



303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201411074	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	NOVEMBER 16, 2014
ACCOUNT NO. :		SAMPLE DATE :	NOVEMBER 14, 2014
PRODUCER :		CYLINDER NO. :	2821
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR 14:10		EMPACT
	SHULL 2-35-9-60		
FIELD DATA		SAMPLE TEMP. :	168
SAMPLE PRES. :	30	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
NITROGEN (AIR)	0.0680	0.0164	0.0151
CARBON DIOXIDE	0.0270	0.0103	0.0094
METHANE	0.1770	0.0245	0.0611
ETHANE	0.3230	0.0838	0.1758
PROPANE	1.0530	0.4008	0.5910
I-BUTANE	0.2780	0.1395	0.1853
N-BUTANE	1.3700	0.6873	0.8798
I-PENTANE	0.6425	0.4002	0.4791
N-PENTANE	1.0730	0.6683	0.7916
HEXANES PLUS	94.9885	97.5689	96.8118
TOTALS	100.0000	100.0000	100.0000

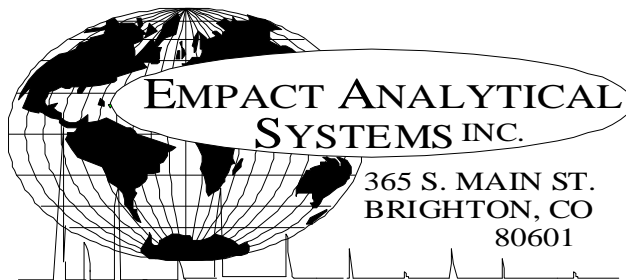
BTEX COMPONENTS	MOLE%	MASS%
BENZENE	1.3097	0.8831
TOLUENE	2.7516	2.1885
ETHYLBENZENE	0.3926	0.3598
XYLENE	1.2221	1.1200
TOTAL BTEX	5.6760	4.5514

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

	TOTAL SAMPLE	C6+ FRACTION
Specific Gravity (H2O=1) =	0.7479	0.7531 60/60
API Gravity =	57.7	56.39 60/60
Molecular Weight =	115.85	119.676
Absolute Density =	6.24	6.28 LBS/GAL
Heating Value Liq. Idl Gas=	126530	127738 BTU/GAL
Vapor/Liquid =	20.48	20.04 CUFT/GAL
Vapor Pressure =	16.14	1.58 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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E & P TANK / GLYCALC INFORMATION

PROJECT NO. :	201411074	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE :	NOVEMBER 16, 2014
ACCOUNT NO. :		SAMPLE DATE :	NOVEMBER 14, 2014
PRODUCER :		CYLINDER NO. :	2821
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR 14:10		EMPACT
	SHULL 2-35-9-60		
FIELD DATA		SAMPLE TEMP. :	168
SAMPLE PRES. :	30	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %	Wt %	LV %			
CARBON DIOXIDE	0.0270	0.0103	0.0094			
NITROGEN (AIR)	0.0680	0.0164	0.0151			
METHANE	0.1770	0.0245	0.0611			
ETHANE	0.3230	0.0838	0.1758			
PROPANE	1.0530	0.4008	0.5910			
I-BUTANE	0.2780	0.1395	0.1853			
N-BUTANE	1.3700	0.6873	0.8798			
I-PENTANE	0.6425	0.4002	0.4791			
N-PENTANE	1.0730	0.6683	0.7916			
CYCLOPENTANE (N-C5)	1.3201	0.7991	0.7858			
N-HEXANE	6.2947	4.6836	5.2743			
CYCLOHEXANE (OTHER C6)	2.5525	1.8543	1.7693			
OTHER HEXANES	9.8004	7.2162	7.7203			
OTHER HEPTANES	12.9369	11.1119	11.6785			
METHYLCYCLOHEXANE (OTHER C7)	3.8712	3.2811	3.1660			
2,2,4 TRIMETHYLPENTANE	0.7625	0.6463	0.6412			
BENZENE	1.3097	0.8831	0.7477			
TOLUENE	2.7516	2.1885	1.8713			
ETHYLBENZENE	0.3926	0.3598	0.3076			
XYLENES	1.2221	1.1200	0.9549			
OTHER OCTANES	11.0720	10.9285	11.0621			
OCTANES PLUS	----	54.1514	----	65.5511	----	63.7986
NONANES	12.6865	13.8706	13.6661			
DECANES PLUS	28.0157	38.6259	37.1667			
SUB TOTAL	100.0000	100.0000	100.0000			
TOTAL	100.0000	100.0000	100.0000			

API Gravity	=	57.70	60/60
Vapor Pressure	=	16.14	PSIA & 100 F
Average Molecular Weight of Decanes plus	=	159.72	
Average Specific Gravity of Decanes plus	=	0.7770	

