CRUDE OIL ASSAY

PROJECT NO. :	201408008	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 6, 2014
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 1, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	TANK BATTERY 13:05		EMPACT
	NELSON RANCHES 3-27-10-59		
FIELD DATA		SAMPLE TEMP. :	99
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; TK #27107		
	SOME H2O IN THE BOTTON OF THE JAR - EMPACT		

SPECIFICATION	TEST METHOD	UNITS	RESULTS
API GRAVITY		API 60/60	31.4
RVP @100 DEG F	D323	PSIG	5.4
TOTAL SULFUR	D2622	WT %	0.517
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
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. :	201408008	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 5, 2014
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 1, 2014
PRODUCER :		CYLINDER NO. :	3707
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR 12:40		EMPACT
	NELSON RANCHES 3-27-10-59		
FIELD DATA		SAMPLE TEMP. :	140
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
ALCOHOLS	0.0027	0.0016	0.0015
NITROGEN (AIR)	0.0050	0.0012	0.0011
CARBON DIOXIDE	0.0240	0.0087	0.0080
METHANE	0.1120	0.0148	0.0371
ETHANE	0.3090	0.0765	0.1614
PROPANE	1.1700	0.4248	0.6297
I-BUTANE	0.2870	0.1373	0.1833
N-BUTANE	1.5860	0.7589	0.9766
I-PENTANE	0.6922	0.4112	0.4950
N-PENTANE	1.2070	0.7170	0.8538
HEXANES PLUS	94.6051	97.4480	96.6525
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	**MOLE%**	**MASS%**
BENZENE	1.0930	0.7029
TOLUENE	2.5177	1.9100
ETHYLBENZENE	0.7198	0.6292
XYLENE	2.3576	2.0608
TOTAL BTEX	6.6881	5.3029

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

	TOTAL SAMPLE	**C6+ FRACTION**	
Specific Gravity (H2O=1) =	0.7519	0.7582	60/60
API Gravity =	56.69	55.13	60/60
Molecular Weight =	121.46	125.764	
Absolute Density =	6.27	6.32	LBS/GAL
Heating Value Liq. Idl Gas=	127004	127950	BTU/GAL
Vapor/Liquid =	19.80	19.30	CUFT/GAL
Vapor Pressure =	13.04	1.45	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. :	201408008	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 5, 2014
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 1, 2014
PRODUCER :		CYLINDER NO. :	3707
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR 12:40		EMPACT
	NELSON RANCHES 3-27-10-59		
FIELD DATA		SAMPLE TEMP. :	140
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0240		0.0087		0.0080	
NITROGEN (AIR)	0.0050		0.0012		0.0011	
METHANE	0.1120		0.0148		0.0371	
ETHANE	0.3090		0.0765		0.1614	
PROPANE	1.1700		0.4248		0.6297	
I-BUTANE	0.2870		0.1373		0.1833	
N-BUTANE	1.5860		0.7589		0.9766	
I-PENTANE	0.6922		0.4112		0.4950	
N-PENTANE	1.2070		0.7170		0.8538	
CYCLOPENTANE (N-C5)	1.1172		0.6451		0.6377	
N-HEXANE	5.6995		4.0452		4.5793	
CYCLOHEXANE (OTHER C6)	2.2470		1.5570		1.4935	
OTHER HEXANES	9.1446		6.4249		6.9247	
OTHER HEPTANES	11.9605		9.7991		10.3537	
METHYLCYCLOHEXANE (OTHER C7)	3.6972		2.9890		2.8995	
2,2,4 TRIMETHYLPENTANE	0.7209		0.5828		0.5813	
BENZENE	1.0930		0.7029		0.5983	
TOLUENE	2.5177		1.9100		1.6418	
ETHYLBENZENE	0.7198		0.6292		0.5408	
XYLENES	2.3576		2.0608		1.7739	
OTHER OCTANES	10.2440		9.6430		9.7963	
OCTANES PLUS	----	57.1284	----	69.3748	----	67.5240
NONANES	10.2880		10.7221		10.5944	
DECANES PLUS	32.7981		45.7369		44.2373	
SUB TOTAL	99.9973		99.9984		99.9985	
ALCOHOLS	0.0027		0.0016		0.0015	
TOTAL	100.0000		100.0000		100.0000	

API Gravity	=	**56.69**	60/60
Vapor Pressure	=	**13.04**	PSIA & 100 F
Average Molecular Weight of Decanes plus	=	**169.38**	
Average Specific Gravity of Decanes plus	=	**0.7770**	

EMPACT ANALYTICAL SYSTEMS INC.
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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

