CRUDE OIL ASSAY

PROJECT NO. :	201403015	ANALYSIS NO. :	01
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 8-26-8-60		EMPACT
FIELD DATA		SAMPLE TEMP. :	85
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; TK# 52620		

SPECIFICATION		TEST METHOD	UNITS	RESULTS
API GRAVITY			API 60/60	36.1
RVP @100 DEG F		D323	PSIG	7.4
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.
BRIGHTON, CO
80601

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201403015	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 5, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	13005
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 14:00 BAILEY 8-26-8-60		EMPACT
FIELD DATA		SAMPLE TEMP. :	144
SAMPLE PRES. :	28 PSI	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
NITROGEN (AIR)	0.0382	0.0099	0.0090
CARBON DIOXIDE	0.0214	0.0087	0.0079
METHANE	0.0648	0.0096	0.0237
ETHANE	0.4273	0.1187	0.2463
PROPANE	1.7183	0.6998	1.0203
I-BUTANE	0.4589	0.2463	0.3234
N-BUTANE	2.3066	1.2380	1.5670
I-PENTANE	1.0620	0.7076	0.8382
N-PENTANE	1.7205	1.1464	1.3427
HEXANES PLUS	92.1820	95.8150	94.6215
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	MOLE%	MASS%
BENZENE	1.4776	1.0659
TOLUENE	2.4294	2.0672
ETHYLBENZENE	0.6456	0.6330
XYLENE	2.0414	2.0016
TOTAL BTEX	6.5940	5.7677

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

	TOTAL SAMPLE	C6+ FRACTION	
Specific Gravity (H2O=1) =	0.7398	0.7491	60/60
API Gravity =	59.77	57.39	60/60
Molecular Weight =	108.28	113.48	
Absolute Density =	6.17	6.24	LBS/GAL
Heating Value Liq. Idl Gas=	125540	127077	BTU/GAL
Vapor/Liquid =	21.64	20.94	CUFT/GAL
Vapor Pressure =	13.75	1.93	PSIA @100 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 LIQUID ANALYSIS (*DHA)

E & P TANK / GLYCALC INFORMATION

PROJECT NO. :	201403015	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 5, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	13005
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 14:00		EMPACT
	BAILEY 8-26-8-60		
FIELD DATA		SAMPLE TEMP. :	144
SAMPLE PRES. :	28 PSI	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0214		0.0087		0.0079	
NITROGEN (AIR)	0.0382		0.0099		0.0090	
METHANE	0.0648		0.0096		0.0237	
ETHANE	0.4273		0.1187		0.2463	
PROPANE	1.7183		0.6998		1.0203	
I-BUTANE	0.4589		0.2463		0.3234	
N-BUTANE	2.3066		1.2380		1.5670	
I-PENTANE	1.0620		0.7076		0.8382	
N-PENTANE	1.7205		1.1464		1.3427	
CYCLOPENTANE (N-C5)	1.9603		1.2696		1.2345	
N-HEXANE	8.2688		6.5800		7.3272	
CYCLOHEXANE (OTHER C6)	2.8147		2.1876		2.0640	
OTHER HEXANES	12.7470		10.0520		10.6971	
OTHER HEPTANES	12.4481		11.4414		11.9054	
METHYLCYCLOHEXANE (OTHER C7)	3.8285		3.4716		3.3124	
2,2,4 TRIMETHYLPENTANE	0.7740		0.7019		0.6886	
BENZENE	1.4776		1.0659		0.8924	
TOLUENE	2.4294		2.0672		1.7478	
ETHYLBENZENE	0.6456		0.6330		0.5351	
XYLENES	2.0414		2.0016		1.6941	
OTHER OCTANES	9.8303		10.3987		10.4335	
OCTANES PLUS	----	46.2076	----	57.6797	----	55.4407
NONANES	10.3292		12.0935		11.7819	
DECANES PLUS	22.5871		31.8510		30.3075	
SUB TOTAL	100.0000		100.0000		100.0000	
TOTAL	100.0000		100.0000		100.0000	

