CRUDE OIL ASSAY

PROJECT NO. :	201403015	ANALYSIS NO. :	07
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 6, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	TANK BATTERY @ 15:50 BAILEY 6-26-8-60		EMPACT
FIELD DATA		SAMPLE TEMP. :	89
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; TK# 52616		

SPECIFICATION		TEST METHOD	UNITS	RESULTS
API GRAVITY			API 60/60	36.3
RVP @100 DEG F		D323	PSIG	6.6
TOTAL SULFUR		D2622	WT %	N/A
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				RED/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

EMPACT ANALYTICAL SYSTEMS INC.
365 S. MAIN ST.
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80601

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201403015	ANALYSIS NO. :	08
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 6, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	10411
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 15:10 BAILEY 6-26-8-60		EMPACT
FIELD DATA		SAMPLE TEMP. :	162
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
ALCOHOLS	0.0024	0.0017	0.0016
NITROGEN (AIR)	0.0562	0.0148	0.0135
CARBON DIOXIDE	0.0171	0.0071	0.0064
METHANE	0.0452	0.0068	0.0167
ETHANE	0.3240	0.0916	0.1899
PROPANE	1.4683	0.6085	0.8864
I-BUTANE	0.4144	0.2263	0.2969
N-BUTANE	2.1053	1.1498	1.4541
I-PENTANE	0.9688	0.6568	0.7769
N-PENTANE	1.6078	1.0901	1.2756
HEXANES PLUS	92.9905	96.1465	95.0820
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	**MOLE%**	**MASS%**
BENZENE	1.4861	1.0908
TOLUENE	2.9717	2.5730
ETHYLBENZENE	0.4913	0.4902
XYLENE	2.0288	2.0242
TOTAL BTEX	6.9779	6.1782

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

	TOTAL SAMPLE	**C6+ FRACTION**	
Specific Gravity (H2O=1) =	0.7389	0.7471	60/60
API Gravity =	60	57.9	60/60
Molecular Weight =	106.42	110.665	
Absolute Density =	6.16	6.23	LBS/GAL
Heating Value Liq. Idl Gas=	125343	126961	BTU/GAL
Vapor/Liquid =	21.97	21.43	CUFT/GAL
Vapor Pressure =	11.23	1.85	PSIA @100 F

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

EMPACT ANALYTICAL SYSTEMS INC.
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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

E & P TANK / GLYCALC INFORMATION

PROJECT NO. :	201403015	ANALYSIS NO. :	08
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 6, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	10411
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 15:10 BAILEY 6-26-8-60		EMPACT
FIELD DATA		SAMPLE TEMP. :	162
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0171		0.0071		0.0064	
NITROGEN (AIR)	0.0562		0.0148		0.0135	
METHANE	0.0452		0.0068		0.0167	
ETHANE	0.3240		0.0916		0.1899	
PROPANE	1.4683		0.6085		0.8864	
I-BUTANE	0.4144		0.2263		0.2969	
N-BUTANE	2.1053		1.1498		1.4541	
I-PENTANE	0.9688		0.6568		0.7769	
N-PENTANE	1.6078		1.0901		1.2756	
CYCLOPENTANE (N-C5)	1.4559		0.9594		0.9321	
N-HEXANE	7.1831		5.8173		6.4730	
CYCLOHEXANE (OTHER C6)	3.0828		2.4380		2.2982	
OTHER HEXANES	11.2995		9.0596		9.5900	
OTHER HEPTANES	14.6642		13.7111		14.2385	
METHYLCYCLOHEXANE (OTHER C7)	4.7573		4.3895		4.1846	
2,2,4 TRIMETHYLPENTANE	0.9229		0.8515		0.8346	
BENZENE	1.4861		1.0908		0.9125	
TOLUENE	2.9717		2.5730		2.1736	
ETHYLBENZENE	0.4913		0.4902		0.4140	
XYLENES	2.0288		2.0242		1.7116	
OTHER OCTANES	12.4761		13.4141		13.4192	
OCTANES PLUS	----	46.0899	----	56.1078	----	54.2795
NONANES	12.0851		14.4285		14.1708	
DECANES PLUS	18.0857		24.8993		23.7293	
SUB TOTAL	99.9976		99.9983		99.9984	
ALCOHOLS	0.0024		0.0017		0.0016	
TOTAL	100.0000		100.0000		100.0000	

