CRUDE OIL ASSAY

PROJECT NO. :	201406119	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 24, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 18, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	TANK BATTERY @ 17:10 BRINGELSON RANCH 11-20-9-58		EMPACT
FIELD DATA		SAMPLE TEMP. :	102
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; TK #20807		

SPECIFICATION		TEST METHOD	UNITS	RESULTS
API GRAVITY			API 60/60	34.1
RVP @100 DEG F		D323	PSIG	5.8
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				DARK 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.
BRIGHTON, CO
80601

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201406119	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 19, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 18, 2014
PRODUCER :		CYLINDER NO. :	1738
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	HEATER-TREATER @ 15:50 BRINGELSON RANCH 11-20-9-58		EMPACT
FIELD DATA		SAMPLE TEMP. :	140
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
ALCOHOLS	0.0046	0.0028	0.0027
NITROGEN (AIR)	0.0520	0.0127	0.0117
CARBON DIOXIDE	0.0220	0.0084	0.0077
METHANE	0.1040	0.0145	0.0361
ETHANE	0.4090	0.1070	0.2239
PROPANE	1.6850	0.6463	0.9504
I-BUTANE	0.4400	0.2224	0.2946
N-BUTANE	2.1990	1.1116	1.4191
I-PENTANE	0.9830	0.6168	0.7364
N-PENTANE	1.6290	1.0222	1.2075
HEXANES PLUS	92.4724	96.2353	95.1099
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	**MOLE%**	**MASS%**
BENZENE	1.0717	0.7280
TOLUENE	2.2257	1.7836
ETHYLBENZENE	0.7329	0.6767
XYLENE	2.0760	1.9169
TOTAL BTEX	6.1063	5.1052

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

	TOTAL SAMPLE	**C6+ FRACTION**	
Specific Gravity (H2O=1) =	0.7459	0.7546	60/60
API Gravity =	58.2	56.02	60/60
Molecular Weight =	114.98	120.415	
Absolute Density =	6.22	6.29	LBS/GAL
Heating Value Liq. Idl Gas=	126086	127608	BTU/GAL
Vapor/Liquid =	20.66	20.01	CUFT/GAL
Vapor Pressure =	15.06	1.61	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. :	201406119	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 19, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 18, 2014
PRODUCER :		CYLINDER NO. :	1738
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	HEATER-TREATER @ 15:50 BRINGELSON RANCH 11-20-9-58		EMPACT
FIELD DATA		SAMPLE TEMP. :	140
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0220		0.0084		0.0077	
NITROGEN (AIR)	0.0520		0.0127		0.0117	
METHANE	0.1040		0.0145		0.0361	
ETHANE	0.4090		0.1070		0.2239	
PROPANE	1.6850		0.6463		0.9504	
I-BUTANE	0.4400		0.2224		0.2946	
N-BUTANE	2.1990		1.1116		1.4191	
I-PENTANE	0.9830		0.6168		0.7364	
N-PENTANE	1.6290		1.0222		1.2075	
CYCLOPENTANE (N-C5)	1.3907		0.8482		0.8318	
N-HEXANE	6.2573		4.6900		5.2678	
CYCLOHEXANE (OTHER C6)	2.5182		1.8432		1.7540	
OTHER HEXANES	9.8417		7.3016		7.7933	
OTHER HEPTANES	12.8905		11.1523		11.6796	
METHYLCYCLOHEXANE (OTHER C7)	4.0841		3.4877		3.3564	
2,2,4 TRIMETHYLPENTANE	0.8658		0.7394		0.7316	
BENZENE	1.0717		0.7280		0.6147	
TOLUENE	2.2257		1.7836		1.5210	
ETHYLBENZENE	0.7329		0.6767		0.5770	
XYLENES	2.0760		1.9169		1.6365	
OTHER OCTANES	11.0787		11.0333		11.1589	
OCTANES PLUS	----	52.1925	----	64.4007	----	62.2913
NONANES	10.7282		11.8019		11.5459	
DECANES PLUS	26.7109		38.2325		36.6414	
SUB TOTAL	99.9954		99.9972		99.9973	
ALCOHOLS	0.0046		0.0028		0.0027	
TOTAL	100.0000		100.0000		100.0000	

API Gravity =	**58.20**	60/60
Vapor Pressure =	**15.06**	PSIA & 100 F
Average Molecular Weight of Decanes plus =	**164.57**	
Average Specific Gravity of Decanes plus =	**0.7800**	

EMPACT ANALYTICAL SYSTEMS INC.
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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