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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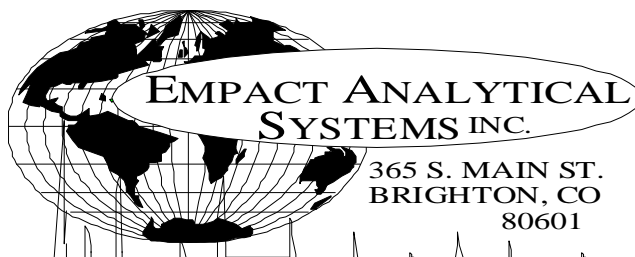
EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

BY CARBON NUMBER

PROJECT NO. :	201411074	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	NOVEMBER 16, 2014
ACCOUNT NO. :		SAMPLE DATE :	NOVEMBER 14, 2014
PRODUCER :		CYLINDER NO. :	2821
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR 14:10		EMPACT
	SHULL 2-35-9-60		
FIELD DATA		SAMPLE TEMP. :	168
SAMPLE PRES. :	30	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER	MOLE%	MASS %	VOLUME %
NITROGEN	0.0680	0.0164	0.0151
CARBON DIOXIDE	0.0270	0.0103	0.0094
C1	0.1770	0.0245	0.0611
C2	0.3230	0.0838	0.1758
C3	1.0530	0.4008	0.5910
C4	1.6480	0.8268	1.0651
C5	3.0356	1.8676	2.0565
C6	19.9573	14.6372	15.5116
C7	19.5597	16.5815	16.7158
C8	13.4492	13.0546	12.9658
C9	12.6865	13.8706	13.6661
C10	11.0417	13.0743	12.5972
C11	5.7700	7.4203	6.9959
C12	3.7832	5.2684	5.0943
C13	2.6907	4.1685	4.0504
C14	1.6659	2.8529	2.7939
C15	1.7555	3.2189	3.1161
C16	0.8898	1.7392	1.6727
C17	0.3418	0.7095	0.6803
C18	0.0653	0.1434	0.1371
C19	0.0026	0.0061	0.0058
C20	0.0018	0.0044	0.0042
C21	0.0021	0.0054	0.0051
C22	0.0032	0.0086	0.0081
C23	0.0012	0.0034	0.0032
C24	0.0009	0.0026	0.0024
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. :	201411074	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	NOVEMBER 16, 2014
ACCOUNT NO. :		SAMPLE DATE :	NOVEMBER 14, 2014
PRODUCER :		CYLINDER NO. :	2821
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR 14:10		EMPACT
	SHULL 2-35-9-60		
FIELD DATA		SAMPLE TEMP. :	168
SAMPLE PRES. :	30	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0680	0.0164	0.0151
Carbon Dioxide	NHC	0.0270	0.0103	0.0094
Methane	P1	0.1770	0.0245	0.0611
Ethane	P2	0.3230	0.0838	0.1758
Propane	P3	1.0530	0.4008	0.5910
i-Butane	I4	0.2780	0.1395	0.1853
n-Butane	P4	1.3700	0.6873	0.8798
2,2-Dimethylpropane	I5	0.0035	0.0022	0.0028
i-Pentane	I5	0.6390	0.3980	0.4763
n-Pentane	P5	1.0730	0.6683	0.7916
2,2-Dimethylbutane	I6	0.0262	0.0195	0.0223
Cyclopentane	N5	1.3201	0.7991	0.7858
2,3-Dimethylbutane	I6	0.3310	0.2462	0.2759
2-Methylpentane	I6	3.2339	2.4057	2.7340
3-Methylpentane	I6	1.9405	1.4436	1.6133
n-Hexane	P6	6.2947	4.6836	5.2743
2,2-Dimethylpentane	I7	0.0146	0.0126	0.0138
Methylcyclopentane	N6	4.2688	3.1012	3.0748
2,4-Dimethylpentane	I7	0.2135	0.1847	0.2041
2,2,3-Trimethylbutane	I7	0.0198	0.0171	0.0184
Benzene	A6	1.3097	0.8831	0.7477
3,3-Dimethylpentane	I7	0.0146	0.0126	0.0135
Cyclohexane	N6	2.5525	1.8543	1.7693
2-Methylhexane	I7	1.0856	0.9390	1.0287
2,3-Dimethylpentane	I7	0.6639	0.5742	0.6111
1,1-Dimethylcyclopentane	N7	0.2983	0.2528	0.2489
3-Methylhexane	I7	1.6473	1.4248	1.5374
1c,3-Dimethylcyclopentane	N7	0.7945	0.6734	0.6716
1t,3-Dimethylcyclopentane	N7	0.7625	0.6463	0.6412
3-Ethylpentane	I7	0.1362	0.1178	0.1251
1t,2-Dimethylcyclopentane	N7	1.7778	1.5068	1.4897
2,2,4-Trimethylpentane	I8	0.0526	0.0519	0.0555
n-Heptane	P7	4.5113	3.9020	4.2383
1c,2-Dimethylcyclopentane	N7	0.1542	0.1307	0.1257
Methylcyclohexane	N7	3.8712	3.2811	3.1660
2,2-Dimethylhexane	I8	0.3551	0.3501	0.3738
Ethylcyclopentane	N7	0.6858	0.5813	0.5635
2,5-Dimethylhexane	I8	0.1067	0.1052	0.1126
2,2,3-Trimethylpentane	I8	0.0537	0.0529	0.0549
2,4-Dimethylhexane	I8	0.1766	0.1741	0.1855
1c,2t,4-Trimethylcyclopentane	N8	0.3686	0.3570	0.3475
3,3-Dimethylhexane	I8	0.0583	0.0575	0.0602