API Gravity =	**60.00**	60/60
Vapor Pressure =	**11.23**	PSIA & 100 F
Average Molecular Weight of Decanes plus =	**146.51**	
Average Specific Gravity of Decanes plus =	**0.7730**	

EMPACT ANALYTICAL SYSTEMS INC.
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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

BY CARBON NUMBER

PROJECT NO. :	201403015	ANALYSIS NO. :	08
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 6, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	10411
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 15:10		EMPACT
	BAILEY 6-26-8-60		
FIELD DATA		SAMPLE TEMP. :	162
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
ALCOHOLS		0.0024	0.0017	0.0016
NITROGEN		0.0562	0.0148	0.0135
CARBON DIOXIDE		0.0171	0.0071	0.0064
	C1	0.0452	0.0068	0.0167
	C2	0.3240	0.0916	0.1899
	C3	1.4683	0.6085	0.8864
	C4	2.5197	1.3761	1.7510
	C5	4.0325	2.7063	2.9846
	C6	23.0515	18.4057	19.2737
	C7	22.3932	20.6736	20.5967
	C8	15.9191	16.7800	16.3794
	C9	12.0851	14.4285	14.1708
	C10	10.4338	13.4959	12.9293
	C11	4.1414	5.7869	5.4129
	C12	2.2528	3.4093	3.2632
	C13	0.8318	1.4042	1.3484
	C14	0.3668	0.6839	0.6617
	C15	0.0503	0.1004	0.0961
	C16	0.0088	0.0187	0.0177
	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. :	201403015	ANALYSIS NO. :	08
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 6, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	10411
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 15:10 BAILEY 6-26-8-60		EMPACT
FIELD DATA		SAMPLE TEMP. :	162
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0562	0.0148	0.0135
Carbon Dioxide	NHC	0.0171	0.0071	0.0064
Methane	P1	0.0452	0.0068	0.0167
Ethane	P2	0.3240	0.0916	0.1899
Propane	P3	1.4683	0.6085	0.8864
i-Butane	I4	0.4144	0.2263	0.2969
n-Butane	P4	2.1053	1.1498	1.4541
2,2-Dimethylpropane	I5	0.0086	0.0058	0.0072
i-Pentane	I5	0.9602	0.6510	0.7697
n-Pentane	P5	1.6078	1.0901	1.2756
t-Butanol	X4	0.0024	0.0017	0.0016
2,2-Dimethylbutane	I6	0.0560	0.0453	0.0512
Cyclopentane	N5	1.4559	0.9594	0.9321
2,3-Dimethylbutane	I6	0.4061	0.3289	0.3642
2-Methylpentane	I6	3.8020	3.0790	3.4571
3-Methylpentane	I6	2.2385	1.8128	2.0015
n-Hexane	P6	7.1831	5.8173	6.4730
2,2-Dimethylpentane	I7	0.0255	0.0240	0.0260
Methylcyclopentane	N6	4.7969	3.7936	3.7160
2,4-Dimethylpentane	I7	0.3093	0.2912	0.3180
2,2,3-Trimethylbutane	I7	0.0471	0.0443	0.0471
Benzene	A6	1.4861	1.0908	0.9125
3,3-Dimethylpentane	I7	0.0348	0.0328	0.0348
Cyclohexane	N6	3.0828	2.4380	2.2982
2-Methylhexane	I7	1.2150	1.1440	1.2382
2,3-Dimethylpentane	I7	0.8493	0.7997	0.8409
1,1-Dimethylcyclopentane	N7	0.5047	0.4657	0.4530
3-Methylhexane	I7	1.8168	1.7106	1.8236
1c,3-Dimethylcyclopentane	N7	1.0169	0.9383	0.9246
1t,3-Dimethylcyclopentane	N7	0.9229	0.8515	0.8346
3-Ethylpentane	I7	0.1466	0.1380	0.1447
1t,2-Dimethylcyclopentane	N7	1.9027	1.7556	1.7148
2,2,4-Trimethylpentane	I8	0.1067	0.1145	0.1210
n-Heptane	P7	5.0886	4.7913	5.1416
1c,2-Dimethylcyclopentane	N7	0.1735	0.1601	0.1522

