CRUDE OIL ASSAY

PROJECT NO. :	201404091	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 29, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 16, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	TANK BATTERY @ 14:00 GAFFNEY 2-29-8-61		EMPACT
FIELD DATA		SAMPLE TEMP. :	82
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; TK #22903		

SPECIFICATION		TEST METHOD	UNITS	RESULTS
API GRAVITY			API 60/60	35.8
RVP @100 DEG F		D323	PSIG	7
TOTAL SULFUR		D2622	WT %	0.418
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 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. :	201404091	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 17, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 16, 2014
PRODUCER :		CYLINDER NO. :	3707
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 13:35 GAFFNEY 2-29-8-61		EMPACT
FIELD DATA		SAMPLE TEMP. :	160
SAMPLE PRES. :	20	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
ALCOHOLS	0.0016	0.0010	0.0009
NITROGEN (AIR)	0.0350	0.0085	0.0079
CARBON DIOXIDE	0.0230	0.0087	0.0080
METHANE	0.0529	0.0073	0.0182
ETHANE	0.2950	0.0767	0.1612
PROPANE	1.2131	0.4623	0.6828
I-BUTANE	0.3613	0.1815	0.2414
N-BUTANE	1.7822	0.8951	1.1477
I-PENTANE	0.8928	0.5566	0.6675
N-PENTANE	1.4722	0.9179	1.0890
HEXANES PLUS	93.8709	96.8844	95.9754
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	**MOLE%**	**MASS%**
BENZENE	1.2790	0.8633
TOLUENE	2.6624	2.1199
ETHYLBENZENE	0.3823	0.3507
XYLENE	2.1259	1.9504
TOTAL BTEX	6.4496	5.2843

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

	TOTAL SAMPLE	**C6+ FRACTION**	
Specific Gravity (H2O=1) =	0.7489	0.757	60/60
API Gravity =	57.44	55.42	60/60
Molecular Weight =	115.72	120.213	
Absolute Density =	6.24	6.3	LBS/GAL
Heating Value Liq. Idl Gas=	126737	127731	BTU/GAL
Vapor/Liquid =	20.67	20.09	CUFT/GAL
Vapor Pressure =	10.45	1.63	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. :	201404091	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 17, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 16, 2014
PRODUCER :		CYLINDER NO. :	3707
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 13:35 GAFFNEY 2-29-8-61		EMPACT
FIELD DATA		SAMPLE TEMP. :	160
SAMPLE PRES. :	20	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0230		0.0087		0.0080	
NITROGEN (AIR)	0.0350		0.0085		0.0079	
METHANE	0.0529		0.0073		0.0182	
ETHANE	0.2950		0.0767		0.1612	
PROPANE	1.2131		0.4623		0.6828	
I-BUTANE	0.3613		0.1815		0.2414	
N-BUTANE	1.7822		0.8951		1.1477	
I-PENTANE	0.8928		0.5566		0.6675	
N-PENTANE	1.4722		0.9179		1.0890	
CYCLOPENTANE (N-C5)	1.4538		0.8810		0.8678	
N-HEXANE	6.4390		4.7956		5.4098	
CYCLOHEXANE (OTHER C6)	2.7297		1.9852		1.8974	
OTHER HEXANES	10.0500		7.4069		7.9323	
OTHER HEPTANES	13.0236		11.1986		11.7925	
METHYLCYCLOHEXANE (OTHER C7)	4.1884		3.5538		3.4350	
2,2,4 TRIMETHYLPENTANE	0.8092		0.6866		0.6823	
BENZENE	1.2790		0.8633		0.7322	
TOLUENE	2.6624		2.1199		1.8157	
ETHYLBENZENE	0.3823		0.3507		0.3003	
XYLENES	2.1259		1.9504		1.6712	
OTHER OCTANES	10.6970		10.5838		10.7600	
OCTANES PLUS	----	52.0450	----	64.0801	----	62.0927
NONANES	11.4509		12.5088		12.2150	
DECANES PLUS	26.5797		37.9998		36.4639	
SUB TOTAL	99.9984		99.9990		99.9991	
ALCOHOLS	0.0016		0.0010		0.0009	
TOTAL	100.0000		100.0000		100.0000	