API Gravity =	**59.77**	60/60
Vapor Pressure =	**13.75**	PSIA & 100 F
Average Molecular Weight of Decanes plus =	**152.69**	
Average Specific Gravity of Decanes plus =	**0.7770**	

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

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

BY CARBON NUMBER

PROJECT NO. :	201403015	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 5, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	13005
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 14:00		EMPACT
	BAILEY 8-26-8-60		
FIELD DATA		SAMPLE TEMP. :	144
SAMPLE PRES. :	28 PSI	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
NITROGEN		0.0382	0.0099	0.0090
CARBON DIOXIDE		0.0214	0.0087	0.0079
	C1	0.0648	0.0096	0.0237
	C2	0.4273	0.1187	0.2463
	C3	1.7183	0.6998	1.0203
	C4	2.7655	1.4843	1.8904
	C5	4.7428	3.1236	3.4154
	C6	25.3081	19.8855	20.9807
	C7	18.7060	16.9802	16.9656
	C8	13.2913	13.7352	13.3513
	C9	10.3292	12.0935	11.7819
	C10	9.5509	12.1480	11.6187
	C11	5.7652	7.8939	7.3318
	C12	3.7828	5.6726	5.4487
	C13	1.9153	3.1811	3.0588
	C14	1.0043	1.8400	1.7818
	C15	0.5686	1.1154	1.0677
	C16	0.0000	0.0000	0.0000
	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.
365 S. MAIN ST.
BRIGHTON, CO
80601

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201403015	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 5, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	13005
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 14:00 BAILEY 8-26-8-60		EMPACT
FIELD DATA		SAMPLE TEMP. :	144
SAMPLE PRES. :	28 PSI	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0382	0.0099	0.0090
Carbon Dioxide	NHC	0.0214	0.0087	0.0079
Methane	P1	0.0648	0.0096	0.0237
Ethane	P2	0.4273	0.1187	0.2463
Propane	P3	1.7183	0.6998	1.0203
i-Butane	I4	0.4589	0.2463	0.3234
n-Butane	P4	2.3066	1.2380	1.5670
2,2-Dimethylpropane	I5	0.0219	0.0146	0.0181
i-Pentane	I5	1.0401	0.6930	0.8201
n-Pentane	P5	1.7205	1.1464	1.3427
2,2-Dimethylbutane	I6	0.0470	0.0374	0.0423
Cyclopentane	N5	1.9603	1.2696	1.2345
2,3-Dimethylbutane	I6	0.4563	0.3632	0.4025
2-Methylpentane	I6	4.6851	3.7287	4.1902
3-Methylpentane	I6	2.5754	2.0497	2.2650
n-Hexane	P6	8.2688	6.5800	7.3272
Methylcyclopentane	N6	4.9832	3.8730	3.7971
2,4-Dimethylpentane	I7	0.2515	0.2327	0.2543
Benzene	A6	1.4776	1.0659	0.8924
3,3-Dimethylpentane	I7	0.0148	0.0137	0.0145
Cyclohexane	N6	2.8147	2.1876	2.0640
2-Methylhexane	I7	1.2275	1.1359	1.2305
2,3-Dimethylpentane	I7	0.7221	0.6682	0.7032
1,1-Dimethylcyclopentane	N7	0.3587	0.3253	0.3167
3-Methylhexane	I7	1.6381	1.5158	1.6173
1c,3-Dimethylcyclopentane	N7	0.8465	0.7676	0.7570
1t,3-Dimethylcyclopentane	N7	0.7740	0.7019	0.6886
3-Ethylpentane	I7	0.1266	0.1171	0.1229
1t,2-Dimethylcyclopentane	N7	1.5188	1.3772	1.3464
2,2,4-Trimethylpentane	I8	0.0984	0.1038	0.1097
n-Heptane	P7	4.2579	3.9400	4.2317
1c,2-Dimethylcyclopentane	N7	0.1594	0.1445	0.1375
Methylcyclohexane	N7	3.8285	3.4716	3.3124
2,2-Dimethylhexane	I8	0.3744	0.3950	0.4171
Ethylcyclopentane	N7	0.5143	0.4664	0.4471

