CRUDE OIL ASSAY

PROJECT NO. :	201403106	ANALYSIS NO. :	07
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 25, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 19, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	TANK BATTERY @ 15:00 CASTOR 5-36-9-59		EMPACT
FIELD DATA		SAMPLE TEMP. :	84
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; TK# 43606		

SPECIFICATION		TEST METHOD	UNITS	RESULTS
API GRAVITY			API 60/60	31.4
RVP @100 DEG F		D323	PSIG	4.8
TOTAL SULFUR		D2622	WT %	0.491
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				DARK BROWN, THICK
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

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

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201403106	ANALYSIS NO. :	08
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 22, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 19, 2014
PRODUCER :		CYLINDER NO. :	37177
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 14:20 CASTOR 5-36-9-59		EMPACT
FIELD DATA		SAMPLE TEMP. :	166
SAMPLE PRES. :	35	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
NITROGEN (AIR)	0.0280	0.0070	0.0065
CARBON DIOXIDE	0.0321	0.0126	0.0115
METHANE	0.2125	0.0305	0.0761
ETHANE	0.2224	0.0598	0.1256
PROPANE	0.7075	0.2788	0.4116
I-BUTANE	0.1933	0.1004	0.1335
N-BUTANE	1.0862	0.5641	0.7229
I-PENTANE	0.5425	0.3497	0.4190
N-PENTANE	0.9843	0.6345	0.7524
HEXANES PLUS	95.9912	97.9626	97.3409
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	**MOLE%**	**MASS%**
BENZENE	1.5029	1.0489
TOLUENE	3.3459	2.7546
ETHYLBENZENE	0.9988	0.9475
XYLENE	2.6279	2.4930
TOTAL BTEX	8.4755	7.2440

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

	TOTAL SAMPLE	**C6+ FRACTION**	
Specific Gravity (H2O=1) =	0.7486	0.7536	60/60
API Gravity =	57.52	56.27	60/60
Molecular Weight =	111.92	114.797	
Absolute Density =	6.24	6.28	LBS/GAL
Heating Value Liq. Idl Gas=	127183	127850	BTU/GAL
Vapor/Liquid =	21.25	20.85	CUFT/GAL
Vapor Pressure =	16.22	1.59	PSIA @100 F

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

EMPACT ANALYTICAL SYSTEMS INC.
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EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

E & P TANK / GLYCALC INFORMATION

PROJECT NO. :	201403106	ANALYSIS NO. :	08
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 22, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 19, 2014
PRODUCER :		CYLINDER NO. :	37177
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 14:20		EMPACT
	CASTOR 5-36-9-59		
FIELD DATA		SAMPLE TEMP. :	166
SAMPLE PRES. :	35	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0321		0.0126		0.0115	
NITROGEN (AIR)	0.0280		0.0070		0.0065	
METHANE	0.2125		0.0305		0.0761	
ETHANE	0.2224		0.0598		0.1256	
PROPANE	0.7075		0.2788		0.4116	
I-BUTANE	0.1933		0.1004		0.1335	
N-BUTANE	1.0862		0.5641		0.7229	
I-PENTANE	0.5425		0.3497		0.4190	
N-PENTANE	0.9843		0.6345		0.7524	
CYCLOPENTANE (N-C5)	1.2307		0.7712		0.7593	
N-HEXANE	6.2417		4.8059		5.4200	
CYCLOHEXANE (OTHER C6)	2.7676		2.0812		1.9882	
OTHER HEXANES	9.5083		7.2448		7.7482	
OTHER HEPTANES	13.3640		11.8826		12.5045	
METHYLCYCLOHEXANE (OTHER C7)	3.9780		3.4901		3.3718	
2,2,4 TRIMETHYLPENTANE	0.7458		0.6543		0.6499	
BENZENE	1.5029		1.0489		0.8892	
TOLUENE	3.3459		2.7546		2.3582	
ETHYLBENZENE	0.9988		0.9475		0.8110	
XYLENES	2.6279		2.4930		2.1342	
OTHER OCTANES	12.3477		12.5917		12.6963	
OCTANES PLUS	----	54.0521	----	63.8833	----	62.3015
NONANES	13.2976		15.0579		14.8966	
DECANES PLUS	24.0343		32.1389		31.1135	
SUB TOTAL	100.0000		100.0000		100.0000	
TOTAL	100.0000		100.0000		100.0000	