BY CARBON NUMBER

PROJECT NO. :	201408008	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 5, 2014
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 1, 2014
PRODUCER :		CYLINDER NO. :	3707
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR 12:40		EMPACT
	NELSON RANCHES 3-27-10-59		
FIELD DATA		SAMPLE TEMP. :	140
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
ALCOHOLS		0.0027	0.0016	0.0015
NITROGEN		0.0050	0.0012	0.0011
CARBON DIOXIDE		0.0240	0.0087	0.0080
	C1	0.1120	0.0148	0.0371
	C2	0.3090	0.0765	0.1614
	C3	1.1700	0.4248	0.6297
	C4	1.8730	0.8962	1.1599
	C5	3.0164	1.7733	1.9865
	C6	18.1841	12.7300	13.5958
	C7	18.1754	14.6981	14.8950
	C8	14.0423	12.9158	12.6923
	C9	10.2880	10.7221	10.5944
	C10	10.8384	12.2692	11.9049
	C11	6.1516	7.5217	7.1090
	C12	3.6933	4.9103	4.7718
	C13	3.0950	4.5616	4.4516
	C14	2.6330	4.3008	4.2343
	C15	2.1508	3.7616	3.6609
	C16	1.5596	2.9076	2.8114
	C17	1.1292	2.2357	2.1551
	C18	1.3432	2.8145	2.7051
	C19	0.1792	0.3962	0.3784
	C20	0.0248	0.0577	0.0548
	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. :	201408008	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 5, 2014
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 1, 2014
PRODUCER :		CYLINDER NO. :	3707
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR 12:40		EMPACT
	NELSON RANCHES 3-27-10-59		
FIELD DATA		SAMPLE TEMP. :	140
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0050	0.0012	0.0011
Carbon Dioxide	NHC	0.0240	0.0087	0.0080
Methane	P1	0.1120	0.0148	0.0371
Ethane	P2	0.3090	0.0765	0.1614
Propane	P3	1.1700	0.4248	0.6297
i-Butane	I4	0.2870	0.1373	0.1833
n-Butane	P4	1.5860	0.7589	0.9766
2,2-Dimethylpropane	I5	0.0082	0.0049	0.0062
i-Pentane	I5	0.6840	0.4063	0.4888
n-Pentane	P5	1.2070	0.7170	0.8538
t-Butanol	X4	0.0027	0.0016	0.0015
2,2-Dimethylbutane	I6	0.0323	0.0229	0.0263
Cyclopentane	N5	1.1172	0.6451	0.6377
2,3-Dimethylbutane	I6	0.3705	0.2629	0.2962
2-Methylpentane	I6	3.0885	2.1915	2.5038
3-Methylpentane	I6	1.8199	1.2913	1.4507
n-Hexane	P6	5.6995	4.0452	4.5793
2,2-Dimethylpentane	I7	0.0173	0.0143	0.0158
Methylcyclopentane	N6	3.8334	2.6563	2.6477
2,4-Dimethylpentane	I7	0.2081	0.1717	0.1908
2,2,3-Trimethylbutane	I7	0.0135	0.0111	0.0120
Benzene	A6	1.0930	0.7029	0.5983
3,3-Dimethylpentane	I7	0.0162	0.0134	0.0145
Cyclohexane	N6	2.2470	1.5570	1.4935
2-Methylhexane	I7	1.0284	0.8484	0.9344
2,3-Dimethylpentane	I7	0.6990	0.5767	0.6170
1,1-Dimethylcyclopentane	N7	0.2676	0.2163	0.2141
3-Methylhexane	I7	1.5184	1.2527	1.3589
1c,3-Dimethylcyclopentane	N7	0.7485	0.6051	0.6067
1t,3-Dimethylcyclopentane	N7	0.7209	0.5828	0.5813
3-Ethylpentane	I7	0.0962	0.0794	0.0847
1t,2-Dimethylcyclopentane	N7	1.5849	1.2813	1.2735
2,2,4-Trimethylpentane	I8	0.0380	0.0357	0.0384
n-Heptane	P7	4.1507	3.4243	3.7392
1c,2-Dimethylcyclopentane	N7	0.1245	0.1007	0.0974
Methylcyclohexane	N7	3.6972	2.9890	2.8995
2,2-Dimethylhexane	I8	0.2863	0.2693	0.2891
Ethylcyclopentane	N7	0.6802	0.5499	0.5359
2,5-Dimethylhexane	I8	0.1076	0.1012	0.1089
2,2,3-Trimethylpentane	I8	0.0418	0.0393	0.0410
2,4-Dimethylhexane	I8	0.2005	0.1886	0.2020
1c,2t,4-Trimethylcyclopentane	N8	0.3690	0.3409	0.3336