2,3,4-Trimethylpentane	I8	0.1147	0.1131	0.1168
2,3,3-Trimethylpentane	I8	0.0022	0.0022	0.0022
Toluene	A7	2.7516	2.1885	1.8713
2,3-Dimethylhexane	I8	0.1979	0.1951	0.2036
2-Methyl-3-ethylpentane	I8	0.1641	0.1618	0.1671
1,1,2-Trimethylcyclopentane	N8	0.0284	0.0275	0.0265
2-Methylheptane	I8	1.2677	1.2500	1.3281
4-Methylheptane	I8	0.3889	0.3835	0.3976
3-Methyl-3-ethylpentane	I8	0.1080	0.1065	0.1088
3,4-Dimethylhexane	I8	0.0911	0.0898	0.0927
1c,2c,4-Trimethylcyclopentane	N8	0.0190	0.0184	0.0177
1c,3-Dimethylcyclohexane	N8	0.0430	0.0416	0.0404
3-Methylheptane	I8	0.5280	0.5206	0.5484
1c,2t,3-Trimethylcyclopentane	N8	0.9202	0.8913	0.8598
3-Ethylhexane	I8	0.2157	0.2127	0.2217
1t,4-Dimethylcyclohexane	N8	0.4296	0.4161	0.4055
1,1-Dimethylcyclohexane	N8	0.1115	0.1080	0.1028
2,2,5-Trimethylhexane	I9	0.0049	0.0054	0.0056
3c-Ethylmethylcyclopentane	N8	0.0050	0.0048	0.0047
3t-Ethylmethylcyclopentane	N8	0.2422	0.2346	0.2274
2t-Ethylmethylcyclopentane	N8	0.2001	0.1938	0.1873
1,1-Methylethylcyclopentane	N8	0.7205	0.6979	0.6643
2,2,4-Trimethylhexane	I9	0.0522	0.0578	0.0600
1t,2-Dimethylcyclohexane	N8	0.5868	0.5684	0.5446
1c,2c,3-Trimethylcyclopentane	N8	0.0058	0.0056	0.0053
1t,3-Dimethylcyclohexane	N8	0.0021	0.0020	0.0019
UnknownC7s	U7	0.1570	0.1358	0.1475
n-Octane	P8	2.4797	2.4451	2.5855
1c,4-Dimethylcyclohexane	N8	0.7317	0.7087	0.6729
i-Propylcyclopentane	I8	0.0759	0.0735	0.0704
2,4,4-Trimethylhexane	I9	0.0191	0.0211	0.0217
2,2,3,4-Tetramethylpentane	I9	0.0206	0.0228	0.0236
2,3,4-Trimethylhexane	I9	0.0197	0.0218	0.0224
1c,2-Dimethylcyclohexane	N8	0.1532	0.1484	0.1386
2,3,5-Trimethylhexane	I9	0.1106	0.1224	0.1260
2,2-Dimethylheptane	I9	0.0133	0.0147	0.0154
1,1,4-Trimethylcyclohexane	N9	1.0322	1.1248	1.0832
2,2,3-Trimethylhexane	I9	0.4331	0.4795	0.4886
2,4-Dimethylheptane	I9	0.0424	0.0469	0.0487
4,4-Dimethylheptane	I9	0.0572	0.0633	0.0658
Ethylcyclohexane	N8	0.5388	0.5219	0.4925
n-Propylcyclopentane	N8	0.2191	0.2122	0.2031
1c,3c,5-Trimethylcyclohexane	N9	0.0370	0.0403	0.0388
2,5-Dimethylheptane	I9	0.0891	0.0986	0.1022
3,3-Dimethylheptane	I9	0.0905	0.1002	0.1039
3,5-Dimethylheptane	I9	0.0709	0.0785	0.0814
2,6-Dimethylheptane	I9	0.0698	0.0773	0.0810
1,1,3-Trimethylcyclohexane	N9	0.1678	0.1829	0.1761
Ethylbenzene	A8	0.3926	0.3598	0.3076
1c,2t,4t-Trimethylcyclohexane	N9	0.4870	0.5307	0.5013
2,3-Dimethylheptane	I9	1.1500	1.2732	1.3035
1,3-Dimethylbenzene (m-Xylene)	A8	0.1681	0.1541	0.1325
1,4-Dimethylbenzene (p-Xylene)	A8	0.3898	0.3572	0.3081
3,4-Dimethylheptane	I9	0.0577	0.0639	0.0649
3,4-Dimethylheptane (2)	I9	0.1521	0.1684	0.1711
4-Ethylheptane	I9	0.0576	0.0638	0.0663
4-Methyloctane	I9	0.2967	0.3285	0.3388
2-Methyloctane	I9	0.3198	0.3541	0.3688
1c,2t,4c-Trimethylcyclohexane	I9	0.0586	0.0649	0.0665
3-Ethylheptane	I9	0.0602	0.0666	0.0681
3-Methyloctane	I9	0.4772	0.5283	0.5448
3,3-Diethylpentane	I9	0.0467	0.0517	0.0509
1c,2t,3-Trimethylcyclohexane	N9	0.0931	0.1015	0.0959
1,1,2-Trimethylcyclohexane	N9	0.0325	0.0354	0.0334
1,2-Dimethylbenzene (o-Xylene)	A8	0.6642	0.6087	0.5143
i-Butylcyclopentane	N9	0.2441	0.2660	0.2532
UnknownC8s	U8	0.0720	0.0710	0.0751
n-Nonane	P9	1.8876	2.0898	2.1643
1,1-Methylethylcyclohexane	N9	0.4050	0.4484	0.4658
i-Propylbenzene	A9	0.3454	0.3584	0.3085
i-Propylcyclohexane	N9	0.1022	0.1114	0.1033
2,2-Dimethyloctane	I10	0.0869	0.1067	0.1073
2,4-Dimethyloctane	I10	0.0765	0.0940	0.0945
2,6-Dimethyloctane	I10	0.0106	0.0130	0.0135