API Gravity	=	**57.44**	60/60
Vapor Pressure	=	**10.45**	PSIA & 100 F
Average Molecular Weight of Decanes plus	=	**165.45**	
Average Specific Gravity of Decanes plus	=	**0.7830**	

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. :	201404091	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 17, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 16, 2014
PRODUCER :		CYLINDER NO. :	3707
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 13:35		EMPACT
	GAFFNEY 2-29-8-61		
FIELD DATA		SAMPLE TEMP. :	160
SAMPLE PRES. :	20	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
ALCOHOLS		0.0016	0.0010	0.0009
NITROGEN		0.0350	0.0085	0.0079
CARBON DIOXIDE		0.0230	0.0087	0.0080
	C1	0.0529	0.0073	0.0182
	C2	0.2950	0.0767	0.1612
	C3	1.2131	0.4623	0.6828
	C4	2.1435	1.0766	1.3891
	C5	3.8188	2.3555	2.6243
	C6	20.4977	15.0510	15.9717
	C7	19.8744	16.8723	17.0432
	C8	14.0144	13.5715	13.4138
	C9	11.4509	12.5088	12.2150
	C10	9.2316	10.8910	10.4168
	C11	5.2068	6.6540	6.2288
	C12	3.1727	4.4024	4.2493
	C13	2.5152	3.8932	3.7865
	C14	2.1435	3.6748	3.6049
	C15	2.0146	3.6980	3.5860
	C16	1.0938	2.1403	2.0621
	C17	0.5328	1.1072	1.0635
	C18	0.3229	0.7101	0.6800
	C19	0.1950	0.4524	0.4305
	C20	0.1030	0.2515	0.2380
	C21	0.0301	0.0771	0.0726
	C22	0.0159	0.0427	0.0401
	C23	0.0018	0.0051	0.0048
	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. :	201404091	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 17, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 16, 2014
PRODUCER :		CYLINDER NO. :	3707
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 13:35		EMPACT
	GAFFNEY 2-29-8-61		
FIELD DATA		SAMPLE TEMP. :	160
SAMPLE PRES. :	20	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0350	0.0085	0.0079
Carbon Dioxide	NHC	0.0230	0.0087	0.0080
Methane	P1	0.0529	0.0073	0.0182
Ethane	P2	0.2950	0.0767	0.1612
Propane	P3	1.2131	0.4623	0.6828
i-Butane	I4	0.3613	0.1815	0.2414
n-Butane	P4	1.7822	0.8951	1.1477
2,2-Dimethylpropane	I5	0.0082	0.0051	0.0064
i-Pentane	I5	0.8846	0.5515	0.6611
n-Pentane	P5	1.4722	0.9179	1.0890
t-Butanol	X4	0.0016	0.0010	0.0009
2,2-Dimethylbutane	I6	0.0301	0.0224	0.0257
Cyclopentane	N5	1.4538	0.8810	0.8678
2,3-Dimethylbutane	I6	0.3214	0.2393	0.2686
2-Methylpentane	I6	3.3097	2.4648	2.8059
3-Methylpentane	I6	1.9540	1.4552	1.6290
n-Hexane	P6	6.4390	4.7956	5.4098
2,2-Dimethylpentane	I7	0.0235	0.0204	0.0224
Methylcyclopentane	N6	4.4348	3.2252	3.2031
2,4-Dimethylpentane	I7	0.2149	0.1861	0.2060
2,2,3-Trimethylbutane	I7	0.0101	0.0087	0.0094
Benzene	A6	1.2790	0.8633	0.7322
3,3-Dimethylpentane	I7	0.0218	0.0189	0.0203
Cyclohexane	N6	2.7297	1.9852	1.8974
2-Methylhexane	I7	1.2443	1.0774	1.1823
2,3-Dimethylpentane	I7	0.6474	0.5606	0.5977
1,1-Dimethylcyclopentane	N7	0.3219	0.2731	0.2693
3-Methylhexane	I7	1.6643	1.4411	1.5576
1c,3-Dimethylcyclopentane	N7	0.8787	0.7456	0.7449
1t,3-Dimethylcyclopentane	N7	0.8092	0.6866	0.6823
3-Ethylpentane	I7	0.1434	0.1242	0.1321
1t,2-Dimethylcyclopentane	N7	1.6884	1.4326	1.4187
2,2,4-Trimethylpentane	I8	0.0541	0.0534	0.0572
n-Heptane	P7	4.5222	3.9156	4.2602
1c,2-Dimethylcyclopentane	N7	0.1748	0.1483	0.1429
Methylcyclohexane	N7	4.1884	3.5538	3.4350
2,2-Dimethylhexane	I8	0.3386	0.3342	0.3574
Ethylcyclopentane	N7	0.6277	0.5326	0.5172
2,5-Dimethylhexane	I8	0.1119	0.1105	0.1185
2,2,3-Trimethylpentane	I8	0.0332	0.0328	0.0341
2,4-Dimethylhexane	I8	0.2155	0.2127	0.2270
1c,2t,4-Trimethylcyclopentane	N8	0.4005	0.3883	0.3786