3,3-Dimethylhexane	I8	0.0409	0.0385	0.0405
2,3,4-Trimethylpentane	I8	0.0912	0.0858	0.0891
2,3,3-Trimethylpentane	I8	0.0026	0.0024	0.0025
Toluene	A7	2.5177	1.9100	1.6418
2,3-Dimethylhexane	I8	0.1915	0.1801	0.1890
2-Methyl-3-ethylpentane	I8	0.1406	0.1322	0.1372
1,1,2-Trimethylcyclopentane	N8	0.0135	0.0125	0.0121
2-Methylheptane	I8	1.2263	1.1533	1.2319
4-Methylheptane	I8	0.3716	0.3495	0.3643
3-Methyl-3-ethylpentane	I8	0.0725	0.0682	0.0701
3,4-Dimethylhexane	I8	0.0692	0.0651	0.0676
1c,2c,4-Trimethylcyclopentane	N8	0.0249	0.0230	0.0223
1c,3-Dimethylcyclohexane	N8	0.0272	0.0251	0.0245
3-Methylheptane	I8	0.4210	0.3960	0.4193
1c,2t,3-Trimethylcyclopentane	N8	0.9523	0.8798	0.8532
3-Ethylhexane	I8	0.1864	0.1753	0.1837
1t,4-Dimethylcyclohexane	N8	0.4019	0.3713	0.3638
1,1-Dimethylcyclohexane	N8	0.1020	0.0942	0.0901
3c-Ethylmethylcyclopentane	N8	0.0034	0.0031	0.0030
3t-Ethylmethylcyclopentane	N8	0.2312	0.2136	0.2081
2t-Ethylmethylcyclopentane	N8	0.1886	0.1742	0.1693
1,1-Methylethylcyclopentane	N8	0.6511	0.6015	0.5756
2,2,4-Trimethylhexane	I9	0.0361	0.0381	0.0398
1t,2-Dimethylcyclohexane	N8	0.5148	0.4756	0.4581
1t,3-Dimethylcyclohexane	N8	0.0044	0.0041	0.0039
UnknownC7s	U7	0.0861	0.0710	0.0775
n-Octane	P8	2.2519	2.1179	2.2514
1c,4-Dimethylcyclohexane	N8	0.8106	0.7489	0.7149
i-Propylcyclopentane	I8	0.0608	0.0562	0.0541
2,4,4-Trimethylhexane	I9	0.0195	0.0206	0.0213
2,2,3,4-Tetramethylpentane	I9	0.0178	0.0188	0.0195
2,3,4-Trimethylhexane	I9	0.0163	0.0172	0.0178
1c,2-Dimethylcyclohexane	N8	0.1352	0.1249	0.1172
2,3,5-Trimethylhexane	I9	0.0863	0.0911	0.0943
2,2-Dimethylheptane	I9	0.0142	0.0150	0.0158
1,1,4-Trimethylcyclohexane	N9	0.9580	0.9957	0.9640
2,2,3-Trimethylhexane	I9	0.4348	0.4592	0.4704
2,4-Dimethylheptane	I9	0.0351	0.0371	0.0387
4,4-Dimethylheptane	I9	0.0384	0.0405	0.0423
Ethylcyclohexane	N8	0.5121	0.4731	0.4489
n-Propylcyclopentane	N8	0.2081	0.1923	0.1850
1c,3c,5-Trimethylcyclohexane	N9	0.0275	0.0286	0.0277
2,5-Dimethylheptane	I9	0.0829	0.0875	0.0912
3,3-Dimethylheptane	I9	0.0855	0.0903	0.0941
3,5-Dimethylheptane	I9	0.0631	0.0666	0.0694
2,6-Dimethylheptane	I9	0.0519	0.0548	0.0577
1,1,3-Trimethylcyclohexane	N9	0.0611	0.0635	0.0615
Ethylbenzene	A8	0.7198	0.6292	0.5408
1c,2t,4t-Trimethylcyclohexane	N9	0.3361	0.3493	0.3317
2,3-Dimethylheptane	I9	0.1309	0.1382	0.1422
1,3-Dimethylbenzene (m-Xylene)	A8	0.7872	0.6881	0.5948
1,4-Dimethylbenzene (p-Xylene)	A8	0.8452	0.7388	0.6407
3,4-Dimethylheptane	I9	0.0596	0.0629	0.0643
3,4-Dimethylheptane (2)	I9	0.1223	0.1291	0.1319
4-Ethylheptane	I9	0.0655	0.0692	0.0723
4-Methyloctane	I9	0.2815	0.2973	0.3082
2-Methyloctane	I9	0.3921	0.4141	0.4336
1c,2t,4c-Trimethylcyclohexane	I9	0.0594	0.0627	0.0646
3-Ethylheptane	I9	0.0531	0.0561	0.0577
3-Methyloctane	I9	0.4391	0.4637	0.4807
3,3-Diethylpentane	I9	0.0472	0.0498	0.0493
1c,2t,3-Trimethylcyclohexane	N9	0.0812	0.0844	0.0802
1,1,2-Trimethylcyclohexane	N9	0.0218	0.0227	0.0216
1,2-Dimethylbenzene (o-Xylene)	A8	0.7252	0.6339	0.5384
i-Butylcyclopentane	N9	0.2839	0.2951	0.2824
UnknownC8s	U8	0.0139	0.0131	0.0139
n-Nonane	P9	1.7731	1.8724	1.9494
1,1-Methylethylcyclohexane	N9	0.4544	0.4798	0.5010
i-Propylbenzene	A9	0.3396	0.3361	0.2909
i-Propylcyclohexane	N9	0.0838	0.0871	0.0812
2,2-Dimethyloctane	I10	0.0478	0.0560	0.0566
2,4-Dimethyloctane	I10	0.0736	0.0862	0.0871
2,6-Dimethyloctane	I10	0.0075	0.0088	0.0092
2,5-Dimethyloctane	I10	0.0402	0.0471	0.0476