BY CARBON NUMBER

PROJECT NO. :	201406119	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 19, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 18, 2014
PRODUCER :		CYLINDER NO. :	1738
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	HEATER-TREATER @ 15:50		EMPACT
	BRINGELSON RANCH 11-20-9-58		
FIELD DATA		SAMPLE TEMP. :	140
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
ALCOHOLS		0.0046	0.0028	0.0027
NITROGEN		0.0520	0.0127	0.0117
CARBON DIOXIDE		0.0220	0.0084	0.0077
	C1	0.1040	0.0145	0.0361
	C2	0.4090	0.1070	0.2239
	C3	1.6850	0.6463	0.9504
	C4	2.6390	1.3340	1.7137
	C5	4.0027	2.4872	2.7757
	C6	19.6889	14.5628	15.4298
	C7	19.2003	16.4236	16.5570
	C8	14.7534	14.3663	14.1040
	C9	10.7282	11.8019	11.5459
	C10	9.7302	11.5804	11.0944
	C11	5.0248	6.4889	6.0797
	C12	3.4742	4.8821	4.7093
	C13	2.4858	3.8787	3.7582
	C14	2.0279	3.4990	3.4175
	C15	1.5873	2.9325	2.8313
	C16	1.1227	2.2110	2.1208
	C17	0.5193	1.0861	1.0386
	C18	0.4616	1.0217	0.9742
	C19	0.2428	0.5670	0.5371
	C20	0.0309	0.0760	0.0717
	C21	0.0020	0.0052	0.0049
	C22	0.0008	0.0022	0.0021
	C23	0.0006	0.0017	0.0016
	C24	0.0000	0.0000	0.0000
	C25	0.0000	0.0000	0.0000
	C26	0.0000	0.0000	0.0000
	C27	0.0000	0.0000	0.0000
	C28	0.0000	0.0000	0.0000
	C29	0.0000	0.0000	0.0000
	C30+	0.0000	0.0000	0.0000
	Total	100.0000	100.0000	100.0000

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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201406119	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 19, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 18, 2014
PRODUCER :		CYLINDER NO. :	1738
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	HEATER-TREATER @ 15:50		EMPACT
	BRINGELSON RANCH 11-20-9-58		
FIELD DATA		SAMPLE TEMP. :	140
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0520	0.0127	0.0117
Carbon Dioxide	NHC	0.0220	0.0084	0.0077
Methane	P1	0.1040	0.0145	0.0361
Ethane	P2	0.4090	0.1070	0.2239
Propane	P3	1.6850	0.6463	0.9504
i-Butane	I4	0.4400	0.2224	0.2946
n-Butane	P4	2.1990	1.1116	1.4191
2,2-Dimethylpropane	I5	0.0080	0.0050	0.0062
Ethanol	X2	0.0008	0.0003	0.0003
i-Pentane	I5	0.9750	0.6118	0.7302
n-Pentane	P5	1.6290	1.0222	1.2075
t-Butanol	X4	0.0038	0.0025	0.0024
2,2-Dimethylbutane	I6	0.0323	0.0242	0.0276
Cyclopentane	N5	1.3907	0.8482	0.8318
2,3-Dimethylbutane	I6	0.3225	0.2417	0.2702
2-Methylpentane	I6	3.2695	2.4506	2.7776
3-Methylpentane	I6	1.9529	1.4637	1.6314
n-Hexane	P6	6.2573	4.6900	5.2678
2,2-Dimethylpentane	I7	0.0194	0.0169	0.0185
Methylcyclopentane	N6	4.2645	3.1214	3.0865
2,4-Dimethylpentane	I7	0.2069	0.1803	0.1987
2,2,3-Trimethylbutane	I7	0.0082	0.0071	0.0076
Benzene	A6	1.0717	0.7280	0.6147
3,3-Dimethylpentane	I7	0.0199	0.0173	0.0185
Cyclohexane	N6	2.5182	1.8432	1.7540
2-Methylhexane	I7	1.1917	1.0385	1.1347
2,3-Dimethylpentane	I7	0.6084	0.5302	0.5628
1,1-Dimethylcyclopentane	N7	0.3707	0.3166	0.3109
3-Methylhexane	I7	1.6186	1.4105	1.5179
1c,3-Dimethylcyclopentane	N7	0.9437	0.8059	0.8016
1t,3-Dimethylcyclopentane	N7	0.8658	0.7394	0.7316
3-Ethylpentane	I7	0.1338	0.1166	0.1234
1t,2-Dimethylcyclopentane	N7	1.7248	1.4729	1.4523
2,2,4-Trimethylpentane	I8	0.0185	0.0184	0.0196
n-Heptane	P7	4.3851	3.8214	4.1396