3,3-Dimethylhexane	I8	0.0383	0.0378	0.0396
2,3,4-Trimethylpentane	I8	0.1075	0.1061	0.1097
2,3,3-Trimethylpentane	I8	0.0026	0.0026	0.0027
Toluene	A7	2.6624	2.1199	1.8157
2,3-Dimethylhexane	I8	0.2316	0.2286	0.2390
2-Methyl-3-ethylpentane	I8	0.1401	0.1383	0.1430
1,1,2-Trimethylcyclopentane	N8	0.0063	0.0061	0.0059
2-Methylheptane	I8	1.3101	1.2932	1.3763
4-Methylheptane	I8	0.3836	0.3787	0.3933
3-Methyl-3-ethylpentane	I8	0.0632	0.0624	0.0639
3,4-Dimethylhexane	I8	0.0595	0.0587	0.0607
1c,2c,4-Trimethylcyclopentane	N8	0.0330	0.0320	0.0309
1c,3-Dimethylcyclohexane	N8	0.0226	0.0219	0.0213
3-Methylheptane	I8	0.6169	0.6089	0.6425
1c,2t,3-Trimethylcyclopentane	N8	0.9530	0.9241	0.8929
3-Ethylhexane	I8	0.1552	0.1532	0.1599
1t,4-Dimethylcyclohexane	N8	0.3807	0.3691	0.3603
1,1-Dimethylcyclohexane	N8	0.1198	0.1162	0.1108
3c-Ethylmethylcyclopentane	N8	0.0037	0.0036	0.0035
3t-Ethylmethylcyclopentane	N8	0.2149	0.2084	0.2023
2t-Ethylmethylcyclopentane	N8	0.1857	0.1801	0.1744
1,1-Methylethylcyclopentane	N8	0.6208	0.6020	0.5740
2,2,4-Trimethylhexane	I9	0.0447	0.0495	0.0515
1t,2-Dimethylcyclohexane	N8	0.5948	0.5768	0.5536
1t,3-Dimethylcyclohexane	N8	0.0113	0.0110	0.0104
UnknownC7s	U7	0.0310	0.0268	0.0292
n-Octane	P8	2.6254	2.5915	2.7450
1c,4-Dimethylcyclohexane	N8	0.4623	0.4483	0.4264
i-Propylcyclopentane	I8	0.0619	0.0600	0.0575
2,4,4-Trimethylhexane	I9	0.0217	0.0240	0.0247
2,2,3,4-Tetramethylpentane	I9	0.0196	0.0217	0.0225
2,3,4-Trimethylhexane	I9	0.0203	0.0225	0.0232
1c,2-Dimethylcyclohexane	N8	0.2062	0.1999	0.1870
2,3,5-Trimethylhexane	I9	0.0891	0.0988	0.1019
2,2-Dimethylheptane	I9	0.0117	0.0130	0.0136
1,1,4-Trimethylcyclohexane	N9	1.0317	1.1255	1.0857
2,2,3-Trimethylhexane	I9	0.3908	0.4331	0.4421
2,4-Dimethylheptane	I9	0.0326	0.0361	0.0376
4,4-Dimethylheptane	I9	0.0370	0.0410	0.0427
Ethylcyclohexane	N8	0.5316	0.5155	0.4873
n-Propylcyclopentane	N8	0.2061	0.1998	0.1915
1c,3c,5-Trimethylcyclohexane	N9	0.0354	0.0386	0.0372
2,5-Dimethylheptane	I9	0.0754	0.0836	0.0868
3,3-Dimethylheptane	I9	0.0878	0.0973	0.1011
3,5-Dimethylheptane	I9	0.0644	0.0714	0.0742
2,6-Dimethylheptane	I9	0.0615	0.0682	0.0716
1,1,3-Trimethylcyclohexane	N9	0.1794	0.1957	0.1888
Ethylbenzene	A8	0.3823	0.3507	0.3003
1c,2t,4t-Trimethylcyclohexane	N9	0.3699	0.4035	0.3818
2,3-Dimethylheptane	I9	0.3742	0.4147	0.4253
1,3-Dimethylbenzene (m-Xylene)	A8	1.1357	1.0420	0.8975
1,4-Dimethylbenzene (p-Xylene)	A8	0.3062	0.2809	0.2427
3,4-Dimethylheptane	I9	0.0602	0.0667	0.0679
3,4-Dimethylheptane (2)	I9	0.1481	0.1641	0.1671
4-Ethylheptane	I9	0.0227	0.0252	0.0262
4-Methyloctane	I9	0.2869	0.3180	0.3285
2-Methyloctane	I9	0.3713	0.4115	0.4293
1c,2t,4c-Trimethylcyclohexane	I9	0.0444	0.0492	0.0505
3-Ethylheptane	I9	0.0791	0.0877	0.0899
3-Methyloctane	I9	0.4408	0.4886	0.5047
3,3-Diethylpentane	I9	0.0333	0.0369	0.0364
1c,2t,3-Trimethylcyclohexane	N9	0.0734	0.0801	0.0758
1,1,2-Trimethylcyclohexane	N9	0.0265	0.0289	0.0273
1,2-Dimethylbenzene (o-Xylene)	A8	0.6840	0.6275	0.5310
i-Butylcyclopentane	N9	0.2936	0.3203	0.3054
UnknownC8s	U8	0.0037	0.0037	0.0039
n-Nonane	P9	1.8110	2.0072	2.0823
1,1-Methylethylcyclohexane	N9	0.3351	0.3714	0.3864
i-Propylbenzene	A9	0.4499	0.4673	0.4029
i-Propylcyclohexane	N9	0.1050	0.1145	0.1063
2,2-Dimethyloctane	I10	0.0752	0.0925	0.0931
2,4-Dimethyloctane	I10	0.0786	0.0966	0.0973
2,6-Dimethyloctane	I10	0.0099	0.0122	0.0127
2,5-Dimethyloctane	I10	0.0459	0.0564	0.0568