n-Butylcyclopentane	N9	0.2411	0.2784	0.2604
3,3-Dimethyloctane	I10	0.0491	0.0575	0.0581
n-Propylbenzene	A9	0.4155	0.4112	0.3559
3,6-Dimethyloctane	I10	0.2105	0.2466	0.2492
3-Methyl-5-ethylheptane	I10	0.4257	0.4495	0.4628
1,3-Methylethylbenzene	A9	0.2444	0.2419	0.2076
1,4-Methylethylbenzene	A9	0.2026	0.2005	0.1721
1,3,5-Trimethylbenzene	A9	0.1936	0.1916	0.1656
2,3-Dimethyloctane	I10	0.0889	0.1041	0.1052
5-Methylnonane	I10	0.2516	0.2947	0.3006
1,2-Methylethylbenzene	A9	0.3592	0.3555	0.3035
2-Methylnonane	I10	0.0670	0.0785	0.0808
3-Ethyloctane	I10	0.0641	0.0751	0.0759
3-Methylnonane	I10	0.2358	0.2762	0.2814
1,2,4-Trimethylbenzene	A9	0.0473	0.0468	0.0400
t-Butylbenzene	A10	0.2691	0.2974	0.2567
i-Butylcyclohexane	N10	0.2397	0.2768	0.2549
1t-Methyl-2-n-propylcyclohexane	I10	0.1006	0.1062	0.1093
i-Butylbenzene	A10	0.0831	0.0918	0.0805
sec-Butylbenzene	A10	0.0423	0.0467	0.0405
UnknownC9s	U9	1.2995	1.3723	1.4288
n-Decane	P10	1.5631	1.8311	1.8744
1,2,3-Trimethylbenzene	A9	0.2317	0.2293	0.1918
1,3-Methyl-i-propylbenzene	A10	0.1082	0.1071	0.0914
1,4-Methyl-i-propylbenzene	A10	0.1430	0.1415	0.1208
Sec-Butylcyclohexane	N10	0.4561	0.5267	0.4844
1,2-Methyl-i-propylbenzene	A10	0.2077	0.2295	0.1958
3-Ethylnonane	I10	0.0562	0.0658	0.0677
1,3-Diethylbenzene	A10	0.1985	0.2194	0.1899
1,3-Methyl-n-propylbenzene	A10	0.1088	0.1202	0.1044
1,4-Diethylbenzene	A10	0.2012	0.2223	0.1929
1,4-Methyl-n-propylbenzene	A10	0.1056	0.1167	0.1016
n-Butylbenzene	A10	0.0837	0.0925	0.0803
1,3-Dimethyl-5-ethylbenzene	A10	0.0799	0.0883	0.0763
1,2-Diethylbenzene	A10	0.1628	0.1799	0.1530
1,2-Methyl-n-propylbenzene	A10	0.1448	0.1600	0.1370
1,4-Dimethyl-2-ethylbenzene	A10	0.1687	0.1864	0.1589
1,3-Dimethyl-4-ethylbenzene	A10	0.0906	0.1001	0.0854
1,2-Dimethyl-4-ethylbenzene	A10	0.3264	0.3607	0.3085
1,3-Dimethyl-2-ethylbenzene	A10	0.0379	0.0419	0.0352
1t,2c,4-Trimethylcyclopentane	A10	0.4633	0.4280	0.4278
1,2-Dimethyl-3-ethylbenzene	A10	0.0391	0.0432	0.0362
1,2-Ethyl-i-propylbenzene	A10	0.0798	0.0882	0.0752
1,4-Methyl-t-butylbenzene	A11	0.2654	0.2933	0.2502
UnknownC10s	U10	3.3323	3.9036	3.9958
n-Undecane	P11	1.3284	1.7096	1.7257
1,4-Ethyl-i-propylbenzene	A11	0.0552	0.0610	0.0520
1,2,4,5-Tetramethylbenzene	A11	0.0660	0.0729	0.0615
1,2-Methyl-n-butylbenzene	A11	0.0878	0.0970	0.0827
1,2,3,5-Tetramethylbenzene	A11	0.1350	0.1492	0.1253
1,2-Methyl-t-butylbenzene	A11	0.1113	0.1230	0.1049
5-Methylindan	A11	0.0386	0.0541	0.0540
4-Methylindan	A11	0.0144	0.0202	0.0202
1,2-Ethyl-n-propylbenzene	A11	0.1473	0.1628	0.1389
2-Methylindan	A11	0.0890	0.1248	0.1246
1,3-Methyl-n-butylbenzene	A11	0.1174	0.1297	0.1106
1,3-Di-i-propylbenzene	A11	0.0446	0.0493	0.0421
sec-Pentylbenzene	A11	0.2158	0.2385	0.2034
n-Pentylbenzene	A11	0.0805	0.0983	0.0856
1t-M-2-(4MP)cyclopentane	P12	0.0134	0.0188	0.0188
1,2-Di-n-propylbenzene	A11	0.1268	0.1401	0.1195
1,4-Di-i-propylbenzene	A11	0.3342	0.3693	0.3150
Tetrahydronaphthalene	A10	0.0120	0.0133	0.0113
t-Decahydronaphthalene	A10	0.2191	0.2421	0.2065
Naphthalene	A10	0.1530	0.1615	0.1378
1-t-Butyl-3,5-dimethylbenzene	A12	0.0662	0.0732	0.0624
1,4-Ethyl-t-butylbenzene	A11	0.1576	0.1742	0.1486
UnknownC11s	U11	2.1584	2.7778	2.8040
n-Dodecane	P12	1.1342	1.5907	1.5881
1,3-Di-n-propylbenzene	A12	0.0692	0.0765	0.0653
1,3,5-Triethylbenzene	A12	0.0416	0.0412	0.0356
1,2,4-Triethylbenzene	A12	0.4194	0.4150	0.3542
1,4-Methyl-n-pentylbenzene	A12	0.0940	0.1039	0.0886
n-Hexylbenzene	A12	0.1653	0.2208	0.1925