2,5-Dimethylhexane	I8	0.1033	0.1090	0.1154
2,2,3-Trimethylpentane	I8	0.0289	0.0305	0.0313
2,4-Dimethylhexane	I8	0.1931	0.2037	0.2146
1c,2t,4-Trimethylcyclopentane	N8	0.3607	0.3738	0.3598
3,3-Dimethylhexane	I8	0.0501	0.0529	0.0548
2,3,4-Trimethylpentane	I8	0.0851	0.0898	0.0917
2,3,3-Trimethylpentane	I8	0.0130	0.0137	0.0139
Toluene	A7	2.4294	2.0672	1.7478
2,3-Dimethylhexane	I8	0.1798	0.1897	0.1958
2-Methyl-3-ethylpentane	I8	0.1178	0.1243	0.1269
1,1,2-Trimethylcyclopentane	N8	0.0072	0.0075	0.0071
2-Methylheptane	I8	1.1758	1.2404	1.3032
4-Methylheptane	I8	0.3470	0.3661	0.3753
3-Methyl-3-ethylpentane	I8	0.0921	0.0972	0.0982
3,4-Dimethylhexane	I8	0.0631	0.0666	0.0680
1c,2c,4-Trimethylcyclopentane	N8	0.0335	0.0347	0.0331
1c,3-Dimethylcyclohexane	N8	0.0163	0.0169	0.0162
3-Methylheptane	I8	0.5298	0.5589	0.5821
1c,2t,3-Trimethylcyclopentane	N8	0.8649	0.8963	0.8549
3-Ethylhexane	I8	0.1875	0.1978	0.2038
1t,4-Dimethylcyclohexane	N8	0.3864	0.4004	0.3859
1,1-Dimethylcyclohexane	N8	0.1148	0.1190	0.1120
3t-Ethylmethylcyclopentane	N8	0.1797	0.1862	0.1785
2t-Ethylmethylcyclopentane	N8	0.1515	0.1570	0.1501
1,1-Methylethylcyclopentane	N8	0.5150	0.5337	0.5023
2,2,4-Trimethylhexane	I9	0.0439	0.0520	0.0534
1t,2-Dimethylcyclohexane	N8	0.5191	0.5379	0.5096
1t,3-Dimethylcyclohexane	N8	0.0148	0.0153	0.0143
UnknownC7s	U7	0.0379	0.0351	0.0377
n-Octane	P8	2.3071	2.4338	2.5448
1c,4-Dimethylcyclohexane	N8	0.4803	0.4977	0.4673
i-Propylcyclopentane	I8	0.0433	0.0449	0.0425
2,4,4-Trimethylhexane	I9	0.0260	0.0308	0.0314
2,2,3,4-Tetramethylpentane	I9	0.0145	0.0172	0.0176
2,3,4-Trimethylhexane	I9	0.0254	0.0301	0.0306
1c,2-Dimethylcyclohexane	N8	0.2346	0.2431	0.2244
2,3,5-Trimethylhexane	I9	0.0148	0.0175	0.0178
2,2-Dimethylheptane	I9	0.0181	0.0214	0.0221
1,1,4-Trimethylcyclohexane	N9	0.9046	1.0546	1.0043
2,2,3-Trimethylhexane	I9	0.3672	0.4349	0.4382
2,4-Dimethylheptane	I9	0.0700	0.0829	0.0852
4,4-Dimethylheptane	I9	0.0378	0.0448	0.0460
Ethylcyclohexane	N8	0.5116	0.5302	0.4948
n-Propylcyclopentane	N8	0.2024	0.2097	0.1985
1c,3c,5-Trimethylcyclohexane	N9	0.0397	0.0463	0.0441
2,5-Dimethylheptane	I9	0.0635	0.0752	0.0771
3,3-Dimethylheptane	I9	0.0710	0.0841	0.0862
3,5-Dimethylheptane	I9	0.0530	0.0628	0.0644
2,6-Dimethylheptane	I9	0.0468	0.0554	0.0574
1,1,3-Trimethylcyclohexane	N9	0.0942	0.1098	0.1046
Ethylbenzene	A8	0.6456	0.6330	0.5351
1c,2t,4t-Trimethylcyclohexane	N9	0.2169	0.2529	0.2362
2,3-Dimethylheptane	I9	0.0134	0.0159	0.0161
1,3-Dimethylbenzene (m-Xylene)	A8	0.7050	0.6912	0.5877
1,4-Dimethylbenzene (p-Xylene)	A8	0.6789	0.6657	0.5678
3,4-Dimethylheptane	I9	0.0691	0.0818	0.0822
3,4-Dimethylheptane (2)	I9	0.1204	0.1426	0.1433
4-Ethylheptane	I9	0.0234	0.0277	0.0285
4-Methyloctane	I9	0.2801	0.3318	0.3384
2-Methyloctane	I9	0.2956	0.3501	0.3606
1c,2t,4c-Trimethylcyclohexane	I9	0.0468	0.0554	0.0561
3-Ethylheptane	I9	0.0954	0.1130	0.1143
3-Methyloctane	I9	0.4452	0.5273	0.5377
3,3-Diethylpentane	I9	0.0513	0.0608	0.0592
1c,2t,3-Trimethylcyclohexane	N9	0.0691	0.0806	0.0753
1,1,2-Trimethylcyclohexane	N9	0.0220	0.0256	0.0239
1,2-Dimethylbenzene (o-Xylene)	A8	0.6575	0.6447	0.5386