n-Butylcyclopentane	N9	0.3910	0.4739	0.4417
3,3-Dimethyloctane	I10	0.0832	0.1023	0.1031
n-Propylbenzene	A9	0.4223	0.4386	0.3783
3,6-Dimethyloctane	I10	0.2648	0.3256	0.3279
3-Methyl-5-ethylheptane	I10	0.5120	0.5675	0.5822
1,3-Methylethylbenzene	A9	0.3927	0.4079	0.3488
1,4-Methylethylbenzene	A9	0.3331	0.3460	0.2959
1,3,5-Trimethylbenzene	A9	0.1421	0.1476	0.1271
2,3-Dimethyloctane	I10	0.0744	0.0915	0.0921
5-Methylnonane	I10	0.2675	0.3289	0.3343
1,2-Methylethylbenzene	A9	0.6429	0.6677	0.5680
2-Methylnonane	I10	0.0349	0.0429	0.0440
3-Ethyloctane	I10	0.0668	0.0821	0.0827
3-Methylnonane	I10	0.2528	0.3108	0.3156
1,2,4-Trimethylbenzene	A9	0.0431	0.0448	0.0381
t-Butylbenzene	A10	0.5322	0.6173	0.5309
i-Butylcyclohexane	N10	0.2170	0.2630	0.2413
1t-Methyl-2-n-propylcyclohexane	I10	0.0351	0.0389	0.0399
i-Butylbenzene	A10	0.0804	0.0932	0.0814
sec-Butylbenzene	A10	0.0418	0.0485	0.0419
UnknownC9s	U9	1.3078	1.4495	1.5037
n-Decane	P10	1.3943	1.7143	1.7485
1,2,3-Trimethylbenzene	A9	0.2474	0.2570	0.2142
1,3-Methyl-i-propylbenzene	A10	0.1077	0.1119	0.0952
1,4-Methyl-i-propylbenzene	A10	0.1275	0.1324	0.1126
Sec-Butylcyclohexane	N10	0.3582	0.4342	0.3979
1,2-Methyl-i-propylbenzene	A10	0.1978	0.2294	0.1950
3-Ethylnonane	I10	0.0379	0.0466	0.0478
1,3-Diethylbenzene	A10	0.1735	0.2012	0.1735
1,3-Methyl-n-propylbenzene	A10	0.0560	0.0649	0.0562
1,4-Diethylbenzene	A10	0.1991	0.2309	0.1996
1,4-Methyl-n-propylbenzene	A10	0.1541	0.1787	0.1551
n-Butylbenzene	A10	0.0714	0.0828	0.0716
1,3-Dimethyl-5-ethylbenzene	A10	0.0858	0.0995	0.0857
1,2-Diethylbenzene	A10	0.1274	0.1478	0.1252
1,2-Methyl-n-propylbenzene	A10	0.1179	0.1367	0.1166
1,4-Dimethyl-2-ethylbenzene	A10	0.1610	0.1867	0.1586
1,3-Dimethyl-4-ethylbenzene	A10	0.0149	0.0173	0.0147