1c,2-Dimethylcyclopentane	N7	0.1614	0.1378	0.1322
Methylcyclohexane	N7	4.0841	3.4877	3.3564
2,2-Dimethylhexane	I8	0.4348	0.4320	0.4600
Ethylcyclopentane	N7	0.5698	0.4866	0.4705
2,5-Dimethylhexane	I8	0.1045	0.1038	0.1108
2,2,3-Trimethylpentane	I8	0.0444	0.0441	0.0456
2,4-Dimethylhexane	I8	0.2182	0.2168	0.2304
1c,2t,4-Trimethylcyclopentane	N8	0.4387	0.4281	0.4156
3,3-Dimethylhexane	I8	0.0441	0.0438	0.0457
2,3,4-Trimethylpentane	I8	0.0915	0.0909	0.0936
2,3,3-Trimethylpentane	I8	0.0042	0.0042	0.0043
Toluene	A7	2.2257	1.7836	1.5210
2,3-Dimethylhexane	I8	0.2247	0.2232	0.2324
2-Methyl-3-ethylpentane	I8	0.1365	0.1356	0.1396
1,1,2-Trimethylcyclopentane	N8	0.0076	0.0074	0.0071
2-Methylheptane	I8	1.3591	1.3502	1.4307
4-Methylheptane	I8	0.3858	0.3833	0.3964
3-Methyl-3-ethylpentane	I8	0.0652	0.0648	0.0660
3,4-Dimethylhexane	I8	0.0621	0.0617	0.0635
1c,2c,4-Trimethylcyclopentane	N8	0.0331	0.0323	0.0310
1c,3-Dimethylcyclohexane	N8	0.0301	0.0294	0.0284
3-Methylheptane	I8	0.6208	0.6168	0.6479
1c,2t,3-Trimethylcyclopentane	N8	1.1288	1.1016	1.0598
3-Ethylhexane	I8	0.1318	0.1309	0.1361
1t,4-Dimethylcyclohexane	N8	0.4460	0.4353	0.4231
1,1-Dimethylcyclohexane	N8	0.1285	0.1254	0.1190
3c-Ethylmethylcyclopentane	N8	0.0049	0.0048	0.0046
3t-Ethylmethylcyclopentane	N8	0.1990	0.1942	0.1877
2t-Ethylmethylcyclopentane	N8	0.1714	0.1673	0.1613
1,1-Methylethylcyclopentane	N8	0.5472	0.5340	0.5069
2,2,4-Trimethylhexane	I9	0.0439	0.0490	0.0508
1t,2-Dimethylcyclohexane	N8	0.6281	0.6130	0.5857
1t,3-Dimethylcyclohexane	N8	0.0022	0.0021	0.0020
UnknownC7s	U7	0.0623	0.0543	0.0588
n-Octane	P8	2.6163	2.5992	2.7411
1c,4-Dimethylcyclohexane	N8	0.5327	0.5199	0.4923
i-Propylcyclopentane	I8	0.0791	0.0772	0.0737
2,4,4-Trimethylhexane	I9	0.0271	0.0302	0.0310
2,2,3,4-Tetramethylpentane	I9	0.0212	0.0236	0.0243
2,3,4-Trimethylhexane	I9	0.0281	0.0313	0.0321
1c,2-Dimethylcyclohexane	N8	0.1807	0.1763	0.1642
2,3,5-Trimethylhexane	I9	0.1034	0.1153	0.1184
2,2-Dimethylheptane	I9	0.0055	0.0061	0.0064
1,1,4-Trimethylcyclohexane	N9	0.9808	1.0769	1.0343
2,2,3-Trimethylhexane	I9	0.4045	0.4512	0.4586
2,4-Dimethylheptane	I9	0.0552	0.0616	0.0638
4,4-Dimethylheptane	I9	0.0431	0.0481	0.0498
Ethylcyclohexane	N8	0.5556	0.5422	0.5103
n-Propylcyclopentane	N8	0.2327	0.2271	0.2168
1c,3c,5-Trimethylcyclohexane	N9	0.0380	0.0417	0.0400
2,5-Dimethylheptane	I9	0.0743	0.0829	0.0857
3,3-Dimethylheptane	I9	0.0880	0.0982	0.1015
3,5-Dimethylheptane	I9	0.0611	0.0682	0.0705
2,6-Dimethylheptane	I9	0.0559	0.0624	0.0652
1,1,3-Trimethylcyclohexane	N9	0.1358	0.1491	0.1432
Ethylbenzene	A8	0.7329	0.6767	0.5770
1c,2t,4t-Trimethylcyclohexane	N9	0.1418	0.1557	0.1467
2,3-Dimethylheptane	I9	0.1602	0.1787	0.1825
1,3-Dimethylbenzene (m-Xylene)	A8	1.2225	1.1288	0.9681
1,4-Dimethylbenzene (p-Xylene)	A8	0.2631	0.2429	0.2090
3,4-Dimethylheptane	I9	0.0585	0.0653	0.0662
3,4-Dimethylheptane (2)	I9	0.1667	0.1860	0.1885
4-Ethylheptane	I9	0.0286	0.0319	0.0330
4-Methyloctane	I9	0.2961	0.3303	0.3397
2-Methyloctane	I9	0.3855	0.4300	0.4467
1c,2t,4c-Trimethylcyclohexane	I9	0.0436	0.0486	0.0496
3-Ethylheptane	I9	0.0666	0.0743	0.0758

