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

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201404119	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 28, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 22, 2014
PRODUCER :		CYLINDER NO. :	11116
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	OIL TREATER @ 11:40 STATE 2-36-9-61		EMPACT
FIELD DATA		SAMPLE TEMP. :	171
SAMPLE PRES. :	27	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
ALCOHOLS	0.0021	0.0014	0.0013
NITROGEN (AIR)	0.0510	0.0130	0.0119
CARBON DIOXIDE	0.0394	0.0158	0.0143
METHANE	0.0635	0.0093	0.0230
ETHANE	0.3566	0.0977	0.2036
PROPANE	1.5639	0.6281	0.9195
I-BUTANE	0.4165	0.2205	0.2908
N-BUTANE	2.1185	1.1214	1.4253
I-PENTANE	0.9259	0.6085	0.7234
N-PENTANE	1.5555	1.0222	1.2021
UNKNOWN C1-C5	0.0001	0.0001	0.0001
HEXANES PLUS	92.9070	96.2620	95.1847
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	MOLE%	MASS%
BENZENE	1.4496	1.0313
TOLUENE	2.8676	2.4065
ETHYLBENZENE	0.8234	0.7962
XYLENE	2.3345	2.2574
TOTAL BTEX	7.4751	6.4914

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

	TOTAL SAMPLE	C6+ FRACTION	
Specific Gravity (H2O=1) =	0.7428	0.751	60/60
API Gravity =	59	56.92	60/60
Molecular Weight =	109.80	114.532	
Absolute Density =	6.19	6.26	LBS/GAL
Heating Value Liq. Idl Gas=	125349	127155	BTU/GAL
Vapor/Liquid =	21.42	20.87	CUFT/GAL
Vapor Pressure =	12.60	1.86	PSIA @100 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 ST.
BRIGHTON, CO
80601

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

E & P TANK / GLYCALC INFORMATION

PROJECT NO. :	201404119	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 28, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 22, 2014
PRODUCER :		CYLINDER NO. :	11116
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	OIL TREATER @ 11:40 STATE 2-36-9-61		EMPACT
FIELD DATA		SAMPLE TEMP. :	171
SAMPLE PRES. :	27	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0394		0.0158		0.0143	
NITROGEN (AIR)	0.0510		0.0130		0.0119	
METHANE	0.0635		0.0093		0.0230	
ETHANE	0.3566		0.0977		0.2036	
PROPANE	1.5639		0.6281		0.9195	
I-BUTANE	0.4165		0.2205		0.2908	
N-BUTANE	2.1185		1.1214		1.4253	
I-PENTANE	0.9259		0.6085		0.7234	
N-PENTANE	1.5555		1.0222		1.2021	
CYCLOPENTANE (N-C5)	1.5994		1.0216		0.9975	
UNKNOWN C1-C5	0.0001		0.0001		0.0001	
N-HEXANE	7.7356		6.0717		6.7903	
CYCLOHEXANE (OTHER C6)	2.9594		2.2684		2.1490	
OTHER HEXANES	11.6098		9.0239		9.6117	
OTHER HEPTANES	14.3095		12.9730		13.5636	
METHYLCYCLOHEXANE (OTHER C7)	4.2577		3.8077		3.6481	
2,2,4 TRIMETHYLPENTANE	0.8359		0.7475		0.7364	
BENZENE	1.4496		1.0313		0.8670	
TOLUENE	2.8676		2.4065		2.0431	
ETHYLBENZENE	0.8234		0.7962		0.6759	
XYLENES	2.3345		2.2574		1.9185	
OTHER OCTANES	10.6995		11.1658		11.2811	
OCTANES PLUS	----	46.1184	----	57.6579	----	55.5144
NONANES	10.0206		11.5456		11.2139	
DECANES PLUS	21.4045		31.1454		29.6886	
SUB TOTAL	99.9979		99.9986		99.9987	
ALCOHOLS	0.0021		0.0014		0.0013	
TOTAL	100.0000		100.0000		100.0000	

API Gravity =	**59.00**	60/60
Vapor Pressure =	**12.60**	PSIA & 100 F
Average Molecular Weight of Decanes plus =	**159.76**	
Average Specific Gravity of Decanes plus =	**0.7770**	

THE DATA PRESENTED HEREIN HAS BEEN ACQUIRED THROUGH JUDICIOUS APPLICATION OF CURRENT STATE-OF-THE ART ANALYTICAL TECHNIQUES. THE APPLICATIONS OF THIS INFORMATION IS THE RESPONSIBILITY OF THE USER. EMPACT ANALYTICAL SYSTEMS, INC. ASSUMES NO RESPONSIBILITY FOR ACCURACY OF THE REPORTED INFORMATION NOR ANY CONSEQUENCES OF IT'S APPLICATION.