1,2-Dimethyl-4-ethylbenzene	A10	0.2021	0.2344	0.1997
1,3-Dimethyl-2-ethylbenzene	A10	0.1488	0.1726	0.1444
1t,2c,4-Trimethylcyclopentane	A10	0.4917	0.4768	0.4749
1,2-Dimethyl-3-ethylbenzene	A10	0.0901	0.1045	0.0873
1,2-Ethyl-i-propylbenzene	A10	0.0662	0.0768	0.0653
1,4-Methyl-t-butylbenzene	A11	0.2204	0.2556	0.2172
UnknownC10s	U10	1.7701	2.1763	2.2197
n-Undecane	P11	1.1089	1.4978	1.5065
1,4-Ethyl-i-propylbenzene	A11	0.0734	0.0851	0.0723
1,2,4,5-Tetramethylbenzene	A11	0.1000	0.1160	0.0976
1,2-Methyl-n-butylbenzene	A11	0.0772	0.0895	0.0761
1,2,3,5-Tetramethylbenzene	A11	0.1367	0.1586	0.1328
1,2-Methyl-t-butylbenzene	A11	0.1030	0.1195	0.1016
5-Methylindan	A11	0.0230	0.0339	0.0337
4-Methylindan	A11	0.0132	0.0194	0.0193
1,2-Ethyl-n-propylbenzene	A11	0.1638	0.1900	0.1615
2-Methylindan	A11	0.0804	0.1183	0.1177
1,3-Methyl-n-butylbenzene	A11	0.0922	0.1069	0.0909
1,3-Di-i-propylbenzene	A11	0.1021	0.1184	0.1006
sec-Pentylbenzene	A11	0.1227	0.1423	0.1209
n-Pentylbenzene	A11	0.0471	0.0603	0.0523
1t-M-2-(4MP)cyclopentane	P12	0.1016	0.1495	0.1487
1,2-Di-n-propylbenzene	A11	0.1243	0.1442	0.1226
1,4-Di-i-propylbenzene	A11	0.2064	0.2394	0.2035
Tetrahydronaphthalene	A10	0.1340	0.1554	0.1321
t-Decahydronaphthalene	A10	0.1501	0.1741	0.1480
Naphthalene	A10	0.1215	0.1346	0.1144
1-t-Butyl-3,5-dimethylbenzene	A12	0.0768	0.0891	0.0757
1,4-Ethyl-t-butylbenzene	A11	0.1442	0.1673	0.1422
UnknownC11s	U11	1.6795	2.2686	2.2818
n-Dodecane	P12	0.9534	1.4034	1.3960
1,3-Di-n-propylbenzene	A12	0.0905	0.1050	0.0892
1,3,5-Triethylbenzene	A12	0.0428	0.0445	0.0383
1,2,4-Triethylbenzene	A12	0.3733	0.3877	0.3297
1,4-Methyl-n-pentylbenzene	A12	0.0795	0.0922	0.0784
n-Hexylbenzene	A12	0.1499	0.2102	0.1826