API Gravity =	**57.52**	60/60
Vapor Pressure =	**16.22**	PSIA & 100 F
Average Molecular Weight of Decanes plus =	**149.66**	
Average Specific Gravity of Decanes plus =	**0.7740**	

EMPACT ANALYTICAL SYSTEMS INC.
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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

BY CARBON NUMBER

PROJECT NO. :	201403106	ANALYSIS NO. :	08
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 22, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 19, 2014
PRODUCER :		CYLINDER NO. :	37177
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 14:20		EMPACT
	CASTOR 5-36-9-59		
FIELD DATA		SAMPLE TEMP. :	166
SAMPLE PRES. :	35	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
NITROGEN		0.0280	0.0070	0.0065
CARBON DIOXIDE		0.0321	0.0126	0.0115
	C1	0.2125	0.0305	0.0761
	C2	0.2224	0.0598	0.1256
	C3	0.7075	0.2788	0.4116
	C4	1.2795	0.6645	0.8564
	C5	2.7575	1.7554	1.9307
	C6	20.0205	15.1808	16.0456
	C7	20.6879	18.1273	18.2345
	C8	16.7202	16.6865	16.2914
	C9	13.2976	15.0579	14.8966
	C10	12.2788	15.0962	14.6605
	C11	5.8943	7.9097	7.5756
	C12	3.0934	4.4574	4.3182
	C13	1.6654	2.6781	2.6080
	C14	0.7641	1.3544	1.3280
	C15	0.3302	0.6267	0.6074
	C16	0.0081	0.0164	0.0158
	C17	0.0000	0.0000	0.0000
	C18	0.0000	0.0000	0.0000
	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

EMPACT ANALYTICAL SYSTEMS INC.
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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201403106	ANALYSIS NO. :	08
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 22, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 19, 2014
PRODUCER :		CYLINDER NO. :	37177
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 14:20		EMPACT
	CASTOR 5-36-9-59		
FIELD DATA		SAMPLE TEMP. :	166
SAMPLE PRES. :	35	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0280	0.0070	0.0065
Carbon Dioxide	NHC	0.0321	0.0126	0.0115
Methane	P1	0.2125	0.0305	0.0761
Ethane	P2	0.2224	0.0598	0.1256
Propane	P3	0.7075	0.2788	0.4116
i-Butane	I4	0.1933	0.1004	0.1335
n-Butane	P4	1.0862	0.5641	0.7229
i-Pentane	I5	0.5425	0.3497	0.4190
n-Pentane	P5	0.9843	0.6345	0.7524
2,2-Dimethylbutane	I6	0.0255	0.0196	0.0224
Cyclopentane	N5	1.2307	0.7712	0.7593
2,3-Dimethylbutane	I6	0.3330	0.2564	0.2877
2-Methylpentane	I6	3.0723	2.3658	2.6919
3-Methylpentane	I6	1.8197	1.4012	1.5678
n-Hexane	P6	6.2417	4.8059	5.4200
2,2-Dimethylpentane	I7	0.0090	0.0081	0.0089
Methylcyclopentane	N6	4.2578	3.2018	3.1784
2,4-Dimethylpentane	I7	0.2461	0.2203	0.2438
2,2,3-Trimethylbutane	I7	0.0085	0.0076	0.0082
Benzene	A6	1.5029	1.0489	0.8892
3,3-Dimethylpentane	I7	0.0204	0.0183	0.0197
Cyclohexane	N6	2.7676	2.0812	1.9882
2-Methylhexane	I7	1.0426	0.9334	1.0238
2,3-Dimethylpentane	I7	0.7895	0.7068	0.7532
1,1-Dimethylcyclopentane	N7	0.3035	0.2663	0.2625
3-Methylhexane	I7	1.6842	1.5079	1.6290
1c,3-Dimethylcyclopentane	N7	0.8169	0.7167	0.7157
1t,3-Dimethylcyclopentane	N7	0.7458	0.6543	0.6499
3-Ethylpentane	I7	0.0964	0.0863	0.0917
1t,2-Dimethylcyclopentane	N7	1.7261	1.5144	1.4990
2,2,4-Trimethylpentane	I8	0.1617	0.1650	0.1766
n-Heptane	P7	4.8911	4.3790	4.7621
1c,2-Dimethylcyclopentane	N7	0.1294	0.1135	0.1093
Methylcyclohexane	N7	3.9780	3.4901	3.3718
2,2-Dimethylhexane	I8	0.3269	0.3337	0.3567
Ethylcyclopentane	N7	0.8545	0.7497	0.7277
2,5-Dimethylhexane	I8	0.1198	0.1223	0.1311
2,2,3-Trimethylpentane	I8	0.0299	0.0305	0.0317
2,4-Dimethylhexane	I8	0.2504	0.2556	0.2726
1c,2t,4-Trimethylcyclopentane	N8	0.3833	0.3843	0.3745
3,3-Dimethylhexane	I8	0.0595	0.0607	0.0636
2,3,4-Trimethylpentane	I8	0.1075	0.1097	0.1134