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. :	201404119	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 28, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 22, 2014
PRODUCER :		CYLINDER NO. :	11116
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	OIL TREATER @ 11:40		EMPACT
	STATE 2-36-9-61		
FIELD DATA		SAMPLE TEMP. :	171
SAMPLE PRES. :	27	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER	MOLE%	MASS %	VOLUME %
ALCOHOLS	0.0021	0.0014	0.0013
NITROGEN	0.0510	0.0130	0.0119
CARBON DIOXIDE	0.0394	0.0158	0.0143
C1	0.0635	0.0093	0.0230
C2	0.3566	0.0977	0.2036
C3	1.5639	0.6281	0.9195
C4	2.5350	1.3419	1.7161
C5	4.0809	2.6524	2.9231
C6	23.7544	18.3953	19.4180
C7	21.4348	19.1872	19.2548
C8	14.6933	14.9669	14.6119
C9	10.0206	11.5456	11.2139
C10	8.3741	10.4088	9.9058
C11	4.4378	5.9996	5.5851
C12	2.5985	3.8344	3.6839
C13	2.0750	3.3939	3.2750
C14	1.6763	3.0289	2.9452
C15	1.4219	2.7510	2.6444
C16	0.5991	1.2356	1.1800
C17	0.1644	0.3601	0.3429
C18	0.0574	0.1331	0.1263
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

THE DATA PRESENTED HEREIN HAS BEEN ACQUIRED THROUGH JUDICIOUS APPLICATION OF CURRENT STATE-OF-THE ART ANALYTICAL TECHNIQUES. THE APPLICATIONS OF THIS INFORMATION IS THE RESPONSIBILITY OF THE USER. EMPACT ANALYTICAL SYSTEMS, INC. ASSUMES NO RESPONSIBILITY FOR ACCURACY OF THE REPORTED INFORMATION NOR ANY CONSEQUENCES OF IT'S APPLICATION.

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. :	201404119	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 28, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 22, 2014
PRODUCER :		CYLINDER NO. :	11116
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	OIL TREATER @ 11:40 STATE 2-36-9-61		EMPACT
FIELD DATA		SAMPLE TEMP. :	171
SAMPLE PRES. :	27	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0510	0.0130	0.0119
Carbon Dioxide	NHC	0.0394	0.0158	0.0143
Methane	P1	0.0635	0.0093	0.0230
Ethane	P2	0.3566	0.0977	0.2036
Propane	P3	1.5639	0.6281	0.9195
i-Butane	I4	0.4165	0.2205	0.2908
n-Butane	P4	2.1185	1.1214	1.4253
2,2-Dimethylpropane	I5	0.0091	0.0060	0.0075
i-Pentane	I5	0.9168	0.6025	0.7159
n-Pentane	P5	1.5555	1.0222	1.2021
t-Butanol	X4	0.0021	0.0014	0.0013
2,2-Dimethylbutane	I6	0.0390	0.0306	0.0347
Cyclopentane	N5	1.5994	1.0216	0.9975
2,3-Dimethylbutane	I6	0.3820	0.2998	0.3336
2-Methylpentane	I6	4.0311	3.1641	3.5705
3-Methylpentane	I6	2.3347	1.8325	2.0334
UnknownC5s	U5	0.0001	0.0001	0.0001
n-Hexane	P6	7.7356	6.0717	6.7903
2,2-Dimethylpentane	I7	0.0121	0.0110	0.0120
Methylcyclopentane	N6	4.8230	3.6969	3.6395
2,4-Dimethylpentane	I7	0.2476	0.2260	0.2480
2,2,3-Trimethylbutane	I7	0.0073	0.0067	0.0072
Benzene	A6	1.4496	1.0313	0.8670
3,3-Dimethylpentane	I7	0.0252	0.0230	0.0245
Cyclohexane	N6	2.9594	2.2684	2.1490
2-Methylhexane	I7	1.4532	1.3262	1.4426
2,3-Dimethylpentane	I7	0.7219	0.6588	0.6962
1,1-Dimethylcyclopentane	N7	0.3206	0.2867	0.2803
3-Methylhexane	I7	1.8871	1.7222	1.8451
1c,3-Dimethylcyclopentane	N7	0.9100	0.8138	0.8059
1t,3-Dimethylcyclopentane	N7	0.8359	0.7475	0.7364
3-Ethylpentane	I7	0.1629	0.1487	0.1567
1t,2-Dimethylcyclopentane	N7	1.7750	1.5874	1.5583
2,2,4-Trimethylpentane	I8	0.0190	0.0198	0.0210
n-Heptane	P7	5.0606	4.6183	4.9807
1c,2-Dimethylcyclopentane	N7	0.1713	0.1532	0.1463
Methylcyclohexane	N7	4.2577	3.8077	3.6481
2,2-Dimethylhexane	I8	0.3002	0.3123	0.3311
Ethylcyclopentane	N7	0.6809	0.6089	0.5861
2,5-Dimethylhexane	I8	0.1460	0.1519	0.1615
2,2,3-Trimethylpentane	I8	0.0156	0.0162	0.0167
2,4-Dimethylhexane	I8	0.2323	0.2417	0.2557