i-Butylcyclopentane	N9	0.2264	0.2639	0.2484
UnknownC8s	U8	0.0219	0.0231	0.0242
n-Nonane	P9	1.8680	2.2126	2.2659
1,1-Methylethylcyclohexane	N9	0.2958	0.3504	0.3599
i-Propylbenzene	A9	0.2740	0.3041	0.2589
i-Propylcyclohexane	N9	0.1028	0.1198	0.1098
2,2-Dimethyloctane	I10	0.0731	0.0961	0.0955
2,4-Dimethyloctane	I10	0.0870	0.1143	0.1136
2,6-Dimethyloctane	I10	0.0126	0.0166	0.0171
2,5-Dimethyloctane	I10	0.0437	0.0574	0.0571
n-Butylcyclopentane	N9	0.3160	0.4093	0.3766
3,3-Dimethyloctane	I10	0.0251	0.0330	0.0328
n-Propylbenzene	A9	0.2564	0.2846	0.2423
3,6-Dimethyloctane	I10	0.2444	0.3211	0.3192
3-Methyl-5-ethylheptane	I10	0.3816	0.4520	0.4578
1,3-Methylethylbenzene	A9	0.3299	0.3662	0.3092
1,4-Methylethylbenzene	A9	0.1623	0.1802	0.1521
1,3,5-Trimethylbenzene	A9	0.1807	0.2006	0.1705
2,3-Dimethyloctane	I10	0.0743	0.0976	0.0970
5-Methylnonane	I10	0.2790	0.3666	0.3678
1,2-Methylethylbenzene	A9	0.5196	0.5768	0.4844
2-Methylnonane	I10	0.0763	0.1003	0.1015
3-Ethyloctane	I10	0.0712	0.0936	0.0930
3-Methylnonane	I10	0.1687	0.2217	0.2222
1,2,4-Trimethylbenzene	A9	0.0263	0.0292	0.0245
t-Butylbenzene	A10	0.2549	0.3160	0.2683
i-Butylcyclohexane	N10	0.2142	0.2775	0.2514
1t-Methyl-2-n-propylcyclohexane	I10	0.0366	0.0433	0.0439
i-Butylbenzene	A10	0.0791	0.0980	0.0845
sec-Butylbenzene	A10	0.0391	0.0485	0.0414
UnknownC9s	U9	1.9360	2.2932	2.3484
n-Decane	P10	1.2565	1.6510	1.6623
1,2,3-Trimethylbenzene	A9	0.1958	0.2173	0.1788
1,3-Methyl-i-propylbenzene	A10	0.1070	0.1188	0.0998
1,4-Methyl-i-propylbenzene	A10	0.0519	0.0576	0.0484
Sec-Butylcyclohexane	N10	0.3311	0.4289	0.3880
1,2-Methyl-i-propylbenzene	A10	0.1535	0.1903	0.1597
3-Ethylnonane	I10	0.0433	0.0569	0.0576
1,3-Diethylbenzene	A10	0.1413	0.1751	0.1491
1,3-Methyl-n-propylbenzene	A10	0.0369	0.0457	0.0390
1,4-Diethylbenzene	A10	0.1502	0.1862	0.1589
1,4-Methyl-n-propylbenzene	A10	0.0332	0.0412	0.0353
n-Butylbenzene	A10	0.0954	0.1183	0.1010
1,3-Dimethyl-5-ethylbenzene	A10	0.0669	0.0829	0.0705
1,2-Diethylbenzene	A10	0.1154	0.1430	0.1196
1,2-Methyl-n-propylbenzene	A10	0.1024	0.1269	0.1068
1,4-Dimethyl-2-ethylbenzene	A10	0.1352	0.1676	0.1405
1,3-Dimethyl-4-ethylbenzene	A10	0.0391	0.0485	0.0407
1,2-Dimethyl-4-ethylbenzene	A10	0.2072	0.2568	0.2160
1,3-Dimethyl-2-ethylbenzene	A10	0.1532	0.1899	0.1569
1t,2c,4-Trimethylcyclopentane	A10	0.4226	0.4379	0.4306
1,2-Dimethyl-3-ethylbenzene	A10	0.1147	0.1422	0.1172
1,2-Ethyl-i-propylbenzene	A10	0.1140	0.1413	0.1186
1,4-Methyl-t-butylbenzene	A11	0.1901	0.2356	0.1977
UnknownC10s	U10	3.1256	4.1069	4.1350
n-Undecane	P11	0.9529	1.3755	1.3657
1,4-Ethyl-i-propylbenzene	A11	0.0818	0.1014	0.0851
1,2,4,5-Tetramethylbenzene	A11	0.2225	0.2758	0.2290
1,2-Methyl-n-butylbenzene	A11	0.1165	0.1444	0.1212
1,2,3,5-Tetramethylbenzene	A11	0.1700	0.2107	0.1741
1,2-Methyl-t-butylbenzene	A11	0.1605	0.1989	0.1669
5-Methylindan	A11	0.0442	0.0695	0.0683
4-Methylindan	A11	0.0247	0.0389	0.0382
1,2-Ethyl-n-propylbenzene	A11	0.1773	0.2198	0.1844
2-Methylindan	A11	0.1029	0.1619	0.1590
1,3-Methyl-n-butylbenzene	A11	0.0847	0.1050	0.0881
1,3-Di-i-propylbenzene	A11	0.1161	0.1439	0.1207