2,3,3-Trimethylpentane	I8	0.0066	0.0067	0.0069
Toluene	A7	3.3459	2.7546	2.3582
2,3-Dimethylhexane	I8	0.1730	0.1766	0.1846
2-Methyl-3-ethylpentane	I8	0.2089	0.2132	0.2204
1,1,2-Trimethylcyclopentane	N8	0.0434	0.0435	0.0419
2-Methylheptane	I8	1.3215	1.3488	1.4348
4-Methylheptane	I8	0.4797	0.4896	0.5083
3-Methyl-3-ethylpentane	I8	0.1188	0.1213	0.1241
3,4-Dimethylhexane	I8	0.1229	0.1254	0.1296
1c,2c,4-Trimethylcyclopentane	N8	0.0505	0.0506	0.0488
1c,3-Dimethylcyclohexane	N8	0.0261	0.0262	0.0255
3-Methylheptane	I8	0.4328	0.4417	0.4658
1c,2t,3-Trimethylcyclopentane	N8	0.9697	0.9722	0.9389
3-Ethylhexane	I8	0.2742	0.2799	0.2921
1t,4-Dimethylcyclohexane	N8	0.5342	0.5356	0.5226
1,1-Dimethylcyclohexane	N8	0.1320	0.1323	0.1261
3t-Ethylmethylcyclopentane	N8	0.2886	0.2894	0.2809
2t-Ethylmethylcyclopentane	N8	0.2184	0.2190	0.2119
1,1-Methylethylcyclopentane	N8	0.8738	0.8761	0.8349
2,2,4-Trimethylhexane	I9	0.0640	0.0733	0.0762
1t,2-Dimethylcyclohexane	N8	0.6039	0.6055	0.5808
1t,3-Dimethylcyclohexane	N8	0.0208	0.0209	0.0198
n-Octane	P8	2.3323	2.3805	2.5202
1c,4-Dimethylcyclohexane	N8	1.1787	1.1818	1.1235
i-Propylcyclopentane	I8	0.0987	0.0990	0.0949
2,4,4-Trimethylhexane	I9	0.0244	0.0280	0.0289
2,2,3,4-Tetramethylpentane	I9	0.0166	0.0190	0.0197
2,3,4-Trimethylhexane	I9	0.0196	0.0225	0.0232
1c,2-Dimethylcyclohexane	N8	0.2166	0.2172	0.2030
2,3,5-Trimethylhexane	I9	0.0601	0.0689	0.0710
2,2-Dimethylheptane	I9	0.0189	0.0217	0.0227
1,1,4-Trimethylcyclohexane	N9	1.1815	1.3327	1.2850
2,2,3-Trimethylhexane	I9	0.4582	0.5251	0.5357
2,4-Dimethylheptane	I9	0.0575	0.0659	0.0685
4,4-Dimethylheptane	I9	0.1140	0.1306	0.1358
Ethylcyclohexane	N8	0.6954	0.6972	0.6588
n-Propylcyclopentane	N8	0.2069	0.2074	0.1987
1c,3c,5-Trimethylcyclohexane	N9	0.0732	0.0826	0.0796
2,5-Dimethylheptane	I9	0.1203	0.1379	0.1432
3,3-Dimethylheptane	I9	0.1118	0.1281	0.1330
3,5-Dimethylheptane	I9	0.1084	0.1242	0.1289
2,6-Dimethylheptane	I9	0.0776	0.0889	0.0933
1,1,3-Trimethylcyclohexane	N9	0.0697	0.0786	0.0758
Ethylbenzene	A8	0.9988	0.9475	0.8110
1c,2t,4t-Trimethylcyclohexane	N9	0.4102	0.4627	0.4376
2,3-Dimethylheptane	I9	0.4313	0.4943	0.5067
1,3-Dimethylbenzene (m-Xylene)	A8	0.8182	0.7762	0.6683
1,4-Dimethylbenzene (p-Xylene)	A8	0.8163	0.7744	0.6688
3,4-Dimethylheptane	I9	0.1110	0.1272	0.1294
3,4-Dimethylheptane (2)	I9	0.2189	0.2509	0.2553
4-Ethylheptane	I9	0.1024	0.1174	0.1221
4-Methyloctane	I9	0.3241	0.3714	0.3835
2-Methyloctane	I9	0.4713	0.5401	0.5632
1c,2t,4c-Trimethylcyclohexane	I9	0.1482	0.1698	0.1741
3-Ethylheptane	I9	0.0917	0.1051	0.1076
3-Methyloctane	I9	0.4624	0.5299	0.5471
3,3-Diethylpentane	I9	0.0671	0.0769	0.0759
1c,2t,3-Trimethylcyclohexane	N9	0.1241	0.1400	0.1324
1,1,2-Trimethylcyclohexane	N9	0.0336	0.0379	0.0358
1,2-Dimethylbenzene (o-Xylene)	A8	0.9934	0.9424	0.7971
i-Butylcyclopentane	N9	0.2806	0.3165	0.3017
UnknownC8s	U8	0.0261	0.0266	0.0282
n-Nonane	P9	1.8297	2.0969	2.1743
1,1-Methylethylcyclohexane	N9	0.8642	0.9904	1.0300
i-Propylbenzene	A9	0.3841	0.4125	0.3555
i-Propylcyclohexane	N9	0.1562	0.1762	0.1635
2,2-Dimethyloctane	I10	0.0523	0.0665	0.0669
2,4-Dimethyloctane	I10	0.0943	0.1199	0.1207
2,6-Dimethyloctane	I10	0.0127	0.0161	0.0167
2,5-Dimethyloctane	I10	0.0458	0.0582	0.0586
n-Butylcyclopentane	N9	0.2390	0.2995	0.2790
3,3-Dimethyloctane	I10	0.1922	0.2443	0.2460
n-Propylbenzene	A9	0.4393	0.4718	0.4067
3,6-Dimethyloctane	I10	0.3116	0.3961	0.3987