1c,2t,4-Trimethylcyclopentane	N8	0.4021	0.4109	0.3971
3,3-Dimethylhexane	I8	0.0335	0.0349	0.0363
2,3,4-Trimethylpentane	I8	0.1120	0.1165	0.1194
2,3,3-Trimethylpentane	I8	0.0052	0.0054	0.0055
Toluene	A7	2.8676	2.4065	2.0431
2,3-Dimethylhexane	I8	0.1673	0.1741	0.1804
2-Methyl-3-ethylpentane	I8	0.1553	0.1616	0.1657
1,1,2-Trimethylcyclopentane	N8	0.0046	0.0047	0.0045
2-Methylheptane	I8	1.3776	1.4332	1.5119
4-Methylheptane	I8	0.4347	0.4523	0.4656
3-Methyl-3-ethylpentane	I8	0.0363	0.0378	0.0384
3,4-Dimethylhexane	I8	0.0503	0.0523	0.0536
1c,2c,4-Trimethylcyclopentane	N8	0.0270	0.0276	0.0264
1c,3-Dimethylcyclohexane	N8	0.0247	0.0252	0.0243
3-Methylheptane	I8	0.6914	0.7193	0.7523
1c,2t,3-Trimethylcyclopentane	N8	0.9369	0.9575	0.9171
3-Ethylhexane	I8	0.0844	0.0878	0.0909
1t,4-Dimethylcyclohexane	N8	0.3404	0.3479	0.3367
1,1-Dimethylcyclohexane	N8	0.1133	0.1158	0.1094
3c-Ethylmethylcyclopentane	N8	0.0028	0.0029	0.0028
3t-Ethylmethylcyclopentane	N8	0.2259	0.2309	0.2222
2t-Ethylmethylcyclopentane	N8	0.1988	0.2032	0.1950
1,1-Methylethylcyclopentane	N8	0.6488	0.6631	0.6267
2,2,4-Trimethylhexane	I9	0.0410	0.0479	0.0494
1t,2-Dimethylcyclohexane	N8	0.5477	0.5597	0.5325
1t,3-Dimethylcyclohexane	N8	0.0015	0.0015	0.0014
UnknownC7s	U7	0.0379	0.0346	0.0373
n-Octane	P8	2.8388	2.9534	3.1009
1c,4-Dimethylcyclohexane	N8	0.2886	0.2949	0.2780
i-Propylcyclopentane	I8	0.0610	0.0623	0.0592
2,4,4-Trimethylhexane	I9	0.0200	0.0234	0.0239
2,2,3,4-Tetramethylpentane	I9	0.0197	0.0230	0.0236
2,3,4-Trimethylhexane	I9	0.0176	0.0206	0.0211
1c,2-Dimethylcyclohexane	N8	0.2141	0.2188	0.2028
2,3,5-Trimethylhexane	I9	0.0569	0.0665	0.0680
2,2-Dimethylheptane	I9	0.0159	0.0186	0.0193
1,1,4-Trimethylcyclohexane	N9	0.9542	1.0971	1.0490
2,2,3-Trimethylhexane	I9	0.3909	0.4566	0.4620
2,4-Dimethylheptane	I9	0.0697	0.0814	0.0840
4,4-Dimethylheptane	I9	0.0339	0.0396	0.0408
Ethylcyclohexane	N8	0.5222	0.5337	0.5001
n-Propylcyclopentane	N8	0.2156	0.2203	0.2094
1c,3c,5-Trimethylcyclohexane	N9	0.0348	0.0400	0.0383
2,5-Dimethylheptane	I9	0.0750	0.0876	0.0902
3,3-Dimethylheptane	I9	0.0876	0.1023	0.1053
3,5-Dimethylheptane	I9	0.0634	0.0741	0.0763
2,6-Dimethylheptane	I9	0.0513	0.0599	0.0623
1,1,3-Trimethylcyclohexane	N9	0.1848	0.2125	0.2032
Ethylbenzene	A8	0.8234	0.7962	0.6759
1c,2t,4t-Trimethylcyclohexane	N9	0.0546	0.0628	0.0589
2,3-Dimethylheptane	I9	0.1536	0.1794	0.1824
1,3-Dimethylbenzene (m-Xylene)	A8	1.3625	1.3175	1.1249
1,4-Dimethylbenzene (p-Xylene)	A8	0.3001	0.2902	0.2486
3,4-Dimethylheptane	I9	0.0373	0.0436	0.0440
3,4-Dimethylheptane (2)	I9	0.1426	0.1666	0.1681
4-Ethylheptane	I9	0.0311	0.0363	0.0374
4-Methyloctane	I9	0.2931	0.3424	0.3506
2-Methyloctane	I9	0.3519	0.4111	0.4251
1c,2t,4c-Trimethylcyclohexane	I9	0.0344	0.0402	0.0409
3-Ethylheptane	I9	0.0739	0.0863	0.0877
3-Methyloctane	I9	0.4492	0.5247	0.5372
3,3-Diethylpentane	I9	0.0604	0.0706	0.0691
1c,2t,3-Trimethylcyclohexane	N9	0.0784	0.0901	0.0845
1,1,2-Trimethylcyclohexane	N9	0.0212	0.0244	0.0229
1,2-Dimethylbenzene (o-Xylene)	A8	0.6719	0.6497	0.5450
i-Butylcyclopentane	N9	0.2329	0.2678	0.2531
UnknownC8s	U8	0.0595	0.0619	0.0650
n-Nonane	P9	1.7540	2.0490	2.1070
1,1-Methylethylcyclohexane	N9	0.2475	0.2891	0.2982
i-Propylbenzene	A9	0.3554	0.3890	0.3325
i-Propylcyclohexane	N9	0.0862	0.0991	0.0912
2,2-Dimethyloctane	I10	0.0682	0.0884	0.0882
2,4-Dimethyloctane	I10	0.0855	0.1108	0.1106
2,6-Dimethyloctane	I10	0.0118	0.0153	0.0158

