6530
N-PENTANE	1.4040	0.9454	1.1082
CYCLOPENTANE (N-C5)	1.6950	1.1093	1.0796
N-HEXANE	7.9583	6.4010	7.1349
CYCLOHEXANE (OTHER C6)	3.2067	2.5186	2.3783
OTHER HEXANES	12.0902	9.6231	10.1827
OTHER HEPTANES	15.4934	14.3869	14.9627
METHYLCYCLOHEXANE (OTHER C7)	4.5935	4.2092	4.0197
2,2,4 TRIMETHYLPENTANE	0.9238	0.8465	0.8312
BENZENE	1.6769	1.2224	1.0243
TOLUENE	3.2554	2.7993	2.3688
ETHYLBENZENE	0.6734	0.6672	0.5645
XYLENES	1.8344	1.8175	1.5388
OTHER OCTANES	11.8326	12.6383	12.6424
OCTANES PLUS	---- 44.4029	---- 54.6203	---- 52.8991
NONANES	11.2928	13.3798	13.1147
DECANES PLUS	17.8459	25.2710	24.2075
SUB TOTAL	99.9950	99.9965	99.9967
ALCOHOLS	0.0050	0.0035	0.0033
TOTAL	100.0000	100.0000	100.0000

API Gravity	=	59.72	60/60
Vapor Pressure	=	10.32	PSIA & 100 F
Average Molecular Weight of Decanes plus	=	151.74	
Average Specific Gravity of Decanes plus	=	0.7740	

THE DATA PRESENTED HEREIN HAS BEEN ACQUIRED THROUGH JUDICIOUS APPLICATION OF CURRENT STATE-OF-THE ART ANALYTICAL TECHNIQUES. THE APPLICATIONS OF THIS INFORMATION IS THE RESPONSIBILITY OF THE USER. EMPACT ANALYTICAL SYSTEMS, INC. ASSUMES NO RESPONSIBILITY FOR ACCURACY OF THE REPORTED INFORMATION NOR ANY CONSEQUENCES OF IT'S APPLICATION.



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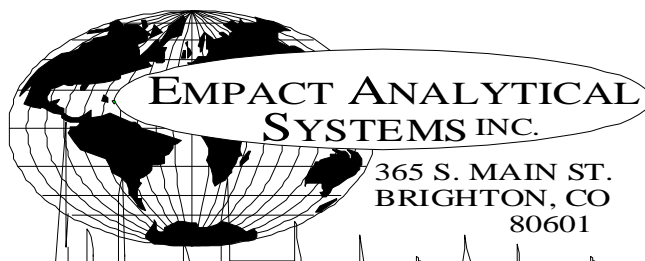
EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

BY CARBON NUMBER

PROJECT NO. :	201310067	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	OCTOBER 12, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 9, 2013
PRODUCER :		CYLINDER NO. :	6021
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	TREATER @ 1:20		EMPACT
	NELSON RANCH 1-27-10-59		
FIELD DATA			
SAMPLE PRES. :	21	SAMPLE TEMP. :	149
VAPOR PRES. :		AMBIENT TEMP.:	
COMMENTS :	SPOT; NO PROBE	GRAVITY :	

COMPONENT / CARBON NUMBER	MOLE%	MASS %	VOLUME %
ALCOHOLS	0.0050	0.0035	0.0033
NITROGEN	0.0330	0.0086	0.0079
CARBON DIOXIDE	0.0294	0.0121	0.0109
C1	0.0642	0.0096	0.0237
C2	0.2204	0.0618	0.1283
C3	1.0567	0.4349	0.6346
C4	1.9963	1.0828	1.3800
C5	3.9177	2.6059	2.8408
C6	24.9321	19.7651	20.7202
C7	23.3423	21.3954	21.3512
C8	15.2642	15.9695	15.5769
C9	11.2928	13.3798	13.1147
C10	8.8669	11.3701	10.9190
C11	4.3635	6.1382	5.8382
C12	2.2609	3.3723	3.2256
C13	0.8404	1.4194	1.3692
C14	0.7076	1.3101	1.2698
C15	0.4214	0.8354	0.8004
C16	0.2999	0.6338	0.6033
C17	0.0834	0.1872	0.1777
C18	0.0019	0.0045	0.0043
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. :	201310067	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	OCTOBER 12, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 9, 2013
PRODUCER :		CYLINDER NO.:	6021
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	TREATER @ 1:20		EMPACT
	NELSON RANCH 1-27-10-59		
FIELD DATA		SAMPLE TEMP. :	149
SAMPLE PRES. :	21	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