3-Methyloctane	I9	0.4675	0.5215	0.5363
3,3-Diethylpentane	I9	0.0444	0.0495	0.0486
1c,2t,3-Trimethylcyclohexane	N9	0.0687	0.0754	0.0710
1,1,2-Trimethylcyclohexane	N9	0.0315	0.0346	0.0326
1,2-Dimethylbenzene (o-Xylene)	A8	0.5904	0.5452	0.4594
i-Butylcyclopentane	N9	0.2810	0.3085	0.2929
UnknownC8s	U8	0.0356	0.0354	0.0373
n-Nonane	P9	1.7925	1.9995	2.0652
1,1-Methylethylcyclohexane	N9	0.3615	0.4032	0.4177
i-Propylbenzene	A9	0.3533	0.3693	0.3171
i-Propylcyclohexane	N9	0.1034	0.1135	0.1049
2,2-Dimethyloctane	I10	0.0768	0.0950	0.0952
2,4-Dimethyloctane	I10	0.0819	0.1013	0.1016
2,6-Dimethyloctane	I10	0.0133	0.0165	0.0171
2,5-Dimethyloctane	I10	0.0471	0.0583	0.0584
n-Butylcyclopentane	N9	0.2630	0.3208	0.2977
3,3-Dimethyloctane	I10	0.0741	0.0917	0.0920
n-Propylbenzene	A9	0.4321	0.4517	0.3879
3,6-Dimethyloctane	I10	0.2061	0.2550	0.2557
3-Methyl-5-ethylheptane	I10	0.4692	0.5234	0.5346
1,3-Methylethylbenzene	A9	0.3496	0.3655	0.3112
1,4-Methylethylbenzene	A9	0.2283	0.2387	0.2033
1,3,5-Trimethylbenzene	A9	0.1338	0.1399	0.1199
2,3-Dimethyloctane	I10	0.0688	0.0851	0.0853
5-Methylnonane	I10	0.2266	0.2804	0.2838
1,2-Methylethylbenzene	A9	0.5151	0.5385	0.4561
2-Methylnonane	I10	0.0621	0.0768	0.0784
3-Ethyloctane	I10	0.0799	0.0989	0.0992
3-Methylnonane	I10	0.2482	0.3071	0.3104
1,2,4-Trimethylbenzene	A9	0.0508	0.0531	0.0450
t-Butylbenzene	A10	0.4989	0.5824	0.4987
i-Butylcyclohexane	N10	0.2286	0.2789	0.2548
1t-Methyl-2-n-propylcyclohexane	I10	0.0768	0.0857	0.0875
i-Butylbenzene	A10	0.0792	0.0925	0.0804
sec-Butylbenzene	A10	0.0315	0.0368	0.0317
UnknownC9s	U9	1.4979	1.6709	1.7258
n-Decane	P10	1.4165	1.7528	1.7799
1,2,3-Trimethylbenzene	A9	0.2403	0.2512	0.2084
1,3-Methyl-i-propylbenzene	A10	0.1106	0.1156	0.0979
1,4-Methyl-i-propylbenzene	A10	0.1330	0.1390	0.1177
Sec-Butylcyclohexane	N10	0.3521	0.4295	0.3919
1,2-Methyl-i-propylbenzene	A10	0.1972	0.2302	0.1948
3-Ethylnonane	I10	0.0595	0.0736	0.0751
1,3-Diethylbenzene	A10	0.1581	0.1846	0.1585
1,3-Methyl-n-propylbenzene	A10	0.0579	0.0676	0.0582
1,4-Diethylbenzene	A10	0.1776	0.2073	0.1784
1,4-Methyl-n-propylbenzene	A10	0.1382	0.1613	0.1394
n-Butylbenzene	A10	0.1204	0.1405	0.1210
1,3-Dimethyl-5-ethylbenzene	A10	0.0695	0.0811	0.0696
1,2-Diethylbenzene	A10	0.1265	0.1477	0.1246
1,2-Methyl-n-propylbenzene	A10	0.1214	0.1417	0.1203
1,4-Dimethyl-2-ethylbenzene	A10	0.1596	0.1863	0.1576
1,3-Dimethyl-4-ethylbenzene	A10	0.0070	0.0082	0.0069
1,2-Dimethyl-4-ethylbenzene	A10	0.2160	0.2521	0.2139
1,3-Dimethyl-2-ethylbenzene	A10	0.1302	0.1520	0.1266
1t,2c,4-Trimethylcyclopentane	A10	0.5188	0.5063	0.5021
1,2-Dimethyl-3-ethylbenzene	A10	0.0957	0.1117	0.0929
1,2-Ethyl-i-propylbenzene	A10	0.1159	0.1353	0.1145
1,4-Methyl-t-butylbenzene	A11	0.2021	0.2359	0.1996
UnknownC10s	U10	2.4044	2.9753	3.0214
n-Undecane	P11	1.1579	1.5741	1.5763
1,4-Ethyl-i-propylbenzene	A11	0.0621	0.0725	0.0614
1,2,4,5-Tetramethylbenzene	A11	0.0994	0.1160	0.0971
1,2-Methyl-n-butylbenzene	A11	0.0815	0.0951	0.0805
1,2,3,5-Tetramethylbenzene	A11	0.0616	0.0719	0.0599
1,2-Methyl-t-butylbenzene	A11	0.1068	0.1247	0.1055
5-Methylindan	A11	0.0220	0.0326	0.0323