2,5-Dimethyloctane	I10	0.0385	0.0499	0.0498
n-Butylcyclopentane	N9	0.3359	0.4291	0.3964
3,3-Dimethyloctane	I10	0.0749	0.0971	0.0970
n-Propylbenzene	A9	0.4026	0.4407	0.3767
3,6-Dimethyloctane	I10	0.2544	0.3297	0.3291
3-Methyl-5-ethylheptane	I10	0.5084	0.5939	0.6040
1,3-Methylethylbenzene	A9	0.3576	0.3915	0.3319
1,4-Methylethylbenzene	A9	0.2510	0.2748	0.2330
1,3,5-Trimethylbenzene	A9	0.1637	0.1792	0.1530
2,3-Dimethyloctane	I10	0.0688	0.0892	0.0890
5-Methylnonane	I10	0.2352	0.3048	0.3071
1,2-Methylethylbenzene	A9	0.4631	0.5070	0.4275
2-Methylnonane	I10	0.0343	0.0444	0.0451
3-Ethyloctane	I10	0.0801	0.1038	0.1036
3-Methylnonane	I10	0.1820	0.2358	0.2373
1,2,4-Trimethylbenzene	A9	0.0400	0.0438	0.0369
t-Butylbenzene	A10	0.4306	0.5264	0.4488
i-Butylcyclohexane	N10	0.2064	0.2637	0.2398
1t-Methyl-2-n-propylcyclohexane	I10	0.0482	0.0563	0.0573
i-Butylbenzene	A10	0.0615	0.0752	0.0651
sec-Butylbenzene	A10	0.0623	0.0762	0.0653
UnknownC9s	U9	1.1983	1.3998	1.4394
n-Decane	P10	1.1902	1.5423	1.5593
1,2,3-Trimethylbenzene	A9	0.2340	0.2561	0.2116
1,3-Methyl-i-propylbenzene	A10	0.1110	0.1215	0.1025
1,4-Methyl-i-propylbenzene	A10	0.0984	0.1077	0.0908
Sec-Butylcyclohexane	N10	0.3149	0.4023	0.3654
1,2-Methyl-i-propylbenzene	A10	0.1636	0.2000	0.1685
3-Ethylnonane	I10	0.0421	0.0546	0.0555
1,3-Diethylbenzene	A10	0.1448	0.1770	0.1513
1,3-Methyl-n-propylbenzene	A10	0.0496	0.0606	0.0520
1,4-Diethylbenzene	A10	0.2652	0.3242	0.2778
1,4-Methyl-n-propylbenzene	A10	0.0326	0.0399	0.0343
n-Butylbenzene	A10	0.0610	0.0746	0.0639
1,3-Dimethyl-5-ethylbenzene	A10	0.0672	0.0822	0.0702
1,2-Diethylbenzene	A10	0.0925	0.1131	0.0950
1,2-Methyl-n-propylbenzene	A10	0.0967	0.1182	0.0999
1,4-Dimethyl-2-ethylbenzene	A10	0.1153	0.1410	0.1187
1,3-Dimethyl-4-ethylbenzene	A10	0.0025	0.0031	0.0026
1,2-Dimethyl-4-ethylbenzene	A10	0.1936	0.2367	0.1999
1,3-Dimethyl-2-ethylbenzene	A10	0.1351	0.1652	0.1370
1t,2c,4-Trimethylcyclopentane	A10	0.4896	0.5004	0.4940
1,2-Dimethyl-3-ethylbenzene	A10	0.0815	0.0996	0.0825
1,2-Ethyl-i-propylbenzene	A10	0.1092	0.1335	0.1125
1,4-Methyl-t-butylbenzene	A11	0.1436	0.1755	0.1479
UnknownC10s	U10	1.7706	2.2945	2.3197
n-Undecane	P11	0.9640	1.3724	1.3683
1,4-Ethyl-i-propylbenzene	A11	0.0411	0.0502	0.0423
1,2,4,5-Tetramethylbenzene	A11	0.1332	0.1628	0.1357
1,2-Methyl-n-butylbenzene	A11	0.0725	0.0886	0.0746
1,2,3,5-Tetramethylbenzene	A11	0.1065	0.1302	0.1080
1,2-Methyl-t-butylbenzene	A11	0.0935	0.1143	0.0963
5-Methylindan	A11	0.0212	0.0329	0.0324
4-Methylindan	A11	0.0047	0.0073	0.0072
1,2-Ethyl-n-propylbenzene	A11	0.1533	0.1874	0.1579
2-Methylindan	A11	0.1139	0.1767	0.1743
1,3-Methyl-n-butylbenzene	A11	0.0821	0.1004	0.0846
1,3-Di-i-propylbenzene	A11	0.1315	0.1608	0.1355
sec-Pentylbenzene	A11	0.0699	0.0854	0.0719
n-Pentylbenzene	A11	0.0896	0.1210	0.1041
1t-M-2-(4MP)cyclopentane	P12	0.0798	0.1238	0.1221
1,2-Di-n-propylbenzene	A11	0.1089	0.1331	0.1121
1,4-Di-i-propylbenzene	A11	0.1391	0.1700	0.1432
Tetrahydronaphthalene	A10	0.0306	0.0374	0.0315
t-Decahydronaphthalene	A10	0.1592	0.1946	0.1639
Naphthalene	A10	0.1060	0.1237	0.1042
1-t-Butyl-3,5-dimethylbenzene	A12	0.0439	0.0537	0.0452
1,4-Ethyl-t-butylbenzene	A11	0.0911	0.1114	0.0939
UnknownC11s	U11	1.4538	2.0697	2.0635
n-Dodecane	P12	0.7859	1.2193	1.2023
1,3-Di-n-propylbenzene	A12	0.0736	0.0900	0.0758
1,3,5-Triethylbenzene	A12	0.0337	0.0369	0.0315
1,2,4-Triethylbenzene	A12	0.2699	0.2954	0.2490
1,4-Methyl-n-pentylbenzene	A12	0.0314	0.0384	0.0324