3-Methyl-5-ethylheptane	I10	0.6206	0.7112	0.7293
1,3-Methylethylbenzene	A9	0.4809	0.5165	0.4415
1,4-Methylethylbenzene	A9	0.1854	0.1991	0.1702
1,3,5-Trimethylbenzene	A9	0.1742	0.1871	0.1610
2,3-Dimethyloctane	I10	0.1106	0.1406	0.1415
5-Methylnonane	I10	0.2672	0.3397	0.3451
1,2-Methylethylbenzene	A9	0.3484	0.3742	0.3182
2-Methylnonane	I10	0.1459	0.1855	0.1900
3-Ethyloctane	I10	0.0733	0.0932	0.0938
3-Methylnonane	I10	0.2507	0.3187	0.3234
1,2,4-Trimethylbenzene	A9	0.0501	0.0538	0.0457
t-Butylbenzene	A10	0.2753	0.3302	0.2838
i-Butylcyclohexane	N10	0.2820	0.3534	0.3241
1t-Methyl-2-n-propylcyclohexane	I10	0.1511	0.1732	0.1776
i-Butylbenzene	A10	0.0732	0.0878	0.0766
sec-Butylbenzene	A10	0.1482	0.1777	0.1536
UnknownC9s	U9	2.0649	2.3664	2.4537
n-Decane	P10	1.4442	1.8360	1.8717
1,2,3-Trimethylbenzene	A9	0.2285	0.2454	0.2044
1,3-Methyl-i-propylbenzene	A10	0.1142	0.1226	0.1042
1,4-Methyl-i-propylbenzene	A10	0.1502	0.1613	0.1372
Sec-Butylcyclohexane	N10	0.4221	0.5290	0.4845
1,2-Methyl-i-propylbenzene	A10	0.1745	0.2093	0.1778
3-Ethylnonane	I10	0.0501	0.0637	0.0653
1,3-Diethylbenzene	A10	0.2050	0.2458	0.2119
1,3-Methyl-n-propylbenzene	A10	0.0988	0.1185	0.1025
1,4-Diethylbenzene	A10	0.1950	0.2339	0.2021
1,4-Methyl-n-propylbenzene	A10	0.1443	0.1731	0.1501
n-Butylbenzene	A10	0.1793	0.2150	0.1858
1,3-Dimethyl-5-ethylbenzene	A10	0.0871	0.1045	0.0900
1,2-Diethylbenzene	A10	0.1285	0.1541	0.1305
1,2-Methyl-n-propylbenzene	A10	0.1339	0.1606	0.1369
1,4-Dimethyl-2-ethylbenzene	A10	0.1384	0.1660	0.1409
1,3-Dimethyl-4-ethylbenzene	A10	0.0895	0.1073	0.0912
1,2-Dimethyl-4-ethylbenzene	A10	0.2702	0.3240	0.2759
1,3-Dimethyl-2-ethylbenzene	A10	0.0624	0.0748	0.0626
1t,2c,4-Trimethylcyclopentane	A10	0.5128	0.5141	0.5118