Methylcyclohexane	N7	4.7573	4.3895	4.1846
2,2-Dimethylhexane	I8	0.6820	0.7321	0.7723
Ethylcyclopentane	N7	0.5717	0.5275	0.5052
2,5-Dimethylhexane	I8	0.1525	0.1637	0.1731
2,2,3-Trimethylpentane	I8	0.0230	0.0247	0.0253
2,4-Dimethylhexane	I8	0.2784	0.2988	0.3145
1c,2t,4-Trimethylcyclopentane	N8	0.4608	0.4859	0.4673
3,3-Dimethylhexane	I8	0.0721	0.0774	0.0800
2,3,4-Trimethylpentane	I8	0.1175	0.1261	0.1286
2,3,3-Trimethylpentane	I8	0.0025	0.0027	0.0027
Toluene	A7	2.9717	2.5730	2.1736
2,3-Dimethylhexane	I8	0.2493	0.2676	0.2760
2-Methyl-3-ethylpentane	I8	0.1708	0.1833	0.1870
1,1,2-Trimethylcyclopentane	N8	0.0077	0.0081	0.0077
2-Methylheptane	I8	1.3531	1.4524	1.5246
4-Methylheptane	I8	0.5086	0.5459	0.5592
3-Methyl-3-ethylpentane	I8	0.1123	0.1205	0.1217
3,4-Dimethylhexane	I8	0.1175	0.1261	0.1286
1c,2c,4-Trimethylcyclopentane	N8	0.0389	0.0410	0.0390
1c,3-Dimethylcyclohexane	N8	0.0449	0.0473	0.0453
3-Methylheptane	I8	0.5727	0.6147	0.6397
1c,2t,3-Trimethylcyclopentane	N8	1.1331	1.1948	1.1387
3-Ethylhexane	I8	0.2266	0.2432	0.2504
1t,4-Dimethylcyclohexane	N8	0.6754	0.7122	0.6857
1,1-Dimethylcyclohexane	N8	0.1511	0.1593	0.1498
3c-Ethylmethylcyclopentane	N8	0.0055	0.0058	0.0056
3t-Ethylmethylcyclopentane	N8	0.1975	0.2082	0.1994
2t-Ethylmethylcyclopentane	N8	0.1553	0.1638	0.1564
1,1-Methylethylcyclopentane	N8	0.5785	0.6100	0.5736
2,2,4-Trimethylhexane	I9	0.0669	0.0806	0.0827
1t,2-Dimethylcyclohexane	N8	0.6997	0.7378	0.6984
1t,3-Dimethylcyclohexane	N8	0.0084	0.0089	0.0083
UnknownC7s	U7	0.0388	0.0365	0.0392
n-Octane	P8	2.4575	2.6379	2.7558
1c,4-Dimethylcyclohexane	N8	0.8435	0.8894	0.8343
i-Propylcyclopentane	I8	0.0850	0.0896	0.0847
2,4,4-Trimethylhexane	I9	0.0266	0.0321	0.0326
2,2,3,4-Tetramethylpentane	I9	0.0198	0.0239	0.0244
2,3,4-Trimethylhexane	I9	0.0272	0.0328	0.0334
1c,2-Dimethylcyclohexane	N8	0.2412	0.2543	0.2346
2,3,5-Trimethylhexane	I9	0.0908	0.1094	0.1113
2,2-Dimethylheptane	I9	0.0205	0.0247	0.0255
1,1,4-Trimethylcyclohexane	N9	1.0141	1.2030	1.1446
2,2,3-Trimethylhexane	I9	0.5152	0.6209	0.6251
2,4-Dimethylheptane	I9	0.0421	0.0507	0.0520
4,4-Dimethylheptane	I9	0.0841	0.1014	0.1041
Ethylcyclohexane	N8	0.5809	0.6125	0.5711
n-Propylcyclopentane	N8	0.2417	0.2549	0.2410
1c,3c,5-Trimethylcyclohexane	N9	0.0542	0.0643	0.0612
2,5-Dimethylheptane	I9	0.0881	0.1062	0.1088
3,3-Dimethylheptane	I9	0.1015	0.1223	0.1253
3,5-Dimethylheptane	I9	0.0678	0.0817	0.0837
2,6-Dimethylheptane	I9	0.0548	0.0661	0.0685
1,1,3-Trimethylcyclohexane	N9	0.1005	0.1192	0.1134
Ethylbenzene	A8	0.4913	0.4902	0.4140
1c,2t,4t-Trimethylcyclohexane	N9	0.4473	0.5306	0.4952
2,3-Dimethylheptane	I9	0.0092	0.0111	0.0112
1,3-Dimethylbenzene (m-Xylene)	A8	0.4493	0.4483	0.3809
1,4-Dimethylbenzene (p-Xylene)	A8	0.8775	0.8755	0.7461
3,4-Dimethylheptane	I9	0.2536	0.3056	0.3068
3,4-Dimethylheptane (2)	I9	0.2084	0.2512	0.2522
4-Ethylheptane	I9	0.0450	0.0542	0.0556
4-Methyloctane	I9	0.2691	0.3243	0.3304
2-Methyloctane	I9	0.3830	0.4616	0.4750
1c,2t,4c-Trimethylcyclohexane	I9	0.0913	0.1100	0.1113
3-Ethylheptane	I9	0.1009	0.1216	0.1229
3-Methyloctane	I9	0.4732	0.5703	0.5810