n-Hexylbenzene	A12	0.1281	0.1893	0.1630
1,2,3,4,5-Pentamethylbenzene	A13	0.1977	0.2417	0.2036
2-Methylnaphthalene	A11	0.2183	0.2827	0.2382
1-Methylnaphthalene	A11	0.2060	0.2668	0.1932
UnknownC12s	U12	1.1522	1.7876	1.7626
n-Tridecane	P13	0.6621	1.1117	1.0832
UnknownC13s	U13	1.2152	2.0405	1.9882
n-Tetradecane	P14	0.5624	1.0162	0.9881
UnknownC14s	U14	1.1139	2.0127	1.9571
n-Pentadecane	P15	0.3098	0.5994	0.5762
UnknownC15s	U15	1.1121	2.1516	2.0682
n-Hexadecane	P16	0.1260	0.2599	0.2482
UnknownC16s	U16	0.4731	0.9757	0.9318
n-Heptadecane	P17	0.0193	0.0423	0.0403
UnknownC17s	U17	0.1451	0.3178	0.3026
n-Octadecane	P18	0.0005	0.0012	0.0011
UnknownC18s	U18	0.0569	0.1319	0.1252
TOTAL		100.0000	100.0000	100.0000

THE DATA PRESENTED HEREIN HAS BEEN ACQUIRED THROUGH JUDICIOUS APPLICATION OF CURRENT STATE-OF-THE ART ANALYTICAL TECHNIQUES. THE APPLICATIONS OF THIS INFORMATION IS THE RESPONSIBILITY OF THE USER. EMPACT ANALYTICAL SYSTEMS, INC. ASSUMES NO RESPONSIBILITY FOR ACCURACY OF THE REPORTED INFORMATION NOR ANY CONSEQUENCES OF IT'S APPLICATION.

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

303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201404119	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 30, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 22, 2014
PRODUCER :		CYLINDER NO. :	0897
LEASE NO. :		SAMPLED BY :	JOHN MOSER-EMPACT
NAME/DESCRIP :	SALES GAS @ 11:50 STATE 2-36-9-61		
FIELD DATA		SAMPLE TEMP. :	110
SAMPLE PRES. :	120	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 3.0 PPM (1-7 PPM) @ 12:05		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0005	0.0012		
HELIUM	0.02	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.01	0.01	---	---
NITROGEN	1.09	1.30	---	---
CARBON DIOXIDE	2.64	4.94	---	---
METHANE	71.26560	48.59830	---	---
ETHANE	11.3881	14.5565	3.0411	3.0577
PROPANE	8.1100	15.2020	2.2313	2.2434
I-BUTANE	0.8003	1.9773	0.2613	0.2627
N-BUTANE	2.6760	6.6117	0.8419	0.8465
I-PENTANE	0.5619	1.7184	0.2012	0.2023
N-PENTANE	0.6708	2.0573	0.2432	0.2446
HEXANES PLUS	0.7668	3.0273	0.3091	0.3107
TOTALS	100.00000	100.00000	7.1291	7.1679

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0274	0.0910
TOLUENE	0.0187	0.0732
ETHYLBENZENE	0.0022	0.0100
XYLENES	0.0048	0.0217
TOTAL BTEX	0.0531	0.1959