1,2,3,4,5-Pentamethylbenzene	A13	0.2627	0.3047	0.2590
2-Methylnaphthalene	A11	0.3378	0.4151	0.3528
1-Methylnaphthalene	A11	0.2505	0.3078	0.2249
UnknownC12s	U12	1.3049	1.9208	1.9107
n-Tridecane	P13	0.8722	1.3895	1.3659
UnknownC13s	U13	1.3803	2.1990	2.1616
n-Tetradecane	P14	0.6930	1.1881	1.1655
UnknownC14s	U14	1.4505	2.4867	2.4394
n-Pentadecane	P15	0.4746	0.8712	0.8448
UnknownC15s	U15	1.5400	2.8268	2.7412
n-Hexadecane	P16	0.2534	0.4958	0.4777
UnknownC16s	U16	0.8404	1.6445	1.5844
n-Heptadecane	P17	0.1381	0.2870	0.2757
UnknownC17s	U17	0.3947	0.8202	0.7878
n-Octadecane	P18	0.1015	0.2232	0.2137
UnknownC18s	U18	0.2214	0.4869	0.4663
n-Nonadecane	P19	0.0822	0.1907	0.1815
UnknownC19s	U19	0.1128	0.2617	0.2490
n-Eicosane	P20	0.0303	0.0740	0.0700
UnknownC20s	U20	0.0727	0.1775	0.1680
n-Heneicosane	P21	0.0039	0.0100	0.0094
UnknownC21s	U21	0.0262	0.0671	0.0632
n-Docosane	P22	0.0014	0.0038	0.0036
UnknownC22s	U22	0.0145	0.0389	0.0365
n-Tricosane	P23	0.0002	0.0006	0.0006
UnknownC23s	U23	0.0016	0.0045	0.0042
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. :	201404091	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 26, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 16, 2014
PRODUCER :		CYLINDER NO. :	0846
LEASE NO. :		SAMPLED BY :	GALE MCENREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 13:45 GAFFNEY 2-29-8-61		
FIELD DATA		SAMPLE TEMP. :	88
SAMPLE PRES. :	85	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 1.5 PPM (1-7 PPM) @ 13:50		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0002	0.0005		
HELIUM	0.01	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.02	0.03	---	---
NITROGEN	1.01	1.17	---	---
CARBON DIOXIDE	2.55	4.63	---	---
METHANE	69.48580	46.00720	---	---
ETHANE	11.6247	14.4262	3.1050	3.1220
PROPANE	8.7707	15.9618	2.4131	2.4263
I-BUTANE	0.9426	2.2611	0.3084	0.3101
N-BUTANE	3.1466	7.5481	0.9903	0.9957
I-PENTANE	0.7024	2.0855	0.2513	0.2527
N-PENTANE	0.8292	2.4691	0.3004	0.3020
HEXANES PLUS	0.9078	3.4105	0.3623	0.3641
TOTALS	100.00000	100.00000	7.7308	7.7729