3,3-Diethylpentane	I9	0.0688	0.0829	0.0807
1c,2t,3-Trimethylcyclohexane	N9	0.1091	0.1294	0.1208
1,1,2-Trimethylcyclohexane	N9	0.0477	0.0566	0.0528
1,2-Dimethylbenzene (o-Xylene)	A8	0.7020	0.7004	0.5846
i-Butylcyclopentane	N9	0.2402	0.2849	0.2679
UnknownC8s	U8	0.0468	0.0502	0.0524
n-Nonane	P9	1.7593	2.1204	2.1696
1,1-Methylethylcyclohexane	N9	0.5923	0.7139	0.7326
i-Propylbenzene	A9	0.3533	0.3990	0.3393
i-Propylcyclohexane	N9	0.1259	0.1494	0.1368
2,2-Dimethyloctane	I10	0.0666	0.0890	0.0884
2,4-Dimethyloctane	I10	0.0972	0.1300	0.1291
2,6-Dimethyloctane	I10	0.0143	0.0191	0.0196
2,5-Dimethyloctane	I10	0.0397	0.0531	0.0527
n-Butylcyclopentane	N9	0.2306	0.3040	0.2795
3,3-Dimethyloctane	I10	0.1252	0.1674	0.1664
n-Propylbenzene	A9	0.0607	0.0686	0.0583
3,6-Dimethyloctane	I10	0.2065	0.2761	0.2742
3-Methyl-5-ethylheptane	I10	0.3713	0.4475	0.4528
1,3-Methylethylbenzene	A9	0.2812	0.3176	0.2679
1,4-Methylethylbenzene	A9	0.1268	0.1432	0.1208
1,3,5-Trimethylbenzene	A9	0.1501	0.1695	0.1440
2,3-Dimethyloctane	I10	0.0641	0.0857	0.0851
5-Methylnonane	I10	0.2612	0.3492	0.3501
1,2-Methylethylbenzene	A9	0.3592	0.4057	0.3404
2-Methylnonane	I10	0.1551	0.2074	0.2097
3-Ethyloctane	I10	0.1049	0.1403	0.1393
3-Methylnonane	I10	0.1529	0.2044	0.2047
1,2,4-Trimethylbenzene	A9	0.0210	0.0237	0.0199
t-Butylbenzene	A10	0.4146	0.5229	0.4436
i-Butylcyclohexane	N10	0.2665	0.3513	0.3179
1t-Methyl-2-n-propylcyclohexane	I10	0.1193	0.1438	0.1455
i-Butylbenzene	A10	0.0672	0.0848	0.0730
sec-Butylbenzene	A10	0.1090	0.1375	0.1173
UnknownC9s	U9	2.6431	3.1856	3.2594
n-Decane	P10	1.4650	1.9587	1.9704
1,2,3-Trimethylbenzene	A9	0.2606	0.2943	0.2419
1,3-Methyl-i-propylbenzene	A10	0.0994	0.1123	0.0942
1,4-Methyl-i-propylbenzene	A10	0.0779	0.0880	0.0738
Sec-Butylcyclohexane	N10	0.3179	0.4190	0.3787
1,2-Methyl-i-propylbenzene	A10	0.1635	0.2062	0.1729
3-Ethylnonane	I10	0.0683	0.0913	0.0923
1,3-Diethylbenzene	A10	0.1320	0.1665	0.1416
1,3-Methyl-n-propylbenzene	A10	0.0323	0.0407	0.0347
1,4-Diethylbenzene	A10	0.1001	0.1262	0.1076
1,4-Methyl-n-propylbenzene	A10	0.0607	0.0766	0.0656
n-Butylbenzene	A10	0.1193	0.1505	0.1284
1,3-Dimethyl-5-ethylbenzene	A10	0.0785	0.0990	0.0841
1,2-Diethylbenzene	A10	0.1358	0.1713	0.1431
1,2-Methyl-n-propylbenzene	A10	0.0999	0.1260	0.1060
1,4-Dimethyl-2-ethylbenzene	A10	0.1287	0.1623	0.1360
1,3-Dimethyl-4-ethylbenzene	A10	0.0329	0.0415	0.0348
1,2-Dimethyl-4-ethylbenzene	A10	0.1731	0.2183	0.1835
1,3-Dimethyl-2-ethylbenzene	A10	0.2005	0.2529	0.2087
1t,2c,4-Trimethylcyclopentane	A10	0.5253	0.5539	0.5441
1,2-Dimethyl-3-ethylbenzene	A10	0.1055	0.1331	0.1096
1,2-Ethyl-i-propylbenzene	A10	0.0696	0.0878	0.0736
1,4-Methyl-t-butylbenzene	A11	0.1521	0.1918	0.1608
UnknownC10s	U10	3.3399	4.4654	4.4920
n-Undecane	P11	0.9502	1.3957	1.3846
1,4-Ethyl-i-propylbenzene	A11	0.0486	0.0613	0.0514
1,2,4,5-Tetramethylbenzene	A11	0.1083	0.1366	0.1133
1,2-Methyl-n-butylbenzene	A11	0.0976	0.1231	0.1032
1,2,3,5-Tetramethylbenzene	A11	0.1202	0.1516	0.1252
1,2-Methyl-t-butylbenzene	A11	0.1085	0.1368	0.1147
5-Methylindan	A11	0.0261	0.0418	0.0410
4-Methylindan	A11	0.0068	0.0109	0.0107