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1206.6 **/scf**	1213.2 **/scf**
	NET WET REAL :	1185.5 **/scf**	1192.1 **/scf**
HIGH	GROSS DRY REAL :	1326.4 **/scf**	1333.7 **/scf**
	GROSS WET REAL :	1303.2 **/scf**	1310.5 **/scf**
	NET DRY REAL :	19483.4 **/lb**	19589.8 **/lb**
	GROSS DRY REAL :	21427.2 **/lb**	21544.2 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8108
	COMPRESSIBILITY FACTOR :		0.99586

(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 ST.
BRIGHTON, CO
80601

303-637-0150

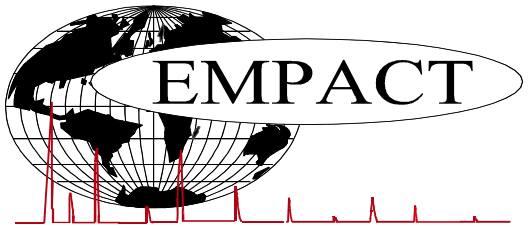
EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201404119	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 30, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 22, 2014
PRODUCER :		CYLINDER NO. :	0897
LEASE NO. :		SAMPLED BY :	JOHN MOSER-EMPACT
NAME/DESCRIP :	SALES GAS @ 11:50 STATE 2-36-9-61		
FIELD DATA		SAMPLE TEMP. :	110
SAMPLE PRES. :	120	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 3.0 PPM (1-7 PPM) @ 12:05		

Componet	Mole %	Wt %
Helium	0.02	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	2.64	4.94
Nitrogen	1.09	1.30
Methane	71.26560	48.59830
Ethane	11.3881	14.5565
Propane	8.1100	15.2020
Isobutane	0.8003	1.9773
n-Butane	2.6760	6.6117
Isopentane	0.5048	1.5482
n-Pentane	0.6708	2.0573
Cyclopentane	0.0571	0.1702
n-Hexane	0.1534	0.5619
Cyclohexane	0.0398	0.1424
Other Hexanes	0.2665	0.9688
Heptanes	0.1359	0.5749
Methycyclohexane	0.0307	0.1281
2,2,4 Trimethylpentane	0.0001	0.0005
Benzene	0.0274	0.0910
Toluene	0.0187	0.0732
Ethylbenzene	0.0022	0.0100
Xylenes	0.0048	0.0217
C8+ Heavies	0.0873	0.4548
Subtotal	99.98950	99.98880
Oxygen/Argon	0.01	0.01
Alcohols	0.0005	0.0012
Total	100.00000	100.00000

THE DATA PRESENTED HEREIN HAS BEEN ACQUIRED THROUGH JUDICIOUS APPLICATION OF CURRENT STATE-OF-THE ART ANALYTICAL TECHNIQUES. THE APPLICATIONS OF THIS INFORMATION IS THE RESPONSIBILITY OF THE USER. EMPACT ANALYTICAL SYSTEMS, INC. ASSUMES NO RESPONSIBILITY FOR ACCURACY OF THE REPORTED INFORMATION NOR ANY CONSEQUENCES OF IT'S APPLICATION.



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201404119	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 30, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 22, 2014
PRODUCER :		CYLINDER NO. :	0897
LEASE NO. :		SAMPLED BY :	JOHN MOSER-EMPACT
NAME/DESCRIP :	SALES GAS @ 11:50 STATE 2-36-9-61		
FIELD DATA		SAMPLE TEMP. :	110
SAMPLE PRES. :	120	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 3.0 PPM (1-7 PPM) @ 12:05		

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	---	1.09	1.30	---	---
Carbon Dioxide	---	2.64	4.94	---	---
Methane	P1	71.26560	48.59830	---	---
Ethane	P2	11.3881	14.5565	3.041	3.058
Propane	P3	8.1100	15.2020	2.231	2.243
i-Butane	I4	0.8003	1.9773	0.261	0.263
n-Butane	P4	2.6760	6.6117	0.842	0.847
2,2-Dimethylpropane	I5	0.0020	0.0061	0.001	0.001
Ethanol	X2	0.0001	0.0002	0.000	0.000
i-Pentane	I5	0.5028	1.5421	0.183	0.184
Acetone	X3	0.0003	0.0007	0.000	0.000
n-Pentane	P5	0.6708	2.0573	0.243	0.245
t-Butanol	X4	0.0001	0.0003	0.000	0.000
2,2-Dimethylbutane	I6	0.0014	0.0051	0.001	0.001
Cyclopentane	N5	0.0571	0.1702	0.017	0.017
2,3-Dimethylbutane	I6	0.0116	0.0425	0.005	0.005
2-Methylpentane	I6	0.1095	0.4011	0.045	0.045
3-Methylpentane	I6	0.0568	0.2081	0.023	0.023
n-Hexane	P6	0.1534	0.5619	0.063	0.063
2,2-Dimethylpentane	I7	0.0005	0.0021	0.000	0.000
Methylcyclopentane	N6	0.0872	0.3120	0.031	0.031
2,4-Dimethylpentane	I7	0.0036	0.0154	0.002	0.002
Benzene	A6	0.0274	0.0910	0.008	0.008
3,3-Dimethylpentane	I7	0.0003	0.0013	0.000	0.000
Cyclohexane	N6	0.0398	0.1424	0.014	0.014
2-Methylhexane	I7	0.0162	0.0690	0.008	0.008
2,3-Dimethylpentane	I7	0.0078	0.0332	0.004	0.004
1,1-Dimethylcyclopentane	N7	0.0033	0.0138	0.001	0.001
3-Methylhexane	I7	0.0191	0.0814	0.009	0.009
1c,3-Dimethylcyclopentane	N7	0.0096	0.0401	0.004	0.004
1t,3-Dimethylcyclopentane	N7	0.0086	0.0359	0.004	0.004
3-Ethylpentane	I7	0.0006	0.0026	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0191	0.0797	0.009	0.009