2,5-Dimethyloctane	I10	0.0404	0.0496	0.0499
n-Butylcyclopentane	N9	0.2447	0.2963	0.2757
3,3-Dimethyloctane	I10	0.1131	0.1389	0.1397
n-Propylbenzene	A9	0.3319	0.3443	0.2964
3,6-Dimethyloctane	I10	0.3334	0.4095	0.4116
3-Methyl-5-ethylheptane	I10	0.5305	0.5873	0.6015
1,3-Methylethylbenzene	A9	0.3483	0.3614	0.3086
1,4-Methylethylbenzene	A9	0.2385	0.2475	0.2113
1,3,5-Trimethylbenzene	A9	0.1095	0.1136	0.0977
2,3-Dimethyloctane	I10	0.0982	0.1206	0.1212
5-Methylnonane	I10	0.2358	0.2896	0.2939
1,2-Methylethylbenzene	A9	0.6127	0.6357	0.5399
2-Methylnonane	I10	0.0975	0.1197	0.1225
3-Ethyl-octane	I10	0.0633	0.0777	0.0781
3-Methylnonane	I10	0.2592	0.3183	0.3226
1,2,4-Trimethylbenzene	A9	0.0568	0.0589	0.0500
t-Butylbenzene	A10	0.5633	0.6526	0.5603
i-Butylcyclohexane	N10	0.2161	0.2617	0.2397
1t-Methyl-2-n-propylcyclohexane	I10	0.0862	0.0954	0.0977
i-Butylbenzene	A10	0.0418	0.0484	0.0422
sec-Butylbenzene	A10	0.0297	0.0344	0.0297
UnknownC9s	U9	1.8532	2.0518	2.1249
n-Decane	P10	1.5545	1.9092	1.9440
1,2,3-Trimethylbenzene	A9	0.2870	0.2978	0.2478
1,3-Methyl-i-propylbenzene	A10	0.1330	0.1380	0.1172
1,4-Methyl-i-propylbenzene	A10	0.1327	0.1377	0.1169
Sec-Butylcyclohexane	N10	0.3982	0.4822	0.4411
1,2-Methyl-i-propylbenzene	A10	0.1963	0.2274	0.1930
3-Ethyl-nonane	I10	0.0451	0.0554	0.0567
1,3-Diethylbenzene	A10	0.1925	0.2230	0.1920
1,3-Methyl-n-propylbenzene	A10	0.0548	0.0635	0.0549
1,4-Diethylbenzene	A10	0.1448	0.1678	0.1448
1,4-Methyl-n-propylbenzene	A10	0.2273	0.2633	0.2281
n-Butylbenzene	A10	0.0671	0.0777	0.0671
1,3-Dimethyl-5-ethylbenzene	A10	0.0531	0.0615	0.0529
1,2-Diethylbenzene	A10	0.1493	0.1730	0.1463
1,2-Methyl-n-propylbenzene	A10	0.1265	0.1466	0.1248
1,4-Dimethyl-2-ethylbenzene	A10	0.1762	0.2041	0.1731
1,3-Dimethyl-4-ethylbenzene	A10	0.0198	0.0229	0.0194
1,2-Dimethyl-4-ethylbenzene	A10	0.2451	0.2840	0.2416
1,3-Dimethyl-2-ethylbenzene	A10	0.1561	0.1809	0.1511
1t,2c,4-Trimethylcyclopentane	A10	0.5233	0.5069	0.5040
1,2-Dimethyl-3-ethylbenzene	A10	0.0908	0.1052	0.0877
1,2-Ethyl-i-propylbenzene	A10	0.0659	0.0764	0.0648
1,4-Methyl-t-butylbenzene	A11	0.2229	0.2583	0.2192
UnknownC10s	U10	3.0148	3.7027	3.7701
n-Undecane	P11	1.2819	1.7296	1.7367
1,4-Ethyl-i-propylbenzene	A11	0.0678	0.0786	0.0667
1,2,4,5-Tetramethylbenzene	A11	0.0607	0.0703	0.0590
1,2-Methyl-n-butylbenzene	A11	0.0860	0.0996	0.0845
1,2,3,5-Tetramethylbenzene	A11	0.0701	0.0812	0.0679
1,2-Methyl-t-butylbenzene	A11	0.1173	0.1359	0.1153
5-Methylindan	A11	0.0275	0.0404	0.0401
4-Methylindan	A11	0.0115	0.0169	0.0168
1,2-Ethyl-n-propylbenzene	A11	0.1824	0.2113	0.1793
2-Methylindan	A11	0.1073	0.1578	0.1567
1,3-Methyl-n-butylbenzene	A11	0.0939	0.1088	0.0923
1,3-Di-i-propylbenzene	A11	0.1168	0.1353	0.1148
sec-Pentylbenzene	A11	0.1179	0.1366	0.1159
n-Pentylbenzene	A11	0.0540	0.0691	0.0599
1t-M-2-(4MP)cyclopentane	P12	0.1257	0.1848	0.1835
1,2-Di-n-propylbenzene	A11	0.1242	0.1439	0.1221
1,4-Di-i-propylbenzene	A11	0.2224	0.2577	0.2187
Tetrahydronaphthalene	A10	0.1019	0.1181	0.1002
t-Decahydronaphthalene	A10	0.1605	0.1860	0.1578
Naphthalene	A10	0.1296	0.1434	0.1217
1-t-Butyl-3,5-dimethylbenzene	A12	0.0740	0.0857	0.0727
1,4-Ethyl-t-butylbenzene	A11	0.1506	0.1745	0.1481
UnknownC11s	U11	2.1000	2.8335	2.8451
n-Dodecane	P12	1.0994	1.6165	1.6053
1,3-Di-n-propylbenzene	A12	0.0938	0.1087	0.0922
1,3,5-Triethylbenzene	A12	0.0620	0.0643	0.0553
1,2,4-Triethylbenzene	A12	0.4217	0.4375	0.3714
1,4-Methyl-n-pentylbenzene	A12	0.0718	0.0832	0.0706