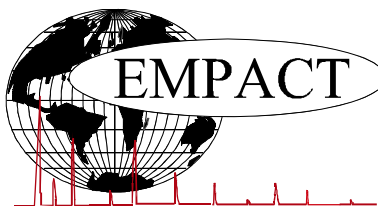
COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0330	0.0086	0.0079
Carbon Dioxide	NHC	0.0294	0.0121	0.0109
Methane	P1	0.0642	0.0096	0.0237
Ethane	P2	0.2204	0.0618	0.1283
Propane	P3	1.0567	0.4349	0.6346
i-Butane	I4	0.3212	0.1742	0.2290
n-Butane	P4	1.6751	0.9086	1.1510
2,2-Dimethylpropane	I5	0.0057	0.0038	0.0047
i-Pentane	I5	0.8130	0.5474	0.6483
n-Pentane	P5	1.4040	0.9454	1.1082
t-Butanol	X4	0.0050	0.0035	0.0033
2,2-Dimethylbutane	I6	0.0714	0.0574	0.0649
Cyclopentane	N5	1.6950	1.1093	1.0796
2,3-Dimethylbutane	I6	0.3580	0.2879	0.3193
2-Methylpentane	I6	3.9766	3.1982	3.5972
3-Methylpentane	I6	2.3492	1.8894	2.0897
n-Hexane	P6	7.9583	6.4010	7.1349
2,2-Dimethylpentane	I7	0.0325	0.0304	0.0330
Methylcyclopentane	N6	5.3350	4.1902	4.1116
2,4-Dimethylpentane	I7	0.2637	0.2466	0.2697
2,2,3-Trimethylbutane	I7	0.0167	0.0156	0.0166
Benzene	A6	1.6769	1.2224	1.0243
3,3-Dimethylpentane	I7	0.0249	0.0233	0.0248
Cyclohexane	N6	3.2067	2.5186	2.3783
2-Methylhexane	I7	1.3589	1.2707	1.3777
2,3-Dimethylpentane	I7	0.8461	0.7912	0.8334
1,1-Dimethylcyclopentane	N7	0.3464	0.3174	0.3093
3-Methylhexane	I7	1.9474	1.8210	1.9446
1c,3-Dimethylcyclopentane	N7	1.0094	0.9250	0.9130
1t,3-Dimethylcyclopentane	N7	0.9238	0.8465	0.8312
3-Ethylpentane	I7	0.1368	0.1279	0.1344
1t,2-Dimethylcyclopentane	N7	2.0869	1.9123	1.8711
2,2,4-Trimethylpentane	I8	0.0520	0.0554	0.0586
n-Heptane	P7	5.4786	5.1231	5.5072
1c,2-Dimethylcyclopentane	N7	0.1847	0.1693	0.1612
Methylcyclohexane	N7	4.5935	4.2092	4.0197
2,2-Dimethylhexane	I8	0.3822	0.4074	0.4305
Ethylcyclopentane	N7	0.8366	0.7666	0.7355
2,5-Dimethylhexane	I8	0.1240	0.1322	0.1401
2,2,3-Trimethylpentane	I8	0.0383	0.0408	0.0419
2,4-Dimethylhexane	I8	0.2492	0.2657	0.2802