1,2-Dimethyl-3-ethylbenzene	A10	0.0730	0.0875	0.0730
1,2-Ethyl-i-propylbenzene	A10	0.0862	0.1034	0.0878
1,4-Methyl-t-butylbenzene	A11	0.2273	0.2726	0.2316
UnknownC10s	U10	4.0764	5.1823	5.2831
n-Undecane	P11	1.0951	1.5295	1.5376
1,4-Ethyl-i-propylbenzene	A11	0.1348	0.1617	0.1374
1,2,4,5-Tetramethylbenzene	A11	0.0805	0.0965	0.0811
1,2-Methyl-n-butylbenzene	A11	0.0679	0.0814	0.0692
1,2,3,5-Tetramethylbenzene	A11	0.1180	0.1415	0.1184
1,2-Methyl-t-butylbenzene	A11	0.0758	0.0909	0.0772
5-Methylindan	A11	0.0248	0.0377	0.0375
4-Methylindan	A11	0.0185	0.0282	0.0280
1,2-Ethyl-n-propylbenzene	A11	0.0917	0.1100	0.0935
2-Methylindan	A11	0.0781	0.1189	0.1182
1,3-Methyl-n-butylbenzene	A11	0.0680	0.0816	0.0693
1,3-Di-i-propylbenzene	A11	0.0901	0.1081	0.0918
sec-Pentylbenzene	A11	0.1296	0.1554	0.1320
n-Pentylbenzene	A11	0.1241	0.1644	0.1426
1t-M-2-(4MP)cyclopentane	P12	0.0142	0.0216	0.0215
1,2-Di-n-propylbenzene	A11	0.0938	0.1125	0.0956
1,4-Di-i-propylbenzene	A11	0.2024	0.2427	0.2062
Tetrahydronaphthalene	A10	0.0087	0.0104	0.0088
t-Decahydronaphthalene	A10	0.2256	0.2706	0.2299
Naphthalene	A10	0.1014	0.1161	0.0986
1-t-Butyl-3,5-dimethylbenzene	A12	0.1007	0.1208	0.1026
1,4-Ethyl-t-butylbenzene	A11	0.1173	0.1407	0.1195
UnknownC11s	U11	2.7915	3.8987	3.9194
n-Dodecane	P12	0.7742	1.1783	1.1715
1,3-Di-n-propylbenzene	A12	0.0213	0.0255	0.0217
1,3,5-Triethylbenzene	A12	0.0571	0.0613	0.0527
1,2,4-Triethylbenzene	A12	0.3448	0.3703	0.3147
1,4-Methyl-n-pentylbenzene	A12	0.0756	0.0907	0.0771
n-Hexylbenzene	A12	0.0968	0.1404	0.1219
1,2,3,4,5-Pentamethylbenzene	A13	0.1459	0.1750	0.1487
2-Methylnaphthalene	A11	0.1559	0.1981	0.1683
1-Methylnaphthalene	A11	0.1091	0.1386	0.1012
UnknownC12s	U12	1.6087	2.4485	2.4345