1,2,3,4,5-Pentamethylbenzene	A13	0.3301	0.3648	0.3112
2-Methylnaphthalene	A11	0.3148	0.3686	0.3144
1-Methylnaphthalene	A11	0.2631	0.3080	0.2258
UnknownC12s	U12	1.6900	2.3702	2.3663
n-Tridecane	P13	1.0433	1.5836	1.5623
UnknownC13s	U13	1.7216	2.6132	2.5781
n-Tetradecane	P14	0.8284	1.3531	1.3322
UnknownC14s	U14	1.8046	2.9477	2.9021
n-Pentadecane	P15	0.5716	0.9997	0.9729
UnknownC15s	U15	1.5792	2.7619	2.6880
n-Hexadecane	P16	0.5660	1.0552	1.0203
UnknownC16s	U16	0.9936	1.8524	1.7911
n-Heptadecane	P17	0.5077	1.0052	0.9690
UnknownC17s	U17	0.6215	1.2305	1.1861
n-Octadecane	P18	0.1587	0.3325	0.3196
UnknownC18s	U18	1.1845	2.4820	2.3855
n-Nonadecane	P19	0.0243	0.0537	0.0513
UnknownC19s	U19	0.1549	0.3425	0.3271
n-Eicosane	P20	0.0053	0.0123	0.0117
UnknownC20s	U20	0.0195	0.0454	0.0431
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. :	201408008	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 7, 2014
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 1, 2014
PRODUCER :		CYLINDER NO. :	1043
LEASE NO. :		SAMPLED BY :	GALE MCENDREE - EMPACT
NAME/DESCRIP :	SALES GAS 12:50 NELSON RANCHES 3-27-10-59		
FIELD DATA		SAMPLE TEMP. :	110
SAMPLE PRES. :	87	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 4.50 PPM (1-7PPM) 12:55		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0003	0.0009		
HELIUM	0.02	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.01	0.01	---	---
NITROGEN	1.22	1.40	---	---
CARBON DIOXIDE	2.61	4.72	---	---
METHANE	69.97480	46.09350	---	---
ETHANE	10.2779	12.6897	2.7456	2.7605
PROPANE	8.9981	16.2920	2.4762	2.4897
I-BUTANE	0.9254	2.2085	0.3024	0.3040
N-BUTANE	3.3240	7.9329	1.0464	1.0521
I-PENTANE	0.7249	2.1409	0.2603	0.2618
N-PENTANE	0.8810	2.6100	0.3184	0.3202
HEXANES PLUS	1.0236	3.9016	0.4133	0.4154
TOTALS	100.00000	100.00000	7.5626	7.6037