sec-Pentylbenzene	A11	0.1129	0.1399	0.1174
n-Pentylbenzene	A11	0.0695	0.0951	0.0815
1t-M-2-(4MP)cyclopentane	P12	0.1086	0.1708	0.1677
1,2-Di-n-propylbenzene	A11	0.1507	0.1868	0.1567
1,4-Di-i-propylbenzene	A11	0.1706	0.2115	0.1775
Tetrahydronaphthalene	A10	0.1292	0.1601	0.1343
t-Decahydronaphthalene	A10	0.1374	0.1703	0.1429
Naphthalene	A10	0.1268	0.1501	0.1259
1-t-Butyl-3,5-dimethylbenzene	A12	0.0837	0.1037	0.0870
1,4-Ethyl-t-butylbenzene	A11	0.1522	0.1887	0.1583
UnknownC11s	U11	2.2312	3.2208	3.1979
n-Dodecane	P12	0.8024	1.2623	1.2395
1,3-Di-n-propylbenzene	A12	0.0946	0.1173	0.0984
1,3,5-Triethylbenzene	A12	0.0774	0.0859	0.0730
1,2,4-Triethylbenzene	A12	0.3268	0.3627	0.3044
1,4-Methyl-n-pentylbenzene	A12	0.0786	0.0974	0.0817
n-Hexylbenzene	A12	0.0690	0.1034	0.0887
1,2,3,4,5-Pentamethylbenzene	A13	0.1724	0.2137	0.1793
2-Methylnaphthalene	A11	0.2140	0.2810	0.2358
1-Methylnaphthalene	A11	0.2199	0.2888	0.2083
UnknownC12s	U12	2.1417	3.3691	3.3083
n-Tridecane	P13	0.5436	0.9255	0.8981
UnknownC13s	U13	1.1993	2.0419	1.9814
n-Tetradecane	P14	0.2727	0.4996	0.4838
UnknownC14s	U14	0.7316	1.3404	1.2980
UnknownC15s	U15	0.5686	1.1154	1.0677
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. :	201403015	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	0710
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 14:10 BAILEY 8-26-8-60		
FIELD DATA		SAMPLE TEMP. :	90
SAMPLE PRES. :	119	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 5PPM (1-7PPM) @ 14:15		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0001	0.0003		
HELIUM	0.02	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.01	0.01	---	---
NITROGEN	0.91	1.06	---	---
CARBON DIOXIDE	2.47	4.50	---	---
METHANE	68.80020	45.69970	---	---
ETHANE	12.6380	15.7346	3.3753	3.3938
PROPANE	9.2753	16.9348	2.5523	2.5662
I-BUTANE	0.8964	2.1573	0.2934	0.2950
N-BUTANE	2.9011	6.9817	0.9132	0.9182
I-PENTANE	0.5810	1.7305	0.2082	0.2094
N-PENTANE	0.6662	1.9902	0.2413	0.2426
HEXANES PLUS	0.8317	3.2009	0.3372	0.3389
TOTALS	100.00000	100.00000	7.9209	7.9641