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

2,2,4-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
n-Heptane	P7	0.0405	0.1725	0.019	0.019
1c,2-Dimethylcyclopentane	N7	0.0014	0.0058	0.001	0.001
Methylcyclohexane	N7	0.0307	0.1281	0.012	0.012
2,2-Dimethylhexane	I8	0.0018	0.0088	0.001	0.001
Ethylcyclopentane	N7	0.0053	0.0221	0.002	0.002
2,5-Dimethylhexane	I8	0.0008	0.0039	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
2,4-Dimethylhexane	I8	0.0015	0.0073	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0026	0.0124	0.001	0.001
3,3-Dimethylhexane	I8	0.0001	0.0005	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0031	0.0148	0.001	0.001
2,3,4-Trimethylpentane	I8	0.0006	0.0029	0.000	0.000
Toluene	A7	0.0187	0.0732	0.006	0.006
2,3-Dimethylhexane	I8	0.0010	0.0049	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0007	0.0034	0.000	0.000
2-Methylheptane	I8	0.0068	0.0330	0.003	0.003
4-Methylheptane	I8	0.0020	0.0097	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0002	0.0010	0.000	0.000
3,4-Dimethylhexane	I8	0.0002	0.0010	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	0.0033	0.0160	0.002	0.002
1c,2t,3-Trimethylcyclopentane	N8	0.0040	0.0191	0.002	0.002
3-Ethylhexane	I8	0.0005	0.0024	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0014	0.0067	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0005	0.0024	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0010	0.0048	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0009	0.0043	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0030	0.0143	0.002	0.002
2,2,4-Trimethylhexane	I9	0.0002	0.0011	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0022	0.0105	0.001	0.001
n-Octane	P8	0.0107	0.0519	0.005	0.005
1c,4-Dimethylcyclohexane	N8	0.0009	0.0043	0.000	0.000
i-Propylcyclopentane	I8	0.0003	0.0015	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
2,2,3,4-Tetramethylpentane	I9	0.0001	0.0006	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0004	0.0019	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0029	0.0156	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0012	0.0066	0.001	0.001
2,4-Dimethylheptane	I9	0.0004	0.0022	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
Ethylcyclohexane	N8	0.0016	0.0077	0.001	0.001
n-Propylcyclopentane	N8	0.0006	0.0029	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0006	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	0.0007	0.0037	0.000	0.000
Ethylbenzene	I8	0.0022	0.0100	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0004	0.0021	0.000	0.000
2,3-Dimethylheptane	I9	0.0015	0.0082	0.001	0.001
1,3-Dimethylbenzene (m-Xylene)	A8	0.0025	0.0113	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0007	0.0032	0.000	0.000
3,4-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0004	0.0022	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0006	0.000	0.000
4-Methyloctane	I9	0.0007	0.0038	0.000	0.000