n-Hexylbenzene	A12	0.1462	0.2048	0.1776
1,2,3,4,5-Pentamethylbenzene	A13	0.2621	0.3037	0.2577
2-Methylnaphthalene	A11	0.2742	0.3366	0.2856
1-Methylnaphthalene	A11	0.2806	0.3444	0.2512
UnknownC12s	U12	1.6886	2.4829	2.4657
n-Tridecane	P13	0.8966	1.4268	1.4002
UnknownC13s	U13	1.5320	2.4380	2.3925
n-Tetradecane	P14	0.3859	0.6609	0.6472
UnknownC14s	U14	1.2800	2.1920	2.1467
n-Pentadecane	P15	0.3118	0.5717	0.5534
UnknownC15s	U15	1.4437	2.6472	2.5627
n-Hexadecane	P16	0.2313	0.4521	0.4348
UnknownC16s	U16	0.6585	1.2871	1.2379
n-Heptadecane	P17	0.0368	0.0764	0.0733
UnknownC17s	U17	0.3050	0.6331	0.6070
n-Octadecane	P18	0.0017	0.0037	0.0035
UnknownC18s	U18	0.0636	0.1397	0.1336
n-Nonadecane	P19	0.0021	0.0049	0.0047
UnknownC19s	U19	0.0005	0.0012	0.0011
n-Eicosane	P20	0.0018	0.0044	0.0042
n-Heneicosane	P21	0.0021	0.0054	0.0051
n-Docosane	P22	0.0032	0.0086	0.0081
n-Tricosane	P23	0.0012	0.0034	0.0032
n-Tetracosane	P24	0.0009	0.0026	0.0024
<u>TOTAL</u>		<u>100.0000</u>	<u>100.0000</u>	<u>100.0000</u>