1c,2t,4-Trimethylcyclopentane	N8	0.4339	0.4544	0.4377
3,3-Dimethylhexane	I8	0.0501	0.0534	0.0553
2,3,4-Trimethylpentane	I8	0.1172	0.1249	0.1276
2,3,3-Trimethylpentane	I8	0.0002	0.0002	0.0002
Toluene	A7	3.2554	2.7993	2.3688
2,3-Dimethylhexane	I8	0.1980	0.2111	0.2181
2-Methyl-3-ethylpentane	I8	0.1688	0.1799	0.1838
1,1,2-Trimethylcyclopentane	N8	0.0087	0.0091	0.0087
2-Methylheptane	I8	1.4280	1.5223	1.6007
4-Methylheptane	I8	0.5007	0.5338	0.5478
3-Methyl-3-ethylpentane	I8	0.0583	0.0622	0.0629
3,4-Dimethylhexane	I8	0.0722	0.0770	0.0787
1c,2c,4-Trimethylcyclopentane	N8	0.0314	0.0329	0.0314
1c,3-Dimethylcyclohexane	N8	0.0314	0.0329	0.0316
3-Methylheptane	I8	0.5580	0.5948	0.6200
1c,2t,3-Trimethylcyclopentane	N8	1.0776	1.1284	1.0773
3-Ethylhexane	I8	0.1830	0.1951	0.2012
1t,4-Dimethylcyclohexane	N8	0.4817	0.5044	0.4865
1,1-Dimethylcyclohexane	N8	0.1229	0.1287	0.1212
3t-Ethylmethylcyclopentane	N8	0.2486	0.2603	0.2497
2t-Ethylmethylcyclopentane	N8	0.1976	0.2069	0.1979
1,1-Methylethylcyclopentane	N8	0.7707	0.8071	0.7603
2,2,4-Trimethylhexane	I9	0.0499	0.0597	0.0614
1t,2-Dimethylcyclohexane	N8	0.6078	0.6365	0.6035
1t,3-Dimethylcyclohexane	N8	0.0014	0.0015	0.0014
n-Octane	P8	2.4646	2.6273	2.7495
1c,4-Dimethylcyclohexane	N8	0.9116	0.9546	0.8970
i-Propylcyclopentane	I8	0.0815	0.0853	0.0808
2,4,4-Trimethylhexane	I9	0.0189	0.0226	0.0230
2,2,3,4-Tetramethylpentane	I9	0.0183	0.0219	0.0224
2,3,4-Trimethylhexane	I9	0.0177	0.0212	0.0216
1c,2-Dimethylcyclohexane	N8	0.2445	0.2560	0.2366
2,3,5-Trimethylhexane	I9	0.0627	0.0751	0.0765
2,2-Dimethylheptane	I9	0.0146	0.0175	0.0181
1,1,4-Trimethylcyclohexane	N9	1.0265	1.2094	1.1527
2,2,3-Trimethylhexane	I9	0.4678	0.5599	0.5647
2,4-Dimethylheptane	I9	0.0680	0.0814	0.0837
4,4-Dimethylheptane	I9	0.0735	0.0880	0.0905
Ethylcyclohexane	N8	0.5603	0.5867	0.5480
n-Propylcyclopentane	N8	0.2245	0.2351	0.2227
1c,3c,5-Trimethylcyclohexane	N9	0.0448	0.0528	0.0503
2,5-Dimethylheptane	I9	0.0946	0.1132	0.1162
3,3-Dimethylheptane	I9	0.1008	0.1206	0.1238
3,5-Dimethylheptane	I9	0.0709	0.0849	0.0871
2,6-Dimethylheptane	I9	0.0657	0.0786	0.0815
1,1,3-Trimethylcyclohexane	N9	0.1136	0.1338	0.1275
Ethylbenzene	A8	0.6734	0.6672	0.5645
1c,2t,4t-Trimethylcyclohexane	N9	0.3727	0.4391	0.4105
2,3-Dimethylheptane	I9	0.0042	0.0050	0.0051
1,3-Dimethylbenzene (m-Xylene)	A8	0.4578	0.4536	0.3860
1,4-Dimethylbenzene (p-Xylene)	A8	0.7133	0.7067	0.6033
3,4-Dimethylheptane	I9	0.4543	0.5438	0.5469
3,4-Dimethylheptane (2)	I9	0.2031	0.2431	0.2445
4-Ethylheptane	I9	0.0471	0.0564	0.0580
4-Methyloctane	I9	0.2843	0.3403	0.3473
2-Methyloctane	I9	0.3098	0.3708	0.3822
1c,2t,4c-Trimethylcyclohexane	I9	0.0602	0.0721	0.0731
3-Ethylheptane	I9	0.0826	0.0989	0.1001
3-Methyloctane	I9	0.4404	0.5271	0.5379
3,3-Diethylpentane	I9	0.0436	0.0522	0.0509
1c,2t,3-Trimethylcyclohexane	N9	0.1111	0.1309	0.1224
1,1,2-Trimethylcyclohexane	N9	0.0212	0.0250	0.0234
1,2-Dimethylbenzene (o-Xylene)	A8	0.6633	0.6572	0.5495
i-Butylcyclopentane	N9	0.2463	0.2902	0.2734
UnknownC8s	U8	0.0755	0.0805	0.0842
n-Nonane	P9	1.6858	2.0179	2.0683
1,1-Methylethylcyclohexane	N9	0.5627	0.6735	0.6924
i-Propylbenzene	A9	0.4080	0.4576	0.3899
i-Propylcyclohexane	N9	0.1240	0.1461	0.1340
2,2-Dimethyloctane	I10	0.0811	0.1077	0.1071
2,4-Dimethyloctane	I10	0.0894	0.1187	0.1181
2,6-Dimethyloctane	I10	0.0095	0.0126	0.0130
2,5-Dimethyloctane	I10	0.0330	0.0438	0.0436