1,2-Ethyl-n-propylbenzene	A11	0.1181	0.1490	0.1249
2-Methylindan	A11	0.0164	0.0263	0.0258
1,3-Methyl-n-butylbenzene	A11	0.0782	0.0986	0.0827
1,3-Di-i-propylbenzene	A11	0.0564	0.0711	0.0596
sec-Pentylbenzene	A11	0.0649	0.0819	0.0687
n-Pentylbenzene	A11	0.0531	0.0740	0.0633
1t-M-2-(4MP)cyclopentane	P12	0.0782	0.1252	0.1229
1,2-Di-n-propylbenzene	A11	0.0872	0.1100	0.0922
1,4-Di-i-propylbenzene	A11	0.1367	0.1724	0.1445
Tetrahydronaphthalene	A10	0.0815	0.1028	0.0862
t-Decahydronaphthalene	A10	0.1150	0.1450	0.1216
Naphthalene	A10	0.0756	0.0911	0.0764
1-t-Butyl-3,5-dimethylbenzene	A12	0.0588	0.0742	0.0622
1,4-Ethyl-t-butylbenzene	A11	0.1358	0.1713	0.1436
UnknownC11s	U11	1.5785	2.3185	2.3000
n-Dodecane	P12	0.5172	0.8279	0.8123
1,3-Di-n-propylbenzene	A12	0.0647	0.0816	0.0684
1,3,5-Triethylbenzene	A12	0.0661	0.0747	0.0634
1,2,4-Triethylbenzene	A12	0.2276	0.2571	0.2156
1,4-Methyl-n-pentylbenzene	A12	0.0422	0.0532	0.0446
n-Hexylbenzene	A12	0.0288	0.0439	0.0376
1,2,3,4,5-Pentamethylbenzene	A13	0.0783	0.0988	0.0828
2-Methylnaphthalene	A11	0.0784	0.1048	0.0879
1-Methylnaphthalene	A11	0.1193	0.1594	0.1148
UnknownC12s	U12	1.1692	1.8715	1.8362
n-Tridecane	P13	0.1133	0.1963	0.1903
UnknownC13s	U13	0.6402	1.1091	1.0753
n-Tetradecane	P14	0.0121	0.0226	0.0219
UnknownC14s	U14	0.3547	0.6613	0.6398
n-Pentadecane	P15	0.0017	0.0034	0.0033
UnknownC15s	U15	0.0486	0.0970	0.0928
n-Hexadecane	P16	0.0015	0.0032	0.0030
UnknownC16s	U16	0.0073	0.0155	0.0147
TOTAL		100.0000	100.0000	100.0000