4-Methylindan	A11	0.0100	0.0148	0.0147
1,2-Ethyl-n-propylbenzene	A11	0.1725	0.2014	0.1704
2-Methylindan	A11	0.0826	0.1224	0.1212
1,3-Methyl-n-butylbenzene	A11	0.0781	0.0912	0.0772
1,3-Di-i-propylbenzene	A11	0.0592	0.0691	0.0585
sec-Pentylbenzene	A11	0.1262	0.1473	0.1247
n-Pentylbenzene	A11	0.0457	0.0589	0.0509
1t-M-2-(4MP)cyclopentane	P12	0.1059	0.1569	0.1554
1,2-Di-n-propylbenzene	A11	0.1160	0.1354	0.1146
1,4-Di-i-propylbenzene	A11	0.2116	0.2470	0.2090
Tetrahydronaphthalene	A10	0.0260	0.0304	0.0257
t-Decahydronaphthalene	A10	0.1308	0.1527	0.1292
Naphthalene	A10	0.1182	0.1318	0.1115
1-t-Butyl-3,5-dimethylbenzene	A12	0.0602	0.0703	0.0595
1,4-Ethyl-t-butylbenzene	A11	0.1282	0.1497	0.1267
UnknownC11s	U11	1.6820	2.2866	2.2898
n-Dodecane	P12	1.0176	1.5076	1.4931
1,3-Di-n-propylbenzene	A12	0.0879	0.1026	0.0868
1,3,5-Triethylbenzene	A12	0.0447	0.0467	0.0400
1,2,4-Triethylbenzene	A12	0.3807	0.3979	0.3369
1,4-Methyl-n-pentylbenzene	A12	0.0720	0.0840	0.0711
n-Hexylbenzene	A12	0.1435	0.2025	0.1751
1,2,3,4,5-Pentamethylbenzene	A13	0.2453	0.2863	0.2423
2-Methylnaphthalene	A11	0.2871	0.3551	0.3005
1-Methylnaphthalene	A11	0.2322	0.2872	0.2089
UnknownC12s	U12	1.5617	2.3136	2.2914
n-Tridecane	P13	0.8575	1.3749	1.3456
UnknownC13s	U13	1.3830	2.2175	2.1703
n-Tetradecane	P14	0.5917	1.0209	0.9971
UnknownC14s	U14	1.4362	2.4781	2.4204
n-Pentadecane	P15	0.2478	0.4578	0.4420
UnknownC15s	U15	1.3395	2.4747	2.3893
n-Hexadecane	P16	0.3360	0.6617	0.6347
UnknownC16s	U16	0.7867	1.5493	1.4861
n-Heptadecane	P17	0.2048	0.4283	0.4096
UnknownC17s	U17	0.3145	0.6578	0.6290
n-Octadecane	P18	0.1135	0.2512	0.2395
UnknownC18s	U18	0.3481	0.7705	0.7347
n-Nonadecane	P19	0.1479	0.3454	0.3272
UnknownC19s	U19	0.0949	0.2216	0.2099
n-Eicosane	P20	0.0137	0.0337	0.0318
UnknownC20s	U20	0.0172	0.0423	0.0399
n-Heneicosane	P21	0.0020	0.0052	0.0049
n-Docosane	P22	0.0008	0.0022	0.0021
n-Tricosane	P23	0.0006	0.0017	0.0016
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. :	201406119	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 25, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 18, 2014
PRODUCER :		CYLINDER NO. :	0962
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 16:50 BRINGELSON RANCH 11-20-9-58		
FIELD DATA		SAMPLE TEMP. :	110
SAMPLE PRES. :	101	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 2 PPM (1-7 PPM) @ 16:55		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0004	0.0010		
GLYCOLS	0.0002	0.0012		
HELIUM	0.01	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.01	0.01	---	---
NITROGEN	0.98	1.08	---	---
CARBON DIOXIDE	2.39	4.15	---	---
METHANE	65.15250	41.20280	---	---
ETHANE	13.1123	15.5430	3.5043	3.5235
PROPANE	11.0882	19.2749	3.0525	3.0692
I-BUTANE	1.0798	2.4741	0.3526	0.3546
N-BUTANE	3.6549	8.3744	1.1511	1.1574
I-PENTANE	0.7204	2.0443	0.2584	0.2598
N-PENTANE	0.8517	2.4224	0.3086	0.3102
HEXANES PLUS	0.9396	3.4219	0.3774	0.3794
TOTALS	100.00000	100.00000	9.0049	9.0541