n-Tridecane	P13	0.3774	0.6217	0.6108
UnknownC13s	U13	1.1421	1.8814	1.8485
n-Tetradecane	P14	0.1036	0.1836	0.1800
UnknownC14s	U14	0.6605	1.1708	1.1480
n-Pentadecane	P15	0.0277	0.0526	0.0510
UnknownC15s	U15	0.3025	0.5741	0.5564
n-Hexadecane	P16	0.0081	0.0164	0.0158
TOTAL		100.0000	100.0000	100.0000

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

303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201403106	ANALYSIS NO. :	09
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 31, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 19, 2014
PRODUCER :		CYLINDER NO. :	0750
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 14:40 CASTOR 5-36-9-59		
FIELD DATA		SAMPLE TEMP. :	115
SAMPLE PRES. :	60	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 4PPM (1-7PPM) @ 14:45		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0004	0.0012		
HELIUM	0.02	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.01	0.01	---	---
NITROGEN	1.05	1.16	---	---
CARBON DIOXIDE	2.34	4.07	---	---
METHANE	67.78640	42.98600	---	---
ETHANE	11.0760	13.1649	2.9598	2.9760
PROPANE	9.3292	16.2613	2.5682	2.5822
I-BUTANE	1.0154	2.3329	0.3315	0.3334
N-BUTANE	3.7465	8.6076	1.1799	1.1864
I-PENTANE	0.9410	2.6738	0.3356	0.3374
N-PENTANE	1.1780	3.3596	0.4267	0.4290
HEXANES PLUS	1.4971	5.3727	0.5986	0.6018
TOTALS	100.00000	100.00000	8.4003	8.4462

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0662	0.2044
TOLUENE	0.0348	0.1268
ETHYLBENZENE	0.0028	0.0117
XYLENES	0.0050	0.0210
TOTAL BTEX	0.1088	0.3639

BTU @		14.650	14.730
LOW	NET DRY REAL :	1302.8 **/scf**	1309.9 **/scf**
	NET WET REAL :	1280.0 **/scf**	1287.2 **/scf**
HIGH	GROSS DRY REAL :	1429.9 **/scf**	1437.8 **/scf**
	GROSS WET REAL :	1404.9 **/scf**	1412.8 **/scf**
	NET DRY REAL :	19570.0 **/lb**	19676.9 **/lb**
	GROSS DRY REAL :	21480.7 **/lb**	21598.0 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8731
	COMPRESSIBILITY FACTOR :		0.99524

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

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

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

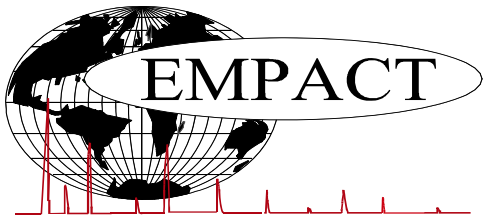
303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201403106	ANALYSIS NO. :	09
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 31, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 19, 2014
PRODUCER :		CYLINDER NO. :	0750
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 14:40 CASTOR 5-36-9-59		
FIELD DATA		SAMPLE TEMP. :	115
SAMPLE PRES. :	60	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 4PPM (1-7PPM) @ 14:45		