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0358	0.1148
TOLUENE	0.0240	0.0908
ETHYLBENZENE	0.0034	0.0148
XYLENES	0.0069	0.0300
TOTAL BTEX	0.0701	0.2504

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1246.4 **/scf**	1253.2 **/scf**
	NET WET REAL :	1224.6 **/scf**	1231.4 **/scf**
HIGH	GROSS DRY REAL :	1369.5 **/scf**	1377.0 **/scf**
	GROSS WET REAL :	1345.6 **/scf**	1353.0 **/scf**
	NET DRY REAL :	19449.8 **/lb**	19556.0 **/lb**
	GROSS DRY REAL :	21371.7 **/lb**	21488.4 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8402
	COMPRESSIBILITY FACTOR :		0.99558

(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

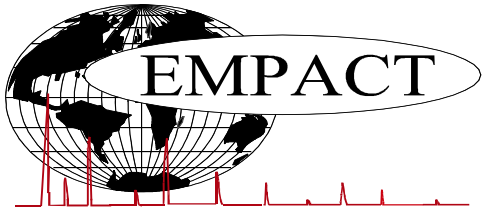
303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201408008	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 7, 2014
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 1, 2014
PRODUCER :		CYLINDER NO. :	1043
LEASE NO. :		SAMPLED BY :	GALE MCENDREE - EMPACT
NAME/DESCRIP :	SALES GAS 12:50 NELSON RANCHES 3-27-10-59		
FIELD DATA		SAMPLE TEMP. :	110
SAMPLE PRES. :	87	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 4.50 PPM (1-7PPM) 12:55		

Componet	Mole %	Wt %
Helium	0.02	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	2.61	4.72
Nitrogen	1.22	1.40
Methane	69.97480	46.09350
Ethane	10.2779	12.6897
Propane	8.9981	16.2920
Isobutane	0.9254	2.2085
n-Butane	3.3240	7.9329
Isopentane	0.6449	1.9105
n-Pentane	0.8810	2.6100
Cyclopentane	0.0800	0.2304
n-Hexane	0.2035	0.7201
Cyclohexane	0.0526	0.1818
Other Hexanes	0.3556	1.2483
Heptanes	0.1862	0.7606
Methycyclohexane	0.0409	0.1649
2,2,4 Trimethylpentane	0.0002	0.0009
Benzene	0.0358	0.1148
Toluene	0.0240	0.0908
Ethylbenzene	0.0034	0.0148
Xylenes	0.0069	0.0300
C8+ Heavies	0.1145	0.5746
Subtotal	99.98970	99.98910
Oxygen/Argon	0.01	0.01
Alcohols	0.0003	0.0009
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201408008	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	AUGUST 7, 2014
ACCOUNT NO. :		SAMPLE DATE :	AUGUST 1, 2014
PRODUCER :		CYLINDER NO. :	1043
LEASE NO. :		SAMPLED BY :	GALE MCENDREE - EMPACT
NAME/DESCRIP :	SALES GAS 12:50 NELSON RANCHES 3-27-10-59		
FIELD DATA		SAMPLE TEMP. :	110
SAMPLE PRES. :	87	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 4.50 PPM (1-7PPM) 12:55		