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0253	0.0779
TOLUENE	0.0174	0.0632
ETHYLBENZENE	0.0019	0.0080
XYLENES	0.0043	0.0179
TOTAL BTEX	0.0489	0.1670

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1307.0 **/scf**	1314.1 **/scf**
	NET WET REAL :	1284.2 **/scf**	1291.3 **/scf**
HIGH	GROSS DRY REAL :	1434.3 **/scf**	1442.1 **/scf**
	GROSS WET REAL :	1409.2 **/scf**	1417.1 **/scf**
	NET DRY REAL :	19578.8 **/lb**	19685.7 **/lb**
	GROSS DRY REAL :	21491.1 **/lb**	21608.5 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8746
	COMPRESSIBILITY FACTOR :		0.99507

(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

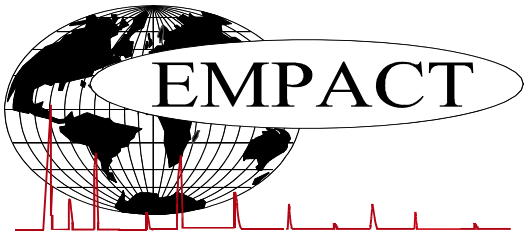
303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201406119	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 25, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 18, 2014
PRODUCER :		CYLINDER NO. :	0962
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 16:50 BRINGELSON RANCH 11-20-9-58		
FIELD DATA		SAMPLE TEMP. :	110
SAMPLE PRES. :	101	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 2 PPM (1-7 PPM) @ 16:55		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	2.39	4.15
Nitrogen	0.98	1.08
Methane	65.15250	41.20280
Ethane	13.1123	15.5430
Propane	11.0882	19.2749
Isobutane	1.0798	2.4741
n-Butane	3.6549	8.3744
Isopentane	0.6613	1.8809
n-Pentane	0.8517	2.4224
Cyclopentane	0.0591	0.1634
n-Hexane	0.1883	0.6397
Cyclohexane	0.0476	0.1579
Other Hexanes	0.3385	1.1415
Heptanes	0.1749	0.6859
Methycyclohexane	0.0409	0.1583
2,2,4 Trimethylpentane	0.0001	0.0004
Benzene	0.0253	0.0779
Toluene	0.0174	0.0632
Ethylbenzene	0.0019	0.0080
Xylenes	0.0043	0.0179
C8+ Heavies	0.1004	0.4712
Subtotal	99.98940	99.98780
Oxygen/Argon	0.01	0.01
Alcohols	0.0004	0.0010
Glycols	0.0002	0.0012
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201406119	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 25, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 18, 2014
PRODUCER :		CYLINDER NO. :	0962