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0333	0.1077
TOLUENE	0.0227	0.0866
ETHYLBENZENE	0.0025	0.0110
XYLENES	0.0064	0.0282
TOTAL BTEX	0.0649	0.2335

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1245.0 **/scf**	1251.8 **/scf**
	NET WET REAL :	1223.2 **/scf**	1230.0 **/scf**
HIGH	GROSS DRY REAL :	1368.2 **/scf**	1375.6 **/scf**
	GROSS WET REAL :	1344.3 **/scf**	1351.7 **/scf**
	NET DRY REAL :	19581.9 **/lb**	19688.9 **/lb**
	GROSS DRY REAL :	21520.9 **/lb**	21638.5 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8327
	COMPRESSIBILITY FACTOR :		0.99559

(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. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	0710
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 14:10 BAILEY 8-26-8-60		
FIELD DATA		SAMPLE TEMP. :	90
SAMPLE PRES. :	119	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 5PPM (1-7PPM) @ 14:15		

Componet	Mole %	Wt %
Helium	0.02	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	2.47	4.50
Nitrogen	0.91	1.06
Methane	68.80020	45.69970
Ethane	12.6380	15.7346
Propane	9.2753	16.9348
Isobutane	0.8964	2.1573
n-Butane	2.9011	6.9817
Isopentane	0.5183	1.5484
n-Pentane	0.6662	1.9902
Cyclopentane	0.0627	0.1821
n-Hexane	0.1538	0.5488
Cyclohexane	0.0462	0.1610
Other Hexanes	0.2749	0.9729
Heptanes	0.1499	0.6175
Methycyclohexane	0.0395	0.1606
2,2,4 Trimethylpentane	0.0001	0.0005
Benzene	0.0333	0.1077
Toluene	0.0227	0.0866
Ethylbenzene	0.0025	0.0110
Xylenes	0.0064	0.0282
C8+ Heavies	0.1024	0.5061
Subtotal	99.98990	99.98970
Oxygen/Argon	0.01	0.01
Alcohols	0.0001	0.0003
Total	100.00000	100.00000