Componet	Mole %	Wt %
Helium	0.02	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	2.34	4.07
Nitrogen	1.05	1.16
Methane	67.78640	42.98600
Ethane	11.0760	13.1649
Propane	9.3292	16.2613
Isobutane	1.0154	2.3329
n-Butane	3.7465	8.6076
Isopentane	0.8169	2.3297
n-Pentane	1.1780	3.3596
Cyclopentane	0.1241	0.3441
n-Hexane	0.3201	1.0904
Cyclohexane	0.0890	0.2961
Other Hexanes	0.5446	1.8398
Heptanes	0.2773	1.0924
Methycyclohexane	0.0583	0.2263
2,2,4 Trimethylpentane	0.0002	0.0009
Benzene	0.0662	0.2044
Toluene	0.0348	0.1268
Ethylbenzene	0.0028	0.0117
Xylenes	0.0050	0.0210
C8+ Heavies	0.0988	0.4629
Subtotal	99.98960	99.98880
Oxygen/Argon	0.01	0.01
Alcohols	0.0004	0.0012
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201403106	ANALYSIS NO. :	09
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 31, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 19, 2014
PRODUCER :		CYLINDER NO. :	0750
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 14:40 CASTOR 5-36-9-59		
FIELD DATA		SAMPLE TEMP. :	115
SAMPLE PRES. :	60	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 4PPM (1-7PPM) @ 14:45		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.02	0.00	---	---
Hydrogen	---	0.01	0.00	---	---
Oxygen/Argon	---	0.01	0.01	---	---
Nitrogen	---	1.05	1.16	---	---
Carbon Dioxide	---	2.34	4.07	---	---
Methane	P1	67.78640	42.98600	---	---
Ethane	P2	11.0760	13.1649	2.960	2.976
Propane	P3	9.3292	16.2613	2.568	2.582
i-Butane	I4	1.0154	2.3329	0.332	0.333
n-Butane	P4	3.7465	8.6076	1.180	1.186
2,2-Dimethylpropane	I5	0.0032	0.0091	0.001	0.001
i-Pentane	I5	0.8137	2.3206	0.298	0.299
n-Pentane	P5	1.1779	3.3593	0.427	0.429
t-Butanol	X4	0.0004	0.0012	0.000	0.000
2,2-Dimethylbutane	I6	0.0027	0.0092	0.001	0.001
Cyclopentane	N5	0.1241	0.3441	0.037	0.037
2,3-Dimethylbutane	I6	0.0191	0.0651	0.008	0.008
2-Methylpentane	I6	0.2178	0.7419	0.090	0.091
3-Methylpentane	I6	0.1127	0.3839	0.046	0.046
UnknownC5s	U5	0.0001	0.0003	0.000	0.000
n-Hexane	P6	0.3201	1.0904	0.131	0.132
2,2-Dimethylpentane	I7	0.0001	0.0004	0.000	0.000
Methylcyclopentane	N6	0.1923	0.6397	0.068	0.069
2,4-Dimethylpentane	I7	0.0076	0.0301	0.004	0.004
2,2,3-Trimethylbutane	I7	0.0002	0.0008	0.000	0.000
Benzene	A6	0.0662	0.2044	0.018	0.018
3,3-Dimethylpentane	I7	0.0003	0.0012	0.000	0.000
Cyclohexane	N6	0.0890	0.2961	0.030	0.030
2-Methylhexane	I7	0.0332	0.1315	0.015	0.015
2,3-Dimethylpentane	I7	0.0161	0.0638	0.007	0.007
1,1-Dimethylcyclopentane	N7	0.0062	0.0241	0.003	0.003
3-Methylhexane	I7	0.0389	0.1541	0.018	0.018
1c,3-Dimethylcyclopentane	N7	0.0195	0.0757	0.009	0.009
1t,3-Dimethylcyclopentane	N7	0.0170	0.0660	0.008	0.008
3-Ethylpentane	I7	0.0027	0.0107	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0385	0.1494	0.018	0.018
2,2,4-Trimethylpentane	I8	0.0002	0.0009	0.000	0.000
n-Heptane	P7	0.0800	0.3169	0.037	0.037
1c,2-Dimethylcyclopentane	N7	0.0029	0.0113	0.001	0.001
Methylcyclohexane	N7	0.0583	0.2263	0.023	0.023
1,1,3-Trimethylcyclopentane	N7	0.0029	0.0129	0.001	0.001
Ethylcyclopentane	N7	0.0112	0.0435	0.005	0.005
2,5-Dimethylhexane	I8	0.0014	0.0063	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0003	0.0013	0.000	0.000
2,4-Dimethylhexane	I8	0.0027	0.0122	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0046	0.0204	0.002	0.002
3,3-Dimethylhexane	I8	0.0003	0.0013	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0054	0.0240	0.002	0.002