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303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201411074	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	NOVEMBER 20, 2014
ACCOUNT NO. :		SAMPLE DATE :	NOVEMBER 14, 2014
PRODUCER :		CYLINDER NO. :	0894
LEASE NO. :		SAMPLED BY :	GALE MCENDREE - EMPACT
NAME/DESCRIP :	SEPARATOR GAS 14:20 SHULL 2-35-9-60		
FIELD DATA		SAMPLE TEMP. :	101
SAMPLE PRES. :	45	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 0.25 PPM (1-7PPM) 14:25		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0025	0.0057		
GLYCOLS	0.0004	0.0024		
HELIUM	0.02	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.04	0.05	---	---
NITROGEN	1.22	1.35	---	---
CARBON DIOXIDE	2.47	4.29	---	---
METHANE	66.91260	42.36930	---	---
ETHANE	11.3608	13.4839	3.0361	3.0527
PROPANE	9.8543	17.1517	2.7126	2.7274
I-BUTANE	1.0687	2.4518	0.3496	0.3515
N-BUTANE	3.7781	8.6676	1.1900	1.1965
I-PENTANE	0.9122	2.5892	0.3256	0.3273
N-PENTANE	1.1082	3.1560	0.4017	0.4039
HEXANES PLUS	1.2422	4.4324	0.5015	0.5042
TOTALS	100.00000	100.00000	8.5171	8.5635

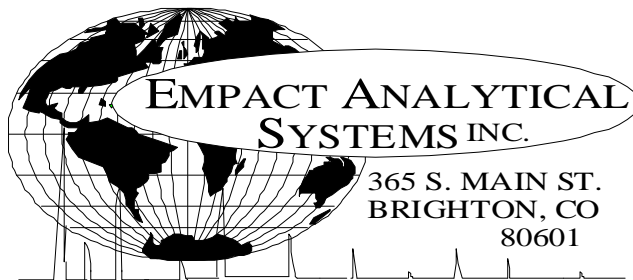
BTEX COMPONENTS	MOLE%	WT%	BTU @	14.650	14.730
BENZENE	0.0478	0.1474	LOW NET DRY REAL :	1299.3 /scf	1306.4 /scf
TOLUENE	0.0254	0.0924	NET WET REAL :	1276.6 /scf	1283.7 /scf
ETHYLBENZENE	0.0015	0.0063	HIGH GROSS DRY REAL :	1426.2 /scf	1434.0 /scf
XYLENES	0.0031	0.0130	GROSS WET REAL :	1401.3 /scf	1409.1 /scf
TOTAL BTEX	0.0778	0.2591	NET DRY REAL :	19480.2 /lb	19586.6 /lb
			GROSS DRY REAL :	21383.7 /lb	21500.5 /lb

RELATIVE DENSITY (AIR=1):	0.8737
COMPRESSIBILITY FACTOR :	0.99519

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

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

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303-637-0150

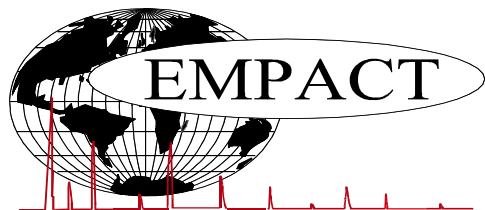
EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201411074	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	NOVEMBER 20, 2014
ACCOUNT NO. :		SAMPLE DATE :	NOVEMBER 14, 2014
PRODUCER :		CYLINDER NO. :	0894
LEASE NO. :		SAMPLED BY :	GALE MCENDREE - EMPACT
NAME/DESCRIP :	SEPARATOR GAS 14:20		
	SHULL 2-35-9-60		
FIELD DATA		SAMPLE TEMP. :	101
SAMPLE PRES. :	45	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 0.25 PPM (1-7PPM) 14:25		