n-Butylcyclopentane	N9	0.2617	0.3426	0.3155
3,3-Dimethyloctane	I10	0.1512	0.2008	0.1999
n-Propylbenzene	A9	0.2989	0.3353	0.2857
3,6-Dimethyloctane	I10	0.2482	0.3296	0.3279
3-Methyl-5-ethylheptane	I10	0.2704	0.3237	0.3281
1,3-Methylethylbenzene	A9	0.2723	0.3054	0.2581
1,4-Methylethylbenzene	A9	0.0803	0.0901	0.0761
1,3,5-Trimethylbenzene	A9	0.1270	0.1425	0.1212
2,3-Dimethyloctane	I10	0.0518	0.0688	0.0684
5-Methylnonane	I10	0.1895	0.2516	0.2527
1,2-Methylethylbenzene	A9	0.3158	0.3542	0.2977
2-Methylnonane	I10	0.0859	0.1141	0.1155
3-Ethyloctane	I10	0.1039	0.1380	0.1373
3-Methylnonane	I10	0.1719	0.2283	0.2290
1,2,4-Trimethylbenzene	A9	0.0158	0.0177	0.0149
t-Butylbenzene	A10	0.1998	0.2503	0.2127
i-Butylcyclohexane	N10	0.2161	0.2829	0.2565
1t-Methyl-2-n-propylcyclohexane	I10	0.0784	0.0938	0.0951
i-Butylbenzene	A10	0.0536	0.0671	0.0579
sec-Butylbenzene	A10	0.1110	0.1390	0.1187
UnknownC9s	U9	1.9697	2.3577	2.4165
n-Decane	P10	0.9375	1.2448	1.2544
1,2,3-Trimethylbenzene	A9	0.1816	0.2037	0.1677
1,3-Methyl-i-propylbenzene	A10	0.0884	0.0992	0.0834
1,4-Methyl-i-propylbenzene	A10	0.0819	0.0919	0.0772
Sec-Butylcyclohexane	N10	0.2595	0.3397	0.3076
1,2-Methyl-i-propylbenzene	A10	0.1288	0.1613	0.1355
3-Ethylnonane	I10	0.0611	0.0811	0.0821
1,3-Diethylbenzene	A10	0.1237	0.1549	0.1320
1,3-Methyl-n-propylbenzene	A10	0.0194	0.0243	0.0208
1,4-Diethylbenzene	A10	0.1046	0.1310	0.1119
1,4-Methyl-n-propylbenzene	A10	0.0286	0.0358	0.0307
n-Butylbenzene	A10	0.1163	0.1457	0.1245
1,3-Dimethyl-5-ethylbenzene	A10	0.0713	0.0893	0.0760
1,2-Diethylbenzene	A10	0.1448	0.1814	0.1518
1,2-Methyl-n-propylbenzene	A10	0.0836	0.1047	0.0882
1,4-Dimethyl-2-ethylbenzene	A10	0.0960	0.1202	0.1009
1,3-Dimethyl-4-ethylbenzene	A10	0.0220	0.0276	0.0232
1,2-Dimethyl-4-ethylbenzene	A10	0.1043	0.1306	0.1099
1,3-Dimethyl-2-ethylbenzene	A10	0.1742	0.2182	0.1804
1t,2c,4-Trimethylcyclopentane	A10	0.5568	0.5831	0.5738
1,2-Dimethyl-3-ethylbenzene	A10	0.0953	0.1194	0.0985
1,2-Ethyl-i-propylbenzene	A10	0.0519	0.0650	0.0546
1,4-Methyl-t-butylbenzene	A11	0.1297	0.1625	0.1365
UnknownC10s	U10	3.0635	4.0677	4.0990
n-Undecane	P11	0.8767	1.2789	1.2709
1,4-Ethyl-i-propylbenzene	A11	0.0624	0.0782	0.0657
1,2,4,5-Tetramethylbenzene	A11	0.0687	0.0861	0.0715
1,2-Methyl-n-butylbenzene	A11	0.0562	0.0704	0.0591
1,2,3,5-Tetramethylbenzene	A11	0.0613	0.0768	0.0635
1,2-Methyl-t-butylbenzene	A11	0.0761	0.0953	0.0800
5-Methylindan	A11	0.0173	0.0275	0.0270
4-Methylindan	A11	0.0111	0.0176	0.0173
1,2-Ethyl-n-propylbenzene	A11	0.0738	0.0924	0.0776
2-Methylindan	A11	0.0810	0.1288	0.1266
1,3-Methyl-n-butylbenzene	A11	0.0726	0.0909	0.0763
1,3-Di-i-propylbenzene	A11	0.0648	0.0812	0.0682
sec-Pentylbenzene	A11	0.1284	0.1608	0.1350
n-Pentylbenzene	A11	0.0362	0.0501	0.0430
1t-M-2-(4MP)cyclopentane	P12	0.0292	0.0464	0.0456
1,2-Di-n-propylbenzene	A11	0.0739	0.0926	0.0778
1,4-Di-i-propylbenzene	A11	0.0800	0.1002	0.0841
Tetrahydronaphthalene	A10	0.1016	0.1273	0.1069
t-Decahydronaphthalene	A10	0.1306	0.1636	0.1374
Naphthalene	A10	0.0765	0.0915	0.0768
1-t-Butyl-3,5-dimethylbenzene	A12	0.0810	0.1015	0.0852
1,4-Ethyl-t-butylbenzene	A11	0.1033	0.1294	0.1087
UnknownC11s	U11	2.1228	3.0966	3.0772
n-Dodecane	P12	0.5446	0.8657	0.8508
1,3-Di-n-propylbenzene	A12	0.0236	0.0296	0.0249
1,3,5-Triethylbenzene	A12	0.1106	0.1241	0.1056
1,2,4-Triethylbenzene	A12	0.2648	0.2970	0.2495
1,4-Methyl-n-pentylbenzene	A12	0.0241	0.0302	0.0254