EMPACT ANALYTICAL SYSTEMS INC.
365 S. MAIN ST.
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80601

303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201403015	ANALYSIS NO. :	09
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	0845
LEASE NO. :		SAMPLED BY :	BRIAN MORROW-EMPACT
NAME/DESCRIP :	SALES GAS @ 15:15 BAILEY 6-26-8-60		
FIELD DATA		SAMPLE TEMP. :	90 F
SAMPLE PRES. :	120	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 3PPM (1-7PPM) @ 15:20 WITNESSED BY GALE MCENDREE-EMPACT		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0001	0.0003		
HELIUM	0.01	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.10	0.13	---	---
NITROGEN	1.27	1.49	---	---
CARBON DIOXIDE	2.49	4.60	---	---
METHANE	69.51600	46.79310	---	---
ETHANE	12.2120	15.4082	3.2618	3.2796
PROPANE	8.8643	16.4015	2.4388	2.4521
I-BUTANE	0.8599	2.0972	0.2813	0.2829
N-BUTANE	2.7843	6.7905	0.8770	0.8818
I-PENTANE	0.5586	1.6863	0.2002	0.2013
N-PENTANE	0.6411	1.9409	0.2323	0.2335
HEXANES PLUS	0.6937	2.6620	0.2791	0.2806
TOTALS	100.00000	100.00000	7.5705	7.6118

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0277	0.0908
TOLUENE	0.0160	0.0619
ETHYLBENZENE	0.0014	0.0063
XYLENES	0.0036	0.0161
TOTAL BTEX	0.0487	0.1751

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1221.5 **/scf**	1228.2 **/scf**
	NET WET REAL :	1200.1 **/scf**	1206.8 **/scf**
HIGH	GROSS DRY REAL :	1342.9 **/scf**	1350.3 **/scf**
	GROSS WET REAL :	1319.4 **/scf**	1326.8 **/scf**
	NET DRY REAL :	19470.5 **/lb**	19576.8 **/lb**
	GROSS DRY REAL :	21405.9 **/lb**	21522.8 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8222
	COMPRESSIBILITY FACTOR :		0.99572