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2,3,4-Trimethylpentane	I8	0.0011	0.0050	0.001	0.001
Toluene	A7	0.0348	0.1268	0.012	0.012
2,3-Dimethylhexane	I8	0.0019	0.0086	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0014	0.0063	0.001	0.001
2-Methylheptane	I8	0.0107	0.0483	0.006	0.006
4-Methylheptane	I8	0.0029	0.0131	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0004	0.0018	0.000	0.000
3,4-Dimethylhexane	I8	0.0003	0.0013	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0003	0.0013	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0001	0.0004	0.000	0.000
3-Methylheptane	I8	0.0048	0.0217	0.002	0.002
1c,2t,3-Trimethylcyclopentane	N8	0.0059	0.0262	0.003	0.003
3-Ethylhexane	I8	0.0008	0.0036	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0020	0.0089	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0008	0.0036	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0017	0.0076	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0014	0.0062	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0047	0.0208	0.002	0.002
2,2,4-Trimethylhexane	I9	0.0002	0.0010	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0029	0.0129	0.001	0.001
n-Octane	P8	0.0138	0.0623	0.007	0.007
1c,4-Dimethylcyclohexane	N8	0.0011	0.0049	0.001	0.001
i-Propylcyclopentane	I8	0.0003	0.0013	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0002	0.0010	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	0.0007	0.0031	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0032	0.0160	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0012	0.0061	0.001	0.001
2,4-Dimethylheptane	I9	0.0006	0.0030	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
Ethylcyclohexane	N8	0.0018	0.0080	0.001	0.001
n-Propylcyclopentane	N8	0.0006	0.0027	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,5-Dimethylheptane	I9	0.0002	0.0010	0.000	0.000
3,3-Dimethylheptane	I9	0.0002	0.0010	0.000	0.000
3,5-Dimethylheptane	I9	0.0002	0.0010	0.000	0.000
2,6-Dimethylheptane	I9	0.0002	0.0010	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0003	0.0015	0.000	0.000
Ethylbenzene	I8	0.0028	0.0117	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0004	0.0020	0.000	0.000
2,3-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0021	0.0088	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0016	0.0067	0.001	0.001
3,4-Dimethylheptane	I9	0.0005	0.0025	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0004	0.0020	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
4-Methyloctane	I9	0.0006	0.0030	0.000	0.000
2-Methyloctane	I9	0.0007	0.0036	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0002	0.0010	0.000	0.000
3-Ethylheptane	I9	0.0002	0.0010	0.000	0.000
3-Methyloctane	I9	0.0008	0.0041	0.000	0.000
1,1,2-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
3,3-Diethylpentane	I9	0.0001	0.0005	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0013	0.0055	0.000	0.000
i-Butylcyclopentane	N9	0.0005	0.0025	0.000	0.000
n-Nonane	P9	0.0018	0.0091	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0002	0.0010	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
2,2-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Butylcyclopentane	N9	0.0003	0.0015	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	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	0.0002	0.0010	0.000	0.000

t-Butylbenzene	A10	0.0002	0.0011	0.000	0.000
UnknownC9s	U9	0.0021	0.0106	0.001	0.001
n-Decane	P10	0.0002	0.0011	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0001	0.0005	0.000	0.000
UnknownC10s	U10	0.0006	0.0034	0.000	0.000
n-Undecane	P11	0.0001	0.0006	0.000	0.000
1,3-Di-n-propylbenzene	A12	0.0001	0.0006	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-Tridecane	P13	0.0001	0.0007	0.000	0.000
n-Tetradecane	P14	0.0004	0.0031	0.000	0.000
UnknownC14s	U14	0.0001	0.0008	0.000	0.000
n-Pentadecane	P15	0.0004	0.0034	0.000	0.000
UnknownC15s	U15	0.0004	0.0034	0.000	0.000
n-Hexadecane	P16	0.0003	0.0027	0.000	0.000
UnknownC16s	U16	0.0001	0.0009	0.000	0.000
n-Heptadecane	P17	0.0001	0.0010	0.000	0.000
UnknownC18s	U18	0.0001	0.0010	0.000	0.000
TOTAL		100.00000	100.00000	8.4003	8.4462

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0662	0.2044
TOLUENE	0.0348	0.1268
ETHYLBENZENE	0.0028	0.0117
XYLENES	0.0050	0.0210
TOTAL BTEX	0.1088	0.3639

	BTU @	14.650		14.730
LOW	NET DRY REAL :	1302.8	**/scf**	1309.9 **/scf**
	NET WET REAL :	1280.0	**/scf**	1287.2 **/scf**
HIGH	GROSS DRY REAL :	1429.9	**/scf**	1437.8 **/scf**
	GROSS WET REAL :	1404.9	**/scf**	1412.8 **/scf**
	NET DRY REAL :	19570.0	**/lb**	19676.9 **/lb**
	GROSS DRY REAL :	21480.7	**/lb**	21598.0 **/lb**

RELATIVE DENSITY (AIR=1): 0.8731

COMPRESSIBILITY FACTOR : 0.99524

(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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