n-Hexylbenzene	A12	0.0366	0.0554	0.0475
1,2,3,4,5-Pentamethylbenzene	A13	0.0566	0.0709	0.0595
2-Methylnaphthalene	A11	0.0774	0.1027	0.0862
1-Methylnaphthalene	A11	0.0898	0.1192	0.0860
UnknownC12s	U12	1.1464	1.8224	1.7911
n-Tridecane	P13	0.1381	0.2376	0.2308
UnknownC13s	U13	0.6457	1.1109	1.0789
n-Tetradecane	P14	0.1264	0.2340	0.2268
UnknownC14s	U14	0.5812	1.0761	1.0430
n-Pentadecane	P15	0.0731	0.1449	0.1388
UnknownC15s	U15	0.3483	0.6905	0.6616
n-Hexadecane	P16	0.0623	0.1317	0.1254
UnknownC16s	U16	0.2376	0.5021	0.4779
n-Heptadecane	P17	0.0028	0.0063	0.0060
UnknownC17s	U17	0.0806	0.1809	0.1717
UnknownC18s	U18	0.0019	0.0045	0.0043
<u>TOTAL</u>		<u>100.0000</u>	<u>100.0000</u>	<u>100.0000</u>

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CRUDE OIL ASSAY

PROJECT NO. :	201310067	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	OCTOBER 18, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 9, 2013
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	PRODUCTION TANK @ 1:30		EMPACT
	NESON RANCH 1-27-10-59		
FIELD DATA		SAMPLE TEMP. :	104
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

<u>SPECIFICATION</u>	<u>TEST METHOD</u>	<u>UNITS</u>	<u>RESULTS</u>
API GRAVITY		API 60/60	32.2
RVP @100 DEG F	D323	PSIG	5
TOTAL SULFUR	D2622	WT %	0.504
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
<u>BS&W</u>	D96		
Crude Oil		VOL %	N/A
Water		VOL %	N/A
Emulsion		VOL %	N/A
Sediment		VOL %	N/A
<u>DISTILLATION:</u>	D86		
INITIAL POINT		DEG F	N/A
50%		DEG F	N/A
90%		DEG F	N/A
END POINT		DEG F	N/A
<u>DISTILLATION:</u>	<u>@TEMP</u>	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

The data presented herein has been acquired by means of current analytical techniques and represents the judicious conclusion EMPACT Analytical Systems, Inc. Results of the analysis can be affected by the sampling conditions, therefore, are only warranted through proper lab protocol. EMPACT assumes no responsibility for interpretation or any consequences from application of the reported information and is the sole liability of the user. The reproduction in any media of this reported information may not be made, in portion or as a whole, without the written permission of EMPACT Analytical Systems, Inc.