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201403015	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	0710
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 14:10 BAILEY 8-26-8-60		
FIELD DATA		SAMPLE TEMP. :	90
SAMPLE PRES. :	119	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 5PPM (1-7PPM) @ 14:15		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.02	0.00	---	---
Hydrogen	---	0.00	0.00	---	---
Oxygen/Argon	---	0.01	0.01	---	---
Nitrogen	---	0.91	1.06	---	---
Carbon Dioxide	---	2.47	4.50	---	---
Methane	P1	68.80020	45.69970	---	---
Ethane	P2	12.6380	15.7346	3.375	3.394
Propane	P3	9.2753	16.9348	2.552	2.566
i-Butane	I4	0.8964	2.1573	0.293	0.295
n-Butane	P4	2.9011	6.9817	0.913	0.918
2,2-Dimethylpropane	I5	0.0025	0.0075	0.001	0.001
i-Pentane	I5	0.5158	1.5409	0.188	0.189
n-Pentane	P5	0.6662	1.9902	0.241	0.243
t-Butanol	X4	0.0001	0.0003	0.000	0.000
2,2-Dimethylbutane	I6	0.0017	0.0061	0.001	0.001
Cyclopentane	N5	0.0627	0.1821	0.019	0.019
2,3-Dimethylbutane	I6	0.0102	0.0364	0.004	0.004
2-Methylpentane	I6	0.1106	0.3946	0.046	0.046
3-Methylpentane	I6	0.0566	0.2020	0.023	0.023
n-Hexane	P6	0.1538	0.5488	0.063	0.063
2,2-Dimethylpentane	I7	0.0001	0.0004	0.000	0.000
Methylcyclopentane	N6	0.0958	0.3338	0.034	0.034
2,4-Dimethylpentane	I7	0.0040	0.0166	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0333	0.1077	0.009	0.009
3,3-Dimethylpentane	I7	0.0004	0.0017	0.000	0.000
Cyclohexane	N6	0.0462	0.1610	0.016	0.016
2-Methylhexane	I7	0.0175	0.0726	0.008	0.008
2,3-Dimethylpentane	I7	0.0080	0.0332	0.004	0.004
1,1-Dimethylcyclopentane	N7	0.0052	0.0212	0.002	0.002
3-Methylhexane	I7	0.0202	0.0838	0.009	0.009
1c,3-Dimethylcyclopentane	N7	0.0115	0.0468	0.005	0.005
1t,3-Dimethylcyclopentane	N7	0.0103	0.0419	0.005	0.005
3-Ethylpentane	I7	0.0015	0.0062	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0204	0.0829	0.009	0.009
2,2,4-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
n-Heptane	P7	0.0438	0.1817	0.020	0.020
1c,2-Dimethylcyclopentane	N7	0.0017	0.0069	0.001	0.001
Methylcyclohexane	N7	0.0395	0.1606	0.016	0.016
2,2-Dimethylhexane	I8	0.0032	0.0152	0.001	0.001
Ethylcyclopentane	N7	0.0052	0.0212	0.002	0.002
2,5-Dimethylhexane	I8	0.0009	0.0043	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0002	0.0010	0.000	0.000
2,4-Dimethylhexane	I8	0.0017	0.0080	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0033	0.0153	0.002	0.002
3,3-Dimethylhexane	I8	0.0002	0.0010	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0036	0.0167	0.002	0.002
2,3,4-Trimethylpentane	I8	0.0007	0.0033	0.000	0.000

EMPACT Analytical Systems, Inc 365 S. Main Street, Brighton, CO 80601 303-637-0150