(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

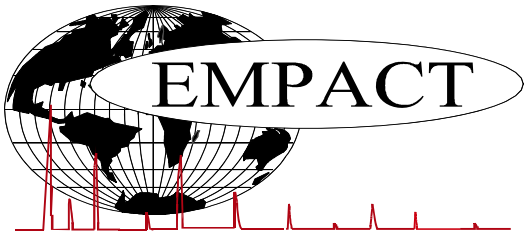
303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201403015	ANALYSIS NO. :	09
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	0845
LEASE NO. :		SAMPLED BY :	BRIAN MORROW-EMPACT
NAME/DESCRIP :	SALES GAS @ 15:15 BAILEY 6-26-8-60		
FIELD DATA		SAMPLE TEMP. :	90 F
SAMPLE PRES. :	120	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 3PPM (1-7PPM) @ 15:20 WITNESSED BY GALE MCENDREE-EMPACT		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	2.49	4.60
Nitrogen	1.27	1.49
Methane	69.51600	46.79310
Ethane	12.2120	15.4082
Propane	8.8643	16.4015
Isobutane	0.8599	2.0972
n-Butane	2.7843	6.7905
Isopentane	0.5004	1.5150
n-Pentane	0.6411	1.9409
Cyclopentane	0.0582	0.1713
n-Hexane	0.1386	0.5012
Cyclohexane	0.0392	0.1384
Other Hexanes	0.2509	0.9001
Heptanes	0.1243	0.5188
Methycyclohexane	0.0312	0.1285
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0277	0.0908
Toluene	0.0160	0.0619
Ethylbenzene	0.0014	0.0063
Xylenes	0.0036	0.0161
C8+ Heavies	0.0608	0.2999
Subtotal	99.89990	99.86970
Oxygen/Argon	0.10	0.13
Alcohols	0.0001	0.0003
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201403015	ANALYSIS NO. :	09
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	0845
LEASE NO. :		SAMPLED BY :	BRIAN MORROW-EMPACT
NAME/DESCRIP :	SALES GAS @ 15:15 BAILEY 6-26-8-60		
FIELD DATA		SAMPLE TEMP. :	90 F
SAMPLE PRES. :	120	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 3PPM (1-7PPM) @ 15:20 WITNESSED BY GALE MCENDREE-EMPACT		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.01	0.00	---	---
Hydrogen	---	0.00	0.00	---	---
Oxygen/Argon	---	0.10	0.13	---	---
Nitrogen	---	1.27	1.49	---	---
Carbon Dioxide	---	2.49	4.60	---	---
Methane	P1	69.51600	46.79310	---	---
Ethane	P2	12.2120	15.4082	3.262	3.280
Propane	P3	8.8643	16.4015	2.439	2.452
i-Butane	I4	0.8599	2.0972	0.281	0.283
n-Butane	P4	2.7843	6.7905	0.877	0.882
2,2-Dimethylpropane	I5	0.0024	0.0073	0.001	0.001
i-Pentane	I5	0.4980	1.5077	0.182	0.183
n-Pentane	P5	0.6411	1.9409	0.232	0.234
t-Butanol	X4	0.0001	0.0003	0.000	0.000
2,2-Dimethylbutane	I6	0.0017	0.0062	0.001	0.001
Cyclopentane	N5	0.0582	0.1713	0.017	0.017
2,3-Dimethylbutane	I6	0.0095	0.0344	0.004	0.004
2-Methylpentane	I6	0.1024	0.3703	0.042	0.042
3-Methylpentane	I6	0.0520	0.1880	0.021	0.021
n-Hexane	P6	0.1386	0.5012	0.057	0.057
2,2-Dimethylpentane	I7	0.0001	0.0004	0.000	0.000
Methylcyclopentane	N6	0.0853	0.3012	0.030	0.030
2,4-Dimethylpentane	I7	0.0037	0.0156	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0277	0.0908	0.008	0.008
3,3-Dimethylpentane	I7	0.0003	0.0013	0.000	0.000
Cyclohexane	N6	0.0392	0.1384	0.013	0.013
2-Methylhexane	I7	0.0148	0.0622	0.007	0.007
2,3-Dimethylpentane	I7	0.0067	0.0282	0.003	0.003
1,1-Dimethylcyclopentane	N7	0.0047	0.0193	0.002	0.002
3-Methylhexane	I7	0.0168	0.0706	0.008	0.008
1c,3-Dimethylcyclopentane	N7	0.0098	0.0404	0.005	0.005
1t,3-Dimethylcyclopentane	N7	0.0088	0.0363	0.004	0.004
3-Ethylpentane	I7	0.0012	0.0050	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0169	0.0696	0.008	0.008
n-Heptane	P7	0.0351	0.1476	0.016	0.016
1c,2-Dimethylcyclopentane	N7	0.0015	0.0062	0.001	0.001
Methylcyclohexane	N7	0.0312	0.1285	0.013	0.013
2,2-Dimethylhexane	I8	0.0028	0.0134	0.001	0.001
Ethylcyclopentane	N7	0.0038	0.0157	0.002	0.002
2,5-Dimethylhexane	I8	0.0008	0.0038	0.000	0.000
2,4-Dimethylhexane	I8	0.0013	0.0063	0.001	0.001