303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201310067	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	OCTOBER 16, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 9, 2013
PRODUCER :		CYLINDER NO. :	0732
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS @ 1:40		
	NELSON RANCH 1-27-10-59		
FIELD DATA		SAMPLE TEMP. :	76
SAMPLE PRES. :	80	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 12PPM @ 1:45		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0028	0.0068		
HELIUM	0.02	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.02	0.03	---	---
NITROGEN	1.16	1.34	---	---
CARBON DIOXIDE	2.67	4.83	---	---
METHANE	69.59850	45.92380	---	---
ETHANE	10.6649	13.1900	2.8488	2.8644
PROPANE	9.1381	16.5738	2.5144	2.5281
I-BUTANE	0.9304	2.2242	0.3044	0.3061
N-BUTANE	3.3416	7.9886	1.0524	1.0582
I-PENTANE	0.7218	2.1355	0.2583	0.2598
N-PENTANE	0.8803	2.6124	0.3184	0.3202
HEXANES PLUS	0.8416	3.1449	0.3353	0.3371
TOTALS	100.00000	100.00000	7.6320	7.6739

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.650	14.730
BENZENE	0.0305	0.0980	LOW NET DRY REAL :	1244.1 /scf	1250.9 /scf
TOLUENE	0.0147	0.0557	NET WET REAL :	1222.4 /scf	1229.1 /scf
ETHYLBENZENE	0.0010	0.0044	HIGH GROSS DRY REAL :	1367.2 /scf	1374.7 /scf
XYLENES	0.0021	0.0092	GROSS WET REAL :	1343.3 /scf	1350.8 /scf
TOTAL BTEX	0.0483	0.1673	NET DRY REAL :	19442.9 /lb	19549.1 /lb
			GROSS DRY REAL :	21366.5 /lb	21483.2 /lb

RELATIVE DENSITY (AIR=1): 0.8384
 COMPRESSIBILITY FACTOR : 0.99554

(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.
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303-637-0150

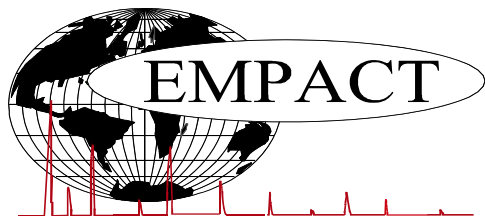
EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201310067	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	OCTOBER 16, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 9, 2013
PRODUCER :		CYLINDER NO. :	0732
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS @ 1:40 NELSON RANCH 1-27-10-59		
FIELD DATA		SAMPLE TEMP. :	76
SAMPLE PRES. :	80	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 12 PPM @ 1:45		

Componet	Mole %	Wt %
Helium	0.02	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	2.67	4.83
Nitrogen	1.16	1.34
Methane	69.59850	45.92380
Ethane	10.6649	13.1900
Propane	9.1381	16.5738
Isobutane	0.9304	2.2242
n-Butane	3.3416	7.9886
Isopentane	0.6437	1.9102
n-Pentane	0.8803	2.6124
Cyclopentane	0.0781	0.2253
n-Hexane	0.1892	0.6706
Cyclohexane	0.0447	0.1547
Other Hexanes	0.3291	1.1576
Heptanes	0.1469	0.6013
Methycyclohexane	0.0292	0.1179
2,2,4 Trimethylpentane	0.0001	0.0005
Benzene	0.0305	0.0980
Toluene	0.0147	0.0557
Ethylbenzene	0.0010	0.0044
Xylenes	0.0021	0.0092
C8+ Heavies	0.0541	0.2750
Subtotal	99.97720	99.96320
Oxygen/Argon	0.02	0.03
Alcohols	0.0028	0.0068
Total	100.00000	100.00000