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	---	1.22	1.40	---	---
Carbon Dioxide	---	2.61	4.72	---	---
Methane	P1	69.97480	46.09350	---	---
Ethane	P2	10.2779	12.6897	2.746	2.761
Propane	P3	8.9981	16.2920	2.476	2.490
i-Butane	I4	0.9254	2.2085	0.302	0.304
n-Butane	P4	3.3240	7.9329	1.046	1.052
2,2-Dimethylpropane	I5	0.0020	0.0059	0.001	0.001
i-Pentane	I5	0.6429	1.9046	0.235	0.237
n-Pentane	P5	0.8809	2.6097	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	0.0800	0.2304	0.024	0.024
2,3-Dimethylbutane	I6	0.0130	0.0460	0.005	0.005
2-Methylpentane	I6	0.1437	0.5085	0.059	0.059
3-Methylpentane	I6	0.0757	0.2679	0.031	0.031
UnknownC5s	U5	0.0001	0.0003	0.000	0.000
n-Hexane	P6	0.2035	0.7201	0.083	0.084
2,2-Dimethylpentane	I7	0.0006	0.0025	0.000	0.000
Methylcyclopentane	N6	0.1214	0.4195	0.043	0.043
2,4-Dimethylpentane	I7	0.0046	0.0189	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0358	0.1148	0.010	0.010
3,3-Dimethylpentane	I7	0.0002	0.0008	0.000	0.000
Cyclohexane	N6	0.0526	0.1818	0.018	0.018
2-Methylhexane	I7	0.0209	0.0860	0.010	0.010
2,3-Dimethylpentane	I7	0.0106	0.0436	0.005	0.005
1,1-Dimethylcyclopentane	N7	0.0049	0.0198	0.002	0.002
3-Methylhexane	I7	0.0259	0.1066	0.012	0.012
1c,3-Dimethylcyclopentane	N7	0.0136	0.0548	0.006	0.006
1t,3-Dimethylcyclopentane	N7	0.0118	0.0476	0.005	0.005
3-Ethylpentane	I7	0.0013	0.0053	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0272	0.1097	0.013	0.013
2,2,4-Trimethylpentane	I8	0.0002	0.0009	0.000	0.000
n-Heptane	P7	0.0545	0.2242	0.025	0.025
1c,2-Dimethylcyclopentane	N7	0.0019	0.0077	0.001	0.001
Methylcyclohexane	N7	0.0409	0.1649	0.016	0.016
2,2-Dimethylhexane	I8	0.0027	0.0127	0.001	0.001

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Ethylcyclopentane	N7	0.0080	0.0323	0.003	0.003
2,5-Dimethylhexane	I8	0.0009	0.0042	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0004	0.0019	0.000	0.000
2,4-Dimethylhexane	I8	0.0020	0.0094	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0036	0.0166	0.002	0.002
3,3-Dimethylhexane	I8	0.0002	0.0009	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0044	0.0203	0.002	0.002
2,3,4-Trimethylpentane	I8	0.0008	0.0037	0.000	0.000
Toluene	A7	0.0240	0.0908	0.008	0.008
2,3-Dimethylhexane	I8	0.0015	0.0070	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0011	0.0052	0.001	0.001
2-Methylheptane	I8	0.0091	0.0427	0.005	0.005
4-Methylheptane	I8	0.0026	0.0122	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0003	0.0014	0.000	0.000
3,4-Dimethylhexane	I8	0.0004	0.0019	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0002	0.0009	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0001	0.0005	0.000	0.000
3-Methylheptane	I8	0.0039	0.0183	0.002	0.002
1c,2t,3-Trimethylcyclopentane	N8	0.0057	0.0263	0.003	0.003
3-Ethylhexane	I8	0.0011	0.0052	0.001	0.001
1t,4-Dimethylcyclohexane	N8	0.0020	0.0092	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0007	0.0032	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0015	0.0069	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0011	0.0051	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0043	0.0198	0.002	0.002
2,2,4-Trimethylhexane	I9	0.0002	0.0011	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0028	0.0129	0.001	0.001
UnknownC7s	U7	0.0001	0.0004	0.000	0.000
n-Octane	P8	0.0124	0.0581	0.006	0.006
1c,4-Dimethylcyclohexane	N8	0.0032	0.0147	0.002	0.002
i-Propylcyclopentane	I8	0.0003	0.0014	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	0.0007	0.0032	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0038	0.0197	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0015	0.0079	0.001	0.001
2,4-Dimethylheptane	I9	0.0006	0.0032	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
Ethylcyclohexane	N8	0.0021	0.0097	0.001	0.001
n-Propylcyclopentane	N8	0.0008	0.0037	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,5-Dimethylheptane	I9	0.0003	0.0016	0.000	0.000
3,3-Dimethylheptane	I9	0.0003	0.0016	0.000	0.000
3,5-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
2,6-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0004	0.0021	0.000	0.000
Ethylbenzene	I8	0.0034	0.0148	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0005	0.0026	0.000	0.000
2,3-Dimethylheptane	I9	0.0005	0.0026	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0026	0.0113	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0023	0.0100	0.001	0.001
3,4-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0005	0.0026	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
4-Methyloctane	I9	0.0009	0.0047	0.001	0.001
2-Methyloctane	I9	0.0010	0.0053	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0002	0.0010	0.000	0.000
3-Ethylheptane	I9	0.0002	0.0011	0.000	0.000
3-Methyloctane	I9	0.0014	0.0074	0.001	0.001
1,1,2-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0020	0.0087	0.001	0.001