Componet	Mole %	Wt %
Helium	0.02	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	2.47	4.29
Nitrogen	1.22	1.35
Methane	66.91260	42.36930
Ethane	11.3608	13.4839
Propane	9.8543	17.1517
Isobutane	1.0687	2.4518
n-Butane	3.7781	8.6676
Isopentane	0.8043	2.2905
n-Pentane	1.1082	3.1560
Cyclopentane	0.1079	0.2987
n-Hexane	0.2699	0.9181
Cyclohexane	0.0723	0.2402
Other Hexanes	0.4823	1.6276
Heptanes	0.2158	0.8476
Methycyclohexane	0.0478	0.1852
2,2,4 Trimethylpentane	0.0010	0.0045
Benzene	0.0478	0.1474
Toluene	0.0254	0.0924
Ethylbenzene	0.0015	0.0063
Xylenes	0.0031	0.0130
C8+ Heavies	0.0753	0.3501
Subtotal	99.95710	99.94190
Oxygen/Argon	0.04	0.05
Alcohols	0.0025	0.0057
Glycols	0.0004	0.0024
Total	100.00000	100.00000

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EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201411074	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	NOVEMBER 20, 2014
ACCOUNT NO. :		SAMPLE DATE :	NOVEMBER 14, 2014
PRODUCER :		CYLINDER NO. :	0894
LEASE NO. :		SAMPLED BY :	GALE MCENDREE - EMPACT
NAME/DESCRIP :	SEPARATOR GAS 14:20		
	SHULL 2-35-9-60		
FIELD DATA		SAMPLE TEMP. :	101
SAMPLE PRES. :	45	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 0.25 PPM (1-7PPM) 14:25		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.02	0.00	---	---
Hydrogen	---	0.01	0.00	---	---
Oxygen/Argon	---	0.04	0.05	---	---
Nitrogen	---	1.22	1.35	---	---
Carbon Dioxide	---	2.47	4.29	---	---
Methane	P1	66.91260	42.36930	---	---
Ethane	P2	11.3608	13.4839	3.036	3.053
Propane	P3	9.8543	17.1517	2.713	2.727
i-Butane	I4	1.0687	2.4518	0.350	0.352
n-Butane	P4	3.7781	8.6676	1.190	1.197
2,2-Dimethylpropane	I5	0.0027	0.0077	0.001	0.001
i-Pentane	I5	0.8016	2.2828	0.293	0.294
Acetone	X3	0.0025	0.0057	0.001	0.001
n-Pentane	P5	1.1082	3.1560	0.402	0.404
2,2-Dimethylbutane	I6	0.0024	0.0082	0.001	0.001
Cyclopentane	N5	0.1079	0.2987	0.032	0.032
2,3-Dimethylbutane	I6	0.0109	0.0371	0.004	0.004
2-Methylpentane	I6	0.1944	0.6613	0.080	0.081
3-Methylpentane	I6	0.1037	0.3528	0.042	0.042
n-Hexane	P6	0.2699	0.9181	0.111	0.112
2,2-Dimethylpentane	I7	0.0009	0.0036	0.000	0.000
Methylcyclopentane	N6	0.1647	0.5471	0.058	0.058
2,4-Dimethylpentane	I7	0.0058	0.0229	0.003	0.003
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0478	0.1474	0.013	0.013
3,3-Dimethylpentane	I7	0.0001	0.0004	0.000	0.000
Cyclohexane	N6	0.0723	0.2402	0.025	0.025
2-Methylhexane	I7	0.0217	0.0858	0.010	0.010
2,3-Dimethylpentane	I7	0.0137	0.0542	0.006	0.006
1,1-Dimethylcyclopentane	N7	0.0087	0.0337	0.004	0.004
3-Methylhexane	I7	0.0292	0.1155	0.013	0.013
1c,3-Dimethylcyclopentane	N7	0.0145	0.0562	0.007	0.007
1t,3-Dimethylcyclopentane	N7	0.0085	0.0330	0.004	0.004
3-Ethylpentane	I7	0.0065	0.0257	0.003	0.003
1t,2-Dimethylcyclopentane	N7	0.0337	0.1306	0.016	0.016
2,2,4-Trimethylpentane	I8	0.0010	0.0045	0.001	0.001
UnknownC6s	U6	0.0062	0.0211	0.003	0.003
n-Heptane	P7	0.0579	0.2290	0.027	0.027
1c,2-Dimethylcyclopentane	N7	0.0024	0.0093	0.001	0.001
Methylcyclohexane	N7	0.0478	0.1852	0.019	0.019
2,2-Dimethylhexane	I8	0.0029	0.0131	0.001	0.001