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EXTENDED NATURAL GAS ANALYSIS (*DHA)
DHA COMPONENT LIST

PROJECT NO. :	201310067	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	OCTOBER 16, 2013
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 9, 2013
PRODUCER :		CYLINDER NO. :	0732
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS @ 1:40 NELSON RANCH 1-27-10-59		
FIELD DATA		SAMPLE TEMP. :	76
SAMPLE PRES. :	80	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 12PPM @ 1:45		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.02	0.00	---	---
Hydrogen	---	0.01	0.00	---	---
Oxygen/Argon	---	0.02	0.03	---	---
Nitrogen	---	1.16	1.34	---	---
Carbon Dioxide	---	2.67	4.83	---	---
Methane	P1	69.59850	45.92380	---	---
Ethane	P2	10.6649	13.1900	2.849	2.864
Propane	P3	9.1381	16.5738	2.514	2.528
i-Butane	I4	0.9304	2.2242	0.304	0.306
n-Butane	P4	3.3415	7.9883	1.052	1.058
2,2-Dimethylpropane	I5	0.0024	0.0071	0.001	0.001
Ethanol	X2	0.0002	0.0004	0.000	0.000
i-Pentane	I5	0.6413	1.9031	0.234	0.236
Acetone	X3	0.0019	0.0045	0.001	0.001
i-Propanol	X3	0.0004	0.0010	0.000	0.000
UnknownC4s	U4	0.0001	0.0003	0.000	0.000
n-Pentane	P5	0.8803	2.6124	0.318	0.320
t-Butanol	X4	0.0003	0.0009	0.000	0.000
2,2-Dimethylbutane	I6	0.0018	0.0064	0.001	0.001
Cyclopentane	N5	0.0781	0.2253	0.023	0.023
2,3-Dimethylbutane	I6	0.0104	0.0369	0.004	0.004
2-Methylpentane	I6	0.1372	0.4863	0.057	0.057
3-Methylpentane	I6	0.0712	0.2524	0.029	0.029
n-Hexane	P6	0.1892	0.6706	0.078	0.079
2,2-Dimethylpentane	I7	0.0006	0.0025	0.000	0.000
Methylcyclopentane	N6	0.1085	0.3756	0.038	0.038
2,4-Dimethylpentane	I7	0.0042	0.0173	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0305	0.0980	0.009	0.009
3,3-Dimethylpentane	I7	0.0005	0.0021	0.000	0.000
Cyclohexane	N6	0.0447	0.1547	0.015	0.015
2-Methylhexane	I7	0.0180	0.0742	0.008	0.008
2,3-Dimethylpentane	I7	0.0086	0.0355	0.004	0.004
1,1-Dimethylcyclopentane	N7	0.0034	0.0137	0.001	0.001
3-Methylhexane	I7	0.0208	0.0857	0.010	0.010
1c,3-Dimethylcyclopentane	N7	0.0109	0.0440	0.005	0.005
1t,3-Dimethylcyclopentane	N7	0.0097	0.0392	0.004	0.004
3-Ethylpentane	I7	0.0017	0.0070	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0203	0.0820	0.009	0.009
2,2,4-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
n-Heptane	P7	0.0411	0.1694	0.019	0.019
1c,2-Dimethylcyclopentane	N7	0.0018	0.0073	0.001	0.001
Methylcyclohexane	N7	0.0292	0.1179	0.012	0.012
2,2-Dimethylhexane	I8	0.0019	0.0089	0.001	0.001
Ethylcyclopentane	N7	0.0051	0.0206	0.002	0.002
2,5-Dimethylhexane	I8	0.0011	0.0052	0.001	0.001
2,4-Dimethylhexane	I8	0.0013	0.0061	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0025	0.0116	0.001	0.001