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 16:50 BRINGELSON RANCH 11-20-9-58		
FIELD DATA		SAMPLE TEMP. :	110
SAMPLE PRES. :	101	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 2 PPM (1-7 PPM) @ 16:55		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.01	0.00	---	---
Hydrogen	---	0.01	0.00	---	---
Oxygen/Argon	---	0.01	0.01	---	---
Nitrogen	---	0.98	1.08	---	---
Carbon Dioxide	---	2.39	4.15	---	---
Methane	P1	65.15250	41.20280	---	---
Ethane	P2	13.1123	15.5430	3.504	3.524
Propane	P3	11.0882	19.2749	3.053	3.069
i-Butane	I4	1.0798	2.4741	0.353	0.355
n-Butane	P4	3.6549	8.3744	1.151	1.157
2,2-Dimethylpropane	I5	0.0028	0.0080	0.001	0.001
Ethanol	X2	0.0002	0.0004	0.000	0.000
i-Pentane	I5	0.6585	1.8729	0.240	0.242
n-Pentane	P5	0.8517	2.4224	0.309	0.310
t-Butanol	X4	0.0002	0.0006	0.000	0.000
2,2-Dimethylbutane	I6	0.0020	0.0068	0.001	0.001
Cyclopentane	N5	0.0591	0.1634	0.017	0.017
2,3-Dimethylbutane	I6	0.0213	0.0724	0.009	0.009
2-Methylpentane	I6	0.1363	0.4630	0.056	0.056
3-Methylpentane	I6	0.0719	0.2443	0.029	0.029
n-Hexane	P6	0.1883	0.6397	0.077	0.078
2,2-Dimethylpentane	I7	0.0009	0.0036	0.000	0.000
Methylcyclopentane	N6	0.1070	0.3550	0.038	0.038
2,4-Dimethylpentane	I7	0.0046	0.0182	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0253	0.0779	0.007	0.007
3,3-Dimethylpentane	I7	0.0005	0.0020	0.000	0.000
Cyclohexane	N6	0.0476	0.1579	0.016	0.016
2-Methylhexane	I7	0.0205	0.0810	0.010	0.010
2,3-Dimethylpentane	I7	0.0096	0.0379	0.004	0.004
1,1-Dimethylcyclopentane	N7	0.0059	0.0228	0.002	0.002
3-Methylhexane	I7	0.0240	0.0948	0.011	0.011
1c,3-Dimethylcyclopentane	N7	0.0140	0.0542	0.006	0.006
1t,3-Dimethylcyclopentane	N7	0.0125	0.0484	0.006	0.006
3-Ethylpentane	I7	0.0011	0.0043	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0241	0.0933	0.011	0.011
2,2,4-Trimethylpentane	I8	0.0001	0.0004	0.000	0.000
n-Heptane	P7	0.0501	0.1979	0.023	0.023
1c,2-Dimethylcyclopentane	N7	0.0017	0.0066	0.001	0.001
Methylcyclohexane	N7	0.0409	0.1583	0.016	0.016
2,2-Dimethylhexane	I8	0.0039	0.0175	0.002	0.002
Ethylcyclopentane	N7	0.0053	0.0205	0.002	0.002