1,1,3-Trimethylcyclopentane	N7	0.0002	0.0009	0.000	0.000
Ethylcyclopentane	N7	0.0080	0.0310	0.003	0.003
2,5-Dimethylhexane	I8	0.0010	0.0045	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0009	0.0041	0.000	0.000
2,4-Dimethylhexane	I8	0.0010	0.0045	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0035	0.0155	0.002	0.002
3,3-Dimethylhexane	I8	0.0001	0.0004	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0043	0.0191	0.002	0.002
2,3,4-Trimethylpentane	I8	0.0002	0.0009	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0004	0.0018	0.000	0.000
Toluene	A7	0.0254	0.0924	0.008	0.008
2,3-Dimethylhexane	I8	0.0015	0.0068	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0005	0.0023	0.000	0.000
1,1,2-Trimethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
2-Methylheptane	I8	0.0067	0.0302	0.003	0.003
4-Methylheptane	I8	0.0018	0.0081	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0007	0.0032	0.000	0.000
3,4-Dimethylhexane	I8	0.0004	0.0018	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0002	0.0009	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0002	0.0009	0.000	0.000
3-Methylheptane	I8	0.0015	0.0068	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0055	0.0244	0.003	0.003
3-Ethylhexane	I8	0.0016	0.0072	0.001	0.001
1t,4-Dimethylcyclohexane	N8	0.0019	0.0084	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0005	0.0022	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0011	0.0049	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0011	0.0049	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0033	0.0146	0.002	0.002
2,2,4-Trimethylhexane	I9	0.0002	0.0010	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0025	0.0111	0.001	0.001
UnknownC7s	U7	0.0039	0.0154	0.002	0.002
n-Octane	P8	0.0051	0.0230	0.003	0.003
1c,4-Dimethylcyclohexane	N8	0.0051	0.0226	0.003	0.003
i-Propylcyclopentane	I8	0.0002	0.0009	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0002	0.0010	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0003	0.0013	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0026	0.0130	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0006	0.0030	0.000	0.000
2,4-Dimethylheptane	I9	0.0003	0.0015	0.000	0.000
4,4-Dimethylheptane	I9	0.0002	0.0010	0.000	0.000
Ethylcyclohexane	N8	0.0012	0.0053	0.001	0.001
n-Propylcyclopentane	N8	0.0003	0.0013	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0002	0.0010	0.000	0.000
2,5-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
3,3-Dimethylheptane	I9	0.0002	0.0010	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
Ethylbenzene	I8	0.0015	0.0063	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0005	0.0025	0.000	0.000
2,3-Dimethylheptane	I9	0.0002	0.0010	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0015	0.0063	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0005	0.0021	0.000	0.000
3,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0007	0.0036	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
4-Methyloctane	I9	0.0004	0.0020	0.000	0.000
2-Methyloctane	I9	0.0005	0.0025	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
3-Methyloctane	I9	0.0005	0.0025	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0011	0.0046	0.000	0.000
i-Butylcyclopentane	N9	0.0003	0.0015	0.000	0.000
UnknownC8s	U8	0.0006	0.0027	0.000	0.000
n-Nonane	P9	0.0011	0.0056	0.001	0.001

1,1-Methylethylcyclohexane	N9	0.0004	0.0020	0.000	0.000
i-Propylbenzene	A9	0.0004	0.0019	0.000	0.000
i-Propylcyclohexane	N9	0.0001	0.0005	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
3,6-Dimethyloctane	I10	0.0002	0.0011	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0002	0.0011	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	0.0001	0.0006	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0005	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0005	0.000	0.000
UnknownC9s	U9	0.0030	0.0152	0.002	0.002
n-Decane	P10	0.0003	0.0017	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0001	0.0005	0.000	0.000
UnknownC10s	U10	0.0010	0.0056	0.001	0.001
n-Undecane	P11	0.0001	0.0006	0.000	0.000
Triethylene Glycol	GL6	0.0004	0.0024	0.000	0.000
UnknownC11s	U11	0.0001	0.0006	0.000	0.000
n-Dodecane	P12	0.0001	0.0007	0.000	0.000
n-Pentadecane	P15	0.0001	0.0008	0.000	0.000
UnknownC18s	U18	0.0001	0.0010	0.000	0.000
UnknownC19s	U19	0.0001	0.0011	0.000	0.000
UnknownC20s	U20	0.0002	0.0022	0.000	0.000
TOTAL		100.00000	100.00000	8.5181	8.5645

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0478	0.1474
TOLUENE	0.0254	0.0924
ETHYLBENZENE	0.0015	0.0063
XYLENES	0.0031	0.0130
TOTAL BTEX	0.0778	0.2591

	BTU @	14.650	14.730
LOW NET DRY REAL :		1299.3 /scf	1306.4 /scf
NET WET REAL :		1276.6 /scf	1283.7 /scf
HIGH GROSS DRY REAL :		1426.2 /scf	1434.0 /scf
GROSS WET REAL :		1401.3 /scf	1409.1 /scf
NET DRY REAL :		19480.2 /lb	19586.6 /lb
GROSS DRY REAL :		21383.7 /lb	21500.5 /lb

RELATIVE DENSITY (AIR=1): 0.8737
COMPRESSIBILITY FACTOR : 0.99519

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

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

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