3,3-Dimethylhexane	I8	0.0001	0.0005	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0029	0.0134	0.001	0.001
2,3,4-Trimethylpentane	I8	0.0005	0.0023	0.000	0.000
Toluene	A7	0.0147	0.0557	0.005	0.005
2,3-Dimethylhexane	I8	0.0007	0.0033	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0011	0.0052	0.001	0.001
2-Methylheptane	I8	0.0052	0.0244	0.003	0.003
4-Methylheptane	I8	0.0015	0.0070	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	0.0024	0.0113	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0029	0.0134	0.001	0.001
3-Ethylhexane	I8	0.0004	0.0019	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0011	0.0051	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0004	0.0019	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0008	0.0037	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0007	0.0033	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0023	0.0106	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0002	0.0011	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0016	0.0074	0.001	0.001
1t,3-Dimethylcyclohexane	N8	0.0001	0.0005	0.000	0.000
UnknownC7s	U7	0.0001	0.0004	0.000	0.000
n-Octane	P8	0.0061	0.0287	0.003	0.003
1c,4-Dimethylcyclohexane	N8	0.0008	0.0037	0.000	0.000
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	0.0002	0.0011	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	0.0003	0.0014	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0015	0.0078	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0006	0.0032	0.000	0.000
2,4-Dimethylheptane	I9	0.0004	0.0021	0.000	0.000
Ethylcyclohexane	N8	0.0009	0.0042	0.000	0.000
n-Propylcyclopentane	N8	0.0004	0.0019	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0005	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
2,6-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0004	0.0021	0.000	0.000
Ethylbenzene	I8	0.0010	0.0044	0.000	0.000
1c,2t,4t-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,3-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0013	0.0057	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0003	0.0013	0.000	0.000
3,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0002	0.0011	0.000	0.000
4-Methyloctane	I9	0.0003	0.0016	0.000	0.000
2-Methyloctane	I9	0.0003	0.0016	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
1,2-Dimethylbenzene (o-Xylene)	A8	0.0005	0.0022	0.000	0.000
i-Butylcyclopentane	N9	0.0002	0.0010	0.000	0.000
UnknownC8s	U8	0.0003	0.0014	0.000	0.000
n-Nonane	P9	0.0007	0.0037	0.000	0.000
1,1-Methylethylcyclohexane	N9	0.0002	0.0010	0.000	0.000
i-Propylbenzene	A9	0.0002	0.0010	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
n-Butylcyclopentane	N9	0.0002	0.0010	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-Methyl-5-ethylheptane	I10	0.0002	0.0012	0.000	0.000
1,3-Methylethylbenzene	A9	0.0001	0.0005	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	0.0001	0.0006	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0005	0.000	0.000

2-Methylnonane	I10	0.0001	0.0006	0.000	0.000
3-Methylnonane	I10	0.0001	0.0006	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0005	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0011	0.0058	0.001	0.001
UnknownC10s	U10	0.0007	0.0041	0.000	0.000
n-Tetradecane	P14	0.0001	0.0008	0.000	0.000
n-Hexadecane	P16	0.0002	0.0019	0.000	0.000
n-Heptadecane	P17	0.0001	0.0010	0.000	0.000
n-Octadecane	P18	0.0001	0.0010	0.000	0.000
UnknownC18s	U18	0.0001	0.0010	0.000	0.000
n-Nonadecane	P19	0.0001	0.0011	0.000	0.000
UnknownC19s	U19	0.0005	0.0055	0.000	0.000
n-Eicosane	P20	0.0001	0.0012	0.000	0.000
n-Heneicosane	P21	0.0001	0.0012	0.000	0.000
UnknownC21s	U21	0.0002	0.0024	0.000	0.000
n-Docosane	P22	0.0001	0.0013	0.000	0.000
n-Tricosane	P23	0.0001	0.0013	0.000	0.000
n-Tetracosane	P24	0.0001	0.0014	0.000	0.000
n-Pentacosane	P25	0.0001	0.0014	0.000	0.000
n-Hexacosane	P26	0.0001	0.0015	0.000	0.000
n-Heptacosane	P27	0.0001	0.0016	0.000	0.000
TOTAL		100.00000	100.00000	7.6330	7.6749

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.650	14.730
BENZENE	0.0305	0.0980	LOW NET DRY REAL :	1244.1 /scf	1250.9 /scf
TOLUENE	0.0147	0.0557	NET WET REAL :	1222.4 /scf	1229.1 /scf
ETHYLBENZENE	0.0010	0.0044	HIGH GROSS DRY REAL :	1367.2 /scf	1374.7 /scf
XYLENES	0.0021	0.0092	GROSS WET REAL :	1343.3 /scf	1350.8 /scf
TOTAL BTEX	0.0483	0.1673	NET DRY REAL :	19442.9 /lb	19549.1 /lb
			GROSS DRY REAL :	21366.5 /lb	21483.2 /lb

RELATIVE DENSITY (AIR=1): 0.8384
COMPRESSIBILITY FACTOR : 0.99554

(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.
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