2-Methyloctane	I9	0.0008	0.0044	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0002	0.0011	0.000	0.000
3-Ethylheptane	I9	0.0002	0.0011	0.000	0.000
3-Methyloctane	I9	0.0010	0.0054	0.001	0.001
1c,2t,4c-Trimethylcyclohexane	I9	0.0001	0.0006	0.000	0.000
1,1,2-Trimethylcyclohexane	N9	0.0001	0.0006	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0016	0.0072	0.001	0.001
i-Butylcyclopentane	N9	0.0006	0.0032	0.000	0.000
UnknownC8s	U8	0.0001	0.0005	0.000	0.000
n-Nonane	P9	0.0031	0.0169	0.002	0.002
1,1-Methylethylcyclohexane	N9	0.0004	0.0021	0.000	0.000
i-Propylbenzene	A9	0.0005	0.0026	0.000	0.000
i-Propylcyclohexane	N9	0.0002	0.0011	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	0.0032	0.000	0.000
3,3-Dimethyloctane	I10	0.0002	0.0012	0.000	0.000
n-Propylbenzene	A9	0.0005	0.0026	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0009	0.0054	0.001	0.001
1,3-Methylethylbenzene	A9	0.0005	0.0026	0.000	0.000
1,4-Methylethylbenzene	A9	0.0002	0.0010	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0001	0.0005	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	0.0003	0.0015	0.000	0.000
2-Methylnonane	I10	0.0003	0.0018	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
1,2,4-Trimethylbenzene	A9	0.0001	0.0005	0.000	0.000
t-Butylbenzene	A10	0.0004	0.0023	0.000	0.000
i-Butylcyclohexane	N10	0.0002	0.0012	0.000	0.000
1t-Methyl-2-n-propylcyclohexane	I10	0.0001	0.0006	0.000	0.000
i-Butylbenzene	A10	0.0001	0.0006	0.000	0.000
sec-Butylbenzene	A10	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0031	0.0169	0.002	0.002
n-Decane	P10	0.0010	0.0060	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	0.0006	0.000	0.000
1,4-Methyl-i-propylbenzene	A10	0.0001	0.0006	0.000	0.000
Sec-Butylcyclohexane	A10	0.0002	0.0012	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0006	0.000	0.000
1,3-Diethylbenzene	A10	0.0001	0.0006	0.000	0.000
1,4-Diethylbenzene	A10	0.0001	0.0006	0.000	0.000
n-Butylbenzene	A10	0.0001	0.0006	0.000	0.000
1,3-Dimethyl-5-ethylbenzene	A10	0.0001	0.0006	0.000	0.000
t-Decahydronaphthalene	A9	0.0001	0.0006	0.000	0.000
1,2-Methyl-n-propylbenzene	A10	0.0001	0.0006	0.000	0.000
1,4-Dimethyl-2-ethylbenzene	A10	0.0001	0.0006	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0001	0.0006	0.000	0.000
1,3-Dimethyl-2-ethylbenzene	A10	0.0001	0.0006	0.000	0.000
UnknownC10s	U10	0.0021	0.0127	0.001	0.001
n-Undecane	P11	0.0004	0.0027	0.000	0.000
1,4-Ethyl-i-propylbenzene	A11	0.0001	0.0006	0.000	0.000
1,2-Methyl-n-butylbenzene	A11	0.0001	0.0006	0.000	0.000
1,2-Ethyl-n-propylbenzene	A11	0.0001	0.0006	0.000	0.000
1,3-Methyl-n-butylbenzene	A11	0.0001	0.0006	0.000	0.000
UnknownC11s	U11	0.0005	0.0033	0.000	0.000
n-Dodecane	P12	0.0002	0.0015	0.000	0.000

UnknownC12s	U12	0.0002	0.0013	0.000	0.000
n-Tridecane	P13	0.0001	0.0008	0.000	0.000
n-Tetradecane	P14	0.0003	0.0026	0.000	0.000
n-Pentadecane	P15	0.0003	0.0027	0.000	0.000
UnknownC15s	U15	0.0002	0.0018	0.000	0.000
n-Hexadecane	P16	0.0003	0.0029	0.000	0.000
n-Heptadecane	P17	0.0002	0.0020	0.000	0.000
UnknownC17s	U17	0.0001	0.0010	0.000	0.000
n-Octadecane	P18	0.0001	0.0011	0.000	0.000
UnknownC18s	U18	0.0001	0.0011	0.000	0.000
TOTAL		100.00000	100.00000	7.1291	7.1679

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0274	0.0910
TOLUENE	0.0187	0.0732
ETHYLBENZENE	0.0022	0.0100
XYLENES	0.0048	0.0217
TOTAL BTEX	0.0531	0.1959

		BTU @	14.650	14.730
LOW	NET DRY REAL :		1206.6 **/scf**	1213.2 **/scf**
	NET WET REAL :		1185.5 **/scf**	1192.1 **/scf**
HIGH	GROSS DRY REAL :		1326.4 **/scf**	1333.7 **/scf**
	GROSS WET REAL :		1303.2 **/scf**	1310.5 **/scf**
	NET DRY REAL :		19483.4 **/lb**	19589.8 **/lb**
	GROSS DRY REAL :		21427.2 **/lb**	21544.2 **/lb**
	RELATIVE DENSITY (AIR=1):			0.8108
	COMPRESSIBILITY FACTOR :			0.99586

(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

CRUDE OIL ASSAY

PROJECT NO. :	201404119	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 30, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 22, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	PRODUCTION TANK @ 12:05 STATE 2-36-9-61		EMPACT
FIELD DATA		SAMPLE TEMP. :	94
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

SPECIFICATION	TEST METHOD	UNITS	RESULTS
API GRAVITY		API 60/60	34.9
RVP @100 DEG F	D323	PSIG	6.4
TOTAL SULFUR	D2622	WT %	0.420
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, CLOUDY
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

The data presented herein has been acquired by means of current analytical techniques and represents the judicious conclusion EMPACT Analytical Systems, Inc. Results of the analysis can be affected by the sampling conditions, therefore, are only warranted through proper lab protocol. EMPACT assumes no responsibility for interpretation or any consequences from application of the reported information and is the sole liability of the user. The reproduction in any media of this reported information may not be made, in portion or as a whole, without the written permission of EMPACT Analytical Systems, Inc.