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1c,2t,4-Trimethylcyclopentane	N8	0.0025	0.0118	0.001	0.001
3,3-Dimethylhexane	I8	0.0002	0.0010	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0027	0.0127	0.001	0.001
2,3,4-Trimethylpentane	I8	0.0005	0.0024	0.000	0.000
Toluene	A7	0.0160	0.0619	0.005	0.005
2,3-Dimethylhexane	I8	0.0011	0.0053	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0005	0.0024	0.000	0.000
2-Methylheptane	I8	0.0059	0.0283	0.003	0.003
4-Methylheptane	I8	0.0016	0.0077	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	0.0026	0.0125	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0042	0.0198	0.002	0.002
3-Ethylhexane	I8	0.0004	0.0019	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0015	0.0071	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0005	0.0024	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0007	0.0033	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0006	0.0028	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0020	0.0094	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0021	0.0099	0.001	0.001
n-Octane	P8	0.0080	0.0384	0.004	0.004
1c,4-Dimethylcyclohexane	N8	0.0008	0.0038	0.000	0.000
i-Propylcyclopentane	I8	0.0001	0.0005	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
1c,2-Dimethylcyclohexane	N8	0.0006	0.0028	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0024	0.0127	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0008	0.0043	0.000	0.000
2,4-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
Ethylcyclohexane	N8	0.0012	0.0057	0.001	0.001
n-Propylcyclopentane	N8	0.0004	0.0019	0.000	0.000
2,5-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
3,3-Dimethylheptane	I9	0.0002	0.0011	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	0.0002	0.0011	0.000	0.000
Ethylbenzene	I8	0.0014	0.0063	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0005	0.0026	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0014	0.0063	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0013	0.0058	0.001	0.001
3,4-Dimethylheptane	I9	0.0004	0.0021	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0003	0.0016	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	0.0005	0.0027	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0006	0.000	0.000
3-Ethylheptane	I9	0.0002	0.0011	0.000	0.000
3-Methyloctane	I9	0.0006	0.0032	0.000	0.000
3,3-Diethylpentane	I9	0.0001	0.0006	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0009	0.0040	0.000	0.000
i-Butylcyclopentane	N9	0.0004	0.0021	0.000	0.000
UnknownC8s	U8	0.0002	0.0010	0.000	0.000
n-Nonane	P9	0.0015	0.0081	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
i-Propylcyclohexane	N9	0.0001	0.0006	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Butylcyclopentane	N9	0.0003	0.0016	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Propylbenzene	A9	0.0003	0.0015	0.000	0.000
3,6-Dimethyloctane	I10	0.0002	0.0012	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
1,3,5-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
i-Butylcyclohexane	N10	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0011	0.0059	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
TOTAL		100.00000	100.00000	7.5705	7.6118

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0277	0.0908
TOLUENE	0.0160	0.0619
ETHYLBENZENE	0.0014	0.0063
XYLENES	0.0036	0.0161
TOTAL BTEX	0.0487	0.1751

		14.650	14.730
	BTU @		
LOW	NET DRY REAL :	1221.5 **/scf**	1228.2 **/scf**
	NET WET REAL :	1200.1 **/scf**	1206.8 **/scf**
HIGH	GROSS DRY REAL :	1342.9 **/scf**	1350.3 **/scf**
	GROSS WET REAL :	1319.4 **/scf**	1326.8 **/scf**
	NET DRY REAL :	19470.5 **/lb**	19576.8 **/lb**
	GROSS DRY REAL :	21405.9 **/lb**	21522.8 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8222
	COMPRESSIBILITY FACTOR :		0.99572

(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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