i-Butylcyclopentane	N9	0.0007	0.0036	0.000	0.000
UnknownC8s	U8	0.0001	0.0005	0.000	0.000
n-Nonane	P9	0.0039	0.0205	0.002	0.002
1,1-Methylethylcyclohexane	N9	0.0005	0.0026	0.000	0.000
i-Propylbenzene	A9	0.0008	0.0039	0.000	0.000
i-Propylcyclohexane	N9	0.0002	0.0010	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
2,5-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Butylcyclopentane	N9	0.0006	0.0031	0.000	0.000
3,3-Dimethyloctane	I10	0.0002	0.0012	0.000	0.000
n-Propylbenzene	A9	0.0007	0.0035	0.000	0.000
3,6-Dimethyloctane	I10	0.0006	0.0035	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0006	0.0035	0.000	0.000
1,3-Methylethylbenzene	A9	0.0006	0.0030	0.000	0.000
1,4-Methylethylbenzene	A9	0.0002	0.0010	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0002	0.0010	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
5-Methylnonane	I10	0.0003	0.0018	0.000	0.000
1,2-Methylethylbenzene	A9	0.0006	0.0030	0.000	0.000
3-Ethyloctane	I10	0.0001	0.0006	0.000	0.000
3-Methylnonane	I10	0.0003	0.0018	0.000	0.000
1,2,4-Trimethylbenzene	A9	0.0001	0.0005	0.000	0.000
t-Butylbenzene	A10	0.0004	0.0022	0.000	0.000
i-Butylcyclohexane	N10	0.0002	0.0012	0.000	0.000
i-Butylbenzene	A10	0.0001	0.0005	0.000	0.000
sec-Butylbenzene	A10	0.0001	0.0005	0.000	0.000
UnknownC9s	U9	0.0041	0.0216	0.002	0.002
n-Decane	P10	0.0011	0.0065	0.001	0.001
1,2,3-Trimethylbenzene	A9	0.0002	0.0010	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Methyl-i-propylbenzene	A10	0.0001	0.0005	0.000	0.000
Sec-Butylcyclohexane	A10	0.0002	0.0012	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,3-Diethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Diethylbenzene	A10	0.0002	0.0011	0.000	0.000
1,2-Diethylbenzene	A10	0.0001	0.0005	0.000	0.000
t-Decahydronaphthalene	A9	0.0001	0.0006	0.000	0.000
1,2-Methyl-n-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Dimethyl-2-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,3-Dimethyl-2-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Methyl-t-butylbenzene	A11	0.0001	0.0006	0.000	0.000
UnknownC10s	U10	0.0032	0.0187	0.002	0.002
n-Undecane	P11	0.0004	0.0026	0.000	0.000
1,2,3,5-Tetramethylbenzene	A11	0.0001	0.0005	0.000	0.000
UnknownC11s	U11	0.0008	0.0051	0.001	0.001
n-Dodecane	P12	0.0001	0.0007	0.000	0.000
UnknownC12s	U12	0.0003	0.0019	0.000	0.000
n-Tridecane	P13	0.0002	0.0015	0.000	0.000
UnknownC13s	U13	0.0001	0.0007	0.000	0.000
n-Tetradecane	P14	0.0005	0.0041	0.000	0.000
UnknownC14s	U14	0.0004	0.0032	0.000	0.000
n-Pentadecane	P15	0.0005	0.0044	0.000	0.000
UnknownC15s	U15	0.0007	0.0061	0.001	0.001
n-Hexadecane	P16	0.0003	0.0028	0.000	0.000
UnknownC16s	U16	0.0004	0.0037	0.000	0.000
n-Heptadecane	P17	0.0001	0.0010	0.000	0.000
UnknownC17s	U17	0.0001	0.0010	0.000	0.000
UnknownC18s	U18	0.0001	0.0010	0.000	0.000
TOTAL		100.00000	100.00000	7.5626	7.6037

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BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0358	0.1148
TOLUENE	0.0240	0.0908
ETHYLBENZENE	0.0034	0.0148
XYLENES	0.0069	0.0300
TOTAL BTEX	0.0701	0.2504

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1246.4 **/scf**	1253.2 **/scf**
	NET WET REAL :	1224.6 **/scf**	1231.4 **/scf**
HIGH	GROSS DRY REAL :	1369.5 **/scf**	1377.0 **/scf**
	GROSS WET REAL :	1345.6 **/scf**	1353.0 **/scf**
	NET DRY REAL :	19449.8 **/lb**	19556.0 **/lb**
	GROSS DRY REAL :	21371.7 **/lb**	21488.4 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8402
	COMPRESSIBILITY FACTOR :		0.99558

(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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