Toluene	A7	0.0227	0.0866	0.008	0.008
2,3-Dimethylhexane	I8	0.0016	0.0076	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0009	0.0043	0.000	0.000
2-Methylheptane	I8	0.0082	0.0388	0.004	0.004
4-Methylheptane	I8	0.0023	0.0109	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0002	0.0010	0.000	0.000
3,4-Dimethylhexane	I8	0.0003	0.0014	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	0.0038	0.0180	0.002	0.002
1c,2t,3-Trimethylcyclopentane	N8	0.0057	0.0265	0.003	0.003
3-Ethylhexane	I8	0.0007	0.0033	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0020	0.0093	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0007	0.0033	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0011	0.0051	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0010	0.0046	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0031	0.0144	0.002	0.002
2,2,4-Trimethylhexane	I9	0.0002	0.0011	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0031	0.0144	0.002	0.002
1t,3-Dimethylcyclohexane	N8	0.0001	0.0005	0.000	0.000
n-Octane	P8	0.0124	0.0586	0.006	0.006
1c,4-Dimethylcyclohexane	N8	0.0014	0.0065	0.001	0.001
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	0.0010	0.0046	0.001	0.001
1,1,4-Trimethylcyclohexane	N9	0.0037	0.0193	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0014	0.0075	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	0.0020	0.0093	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	0.0002	0.0011	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	0.0025	0.0110	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0008	0.0042	0.000	0.000
2,3-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0026	0.0114	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0019	0.0084	0.001	0.001
3,4-Dimethylheptane	I9	0.0014	0.0075	0.001	0.001
3,4-Dimethylheptane (2)	I9	0.0005	0.0027	0.000	0.000
4-Ethylheptane	I9	0.0002	0.0011	0.000	0.000
4-Methyloctane	I9	0.0008	0.0043	0.000	0.000
2-Methyloctane	I9	0.0009	0.0048	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0002	0.0010	0.000	0.000
3-Ethylheptane	I9	0.0004	0.0021	0.000	0.000
3-Methyloctane	I9	0.0011	0.0058	0.001	0.001
3,3-Diethylpentane	I9	0.0001	0.0005	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0019	0.0084	0.001	0.001
i-Butylcyclopentane	N9	0.0009	0.0047	0.000	0.000
n-Nonane	P9	0.0036	0.0191	0.002	0.002
1,1-Methylethylcyclohexane	N9	0.0006	0.0032	0.000	0.000
i-Propylbenzene	A9	0.0007	0.0035	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	0.0007	0.0036	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	0.0005	0.0029	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0007	0.0041	0.000	0.000
1,3-Methylethylbenzene	A9	0.0005	0.0025	0.000	0.000
1,4-Methylethylbenzene	A9	0.0002	0.0010	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0003	0.0015	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
2-Methylnonane	I10	0.0001	0.0006	0.000	0.000
3-Ethyloctane	I10	0.0001	0.0006	0.000	0.000
3-Methylnonane	I10	0.0002	0.0012	0.000	0.000
t-Butylbenzene	A10	0.0006	0.0034	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
UnknownC9s	U9	0.0026	0.0138	0.001	0.001
n-Decane	P10	0.0009	0.0053	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	0.0001	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
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
1,3-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
1,2-Dimethyl-3-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
UnknownC10s	U10	0.0026	0.0153	0.002	0.002
n-Undecane	P11	0.0003	0.0020	0.000	0.000
1,2,4,5-Tetramethylbenzene	A11	0.0001	0.0005	0.000	0.000
1,2,3,5-Tetramethylbenzene	A11	0.0001	0.0005	0.000	0.000
UnknownC11s	U11	0.0002	0.0013	0.000	0.000
n-Dodecane	P12	0.0001	0.0007	0.000	0.000
UnknownC12s	U12	0.0001	0.0007	0.000	0.000
n-Tridecane	P13	0.0001	0.0008	0.000	0.000
TOTAL		100.00000	100.00000	7.9209	7.9641

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0333	0.1077
TOLUENE	0.0227	0.0866
ETHYLBENZENE	0.0025	0.0110
XYLENES	0.0064	0.0282
TOTAL BTEX	0.0649	0.2335

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1245.0 **/scf**	1251.8 **/scf**
	NET WET REAL :	1223.2 **/scf**	1230.0 **/scf**
HIGH	GROSS DRY REAL :	1368.2 **/scf**	1375.6 **/scf**
	GROSS WET REAL :	1344.3 **/scf**	1351.7 **/scf**
	NET DRY REAL :	19581.9 **/lb**	19688.9 **/lb**
	GROSS DRY REAL :	21520.9 **/lb**	21638.5 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8327
	COMPRESSIBILITY FACTOR :		0.99559

(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.

EMPACT Analytical Systems, Inc 365 S. Main Street, Brighton, CO 80601 303-637-0150