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2,5-Dimethylhexane	I8	0.0011	0.0050	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0002	0.0009	0.000	0.000
2,4-Dimethylhexane	I8	0.0018	0.0081	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0037	0.0164	0.002	0.002
3,3-Dimethylhexane	I8	0.0003	0.0013	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0041	0.0181	0.002	0.002
2,3,4-Trimethylpentane	I8	0.0007	0.0032	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0004	0.000	0.000
Toluene	A7	0.0174	0.0632	0.006	0.006
2,3-Dimethylhexane	I8	0.0013	0.0059	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0009	0.0041	0.000	0.000
2-Methylheptane	I8	0.0086	0.0387	0.004	0.004
4-Methylheptane	I8	0.0023	0.0104	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0003	0.0013	0.000	0.000
3,4-Dimethylhexane	I8	0.0003	0.0013	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	0.0041	0.0185	0.002	0.002
1c,2t,3-Trimethylcyclopentane	N8	0.0058	0.0257	0.003	0.003
3-Ethylhexane	I8	0.0007	0.0032	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0022	0.0097	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0007	0.0031	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0011	0.0049	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0009	0.0040	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0028	0.0124	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0002	0.0010	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0029	0.0128	0.001	0.001
1t,3-Dimethylcyclohexane	N8	0.0001	0.0004	0.000	0.000
n-Octane	P8	0.0126	0.0567	0.006	0.006
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	0.0006	0.0030	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	0.0006	0.0026	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0032	0.0159	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0014	0.0071	0.001	0.001
2,4-Dimethylheptane	I9	0.0003	0.0015	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	0.0008	0.0036	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	0.0003	0.0015	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	0.0006	0.0030	0.000	0.000
Ethylbenzene	I8	0.0019	0.0080	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0007	0.0035	0.000	0.000
2,3-Dimethylheptane	I9	0.0016	0.0081	0.001	0.001
1,3-Dimethylbenzene (m-Xylene)	A8	0.0023	0.0096	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0007	0.0029	0.000	0.000
3,4-Dimethylheptane	I9	0.0001	0.0005	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	0.0007	0.0036	0.000	0.000
2-Methyloctane	I9	0.0009	0.0045	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
3-Ethylheptane	I9	0.0003	0.0015	0.000	0.000
3-Methyloctane	I9	0.0010	0.0051	0.001	0.001
3,3-Diethylpentane	I9	0.0001	0.0005	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0013	0.0054	0.000	0.000
i-Butylcyclopentane	N9	0.0007	0.0035	0.000	0.000
UnknownC8s	U8	0.0004	0.0018	0.000	0.000
n-Nonane	P9	0.0030	0.0152	0.002	0.002
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	0.0002	0.0010	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
2,4-Dimethyloctane	I10	0.0002	0.0011	0.000	0.000
n-Butylcyclopentane	N9	0.0005	0.0025	0.000	0.000
3,3-Dimethyloctane	I10	0.0002	0.0011	0.000	0.000
n-Propylbenzene	A9	0.0005	0.0024	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0007	0.0039	0.000	0.000
1,3-Methylethylbenzene	A9	0.0004	0.0019	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	0.0002	0.0011	0.000	0.000
1,2-Methylethylbenzene	A9	0.0003	0.0014	0.000	0.000
2-Methylnonane	I10	0.0003	0.0017	0.000	0.000
3-Ethyloctane	I10	0.0001	0.0006	0.000	0.000
3-Methylnonane	I10	0.0002	0.0011	0.000	0.000
1,2,4-Trimethylbenzene	A9	0.0001	0.0005	0.000	0.000
t-Butylbenzene	A10	0.0004	0.0021	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0006	0.000	0.000
1t-Methyl-2-n-propylcyclohexane	I10	0.0001	0.0006	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	0.0024	0.0121	0.001	0.001
n-Decane	P10	0.0009	0.0051	0.001	0.001
1,2,3-Trimethylbenzene	A9	0.0002	0.0010	0.000	0.000
1,4-Methyl-i-propylbenzene	A10	0.0001	0.0005	0.000	0.000
Sec-Butylcyclohexane	A10	0.0002	0.0011	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	0.0001	0.0005	0.000	0.000
n-Butylbenzene	A10	0.0001	0.0005	0.000	0.000
1,3-Dimethyl-5-ethylbenzene	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
UnknownC10s	U10	0.0018	0.0101	0.001	0.001
n-Undecane	P11	0.0004	0.0025	0.000	0.000
Triethylene Glycol	GL6	0.0002	0.0012	0.000	0.000
UnknownC11s	U11	0.0004	0.0025	0.000	0.000
n-Dodecane	P12	0.0002	0.0013	0.000	0.000
UnknownC12s	U12	0.0001	0.0006	0.000	0.000
n-Tridecane	P13	0.0001	0.0007	0.000	0.000
n-Tetradecane	P14	0.0001	0.0008	0.000	0.000
TOTAL		100.00000	100.00000	9.0049	9.0541

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0253	0.0779
TOLUENE	0.0174	0.0632
ETHYLBENZENE	0.0019	0.0080
XYLENES	0.0043	0.0179
TOTAL BTEX	0.0489	0.1670

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1307.0 **/scf**	1314.1 **/scf**
	NET WET REAL :	1284.2 **/scf**	1291.3 **/scf**
HIGH	GROSS DRY REAL :	1434.3 **/scf**	1442.1 **/scf**
	GROSS WET REAL :	1409.2 **/scf**	1417.1 **/scf**
	NET DRY REAL :	19578.8 **/lb**	19685.7 **/lb**
	GROSS DRY REAL :	21491.1 **/lb**	21608.5 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8746
	COMPRESSIBILITY FACTOR :		0.99507

(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.