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0324	0.1045
TOLUENE	0.0181	0.0688
ETHYLBENZENE	0.0014	0.0061
XYLENES	0.0031	0.0136
TOTAL BTEX	0.0550	0.1930

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1245.2 **/scf**	1252.0 **/scf**
	NET WET REAL :	1223.4 **/scf**	1230.3 **/scf**
HIGH	GROSS DRY REAL :	1368.1 **/scf**	1375.6 **/scf**
	GROSS WET REAL :	1344.2 **/scf**	1351.6 **/scf**
	NET DRY REAL :	19522.1 **/lb**	19628.7 **/lb**
	GROSS DRY REAL :	21454.3 **/lb**	21571.4 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8361
	COMPRESSIBILITY FACTOR :		0.99557

(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

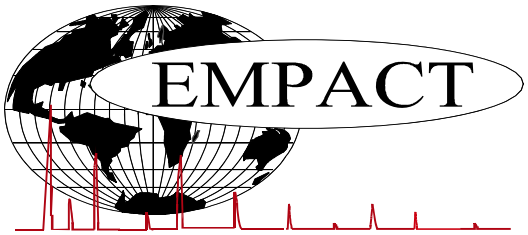
303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201404091	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 26, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 16, 2014
PRODUCER :		CYLINDER NO. :	0846
LEASE NO. :		SAMPLED BY :	GALE MCENREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 13:45 GAFFNEY 2-29-8-61		
FIELD DATA		SAMPLE TEMP. :	88
SAMPLE PRES. :	85	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 1.5 PPM (1-7 PPM) @ 13:50		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	2.55	4.63
Nitrogen	1.01	1.17
Methane	69.48580	46.00720
Ethane	11.6247	14.4262
Propane	8.7707	15.9618
Isobutane	0.9426	2.2611
n-Butane	3.1466	7.5481
Isopentane	0.6302	1.8765
n-Pentane	0.8292	2.4691
Cyclopentane	0.0722	0.2090
n-Hexane	0.1884	0.6700
Cyclohexane	0.0519	0.1803
Other Hexanes	0.3418	1.2062
Heptanes	0.1641	0.6754
Methycyclohexane	0.0383	0.1552
2,2,4 Trimethylpentane	0.0002	0.0009
Benzene	0.0324	0.1045
Toluene	0.0181	0.0688
Ethylbenzene	0.0014	0.0061
Xylenes	0.0031	0.0136
C8+ Heavies	0.0681	0.3295
Subtotal	99.97980	99.96950
Oxygen/Argon	0.02	0.03
Alcohols	0.0002	0.0005
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201404091	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 26, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 16, 2014
PRODUCER :		CYLINDER NO. :	0846
LEASE NO. :		SAMPLED BY :	GALE MCENREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 13:45 GAFFNEY 2-29-8-61		
FIELD DATA		SAMPLE TEMP. :	88
SAMPLE PRES. :	85	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 1.5 PPM (1-7 PPM) @ 13:50		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.01	0.00	---	---
Hydrogen	---	0.00	0.00	---	---
Oxygen/Argon	---	0.02	0.03	---	---
Nitrogen	---	1.01	1.17	---	---
Carbon Dioxide	---	2.55	4.63	---	---
Methane	P1	69.48580	46.00720	---	---
Ethane	P2	11.6247	14.4262	3.105	3.122
Propane	P3	8.7707	15.9618	2.413	2.426
i-Butane	I4	0.9426	2.2611	0.308	0.310
n-Butane	P4	3.1466	7.5481	0.990	0.996
2,2-Dimethylpropane	I5	0.0025	0.0074	0.001	0.001
Ethanol	X2	0.0001	0.0002	0.000	0.000
i-Pentane	I5	0.6277	1.8691	0.229	0.231
n-Pentane	P5	0.8292	2.4691	0.300	0.302
t-Butanol	X4	0.0001	0.0003	0.000	0.000
2,2-Dimethylbutane	I6	0.0020	0.0071	0.001	0.001
Cyclopentane	N5	0.0722	0.2090	0.021	0.021
2,3-Dimethylbutane	I6	0.0176	0.0626	0.007	0.007
2-Methylpentane	I6	0.1374	0.4887	0.057	0.057
3-Methylpentane	I6	0.0704	0.2504	0.029	0.029
n-Hexane	P6	0.1884	0.6700	0.077	0.078
2,2-Dimethylpentane	I7	0.0007	0.0029	0.000	0.000
Methylcyclopentane	N6	0.1144	0.3974	0.040	0.040
2,4-Dimethylpentane	I7	0.0045	0.0186	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0324	0.1045	0.009	0.009
3,3-Dimethylpentane	I7	0.0005	0.0021	0.000	0.000
Cyclohexane	N6	0.0519	0.1803	0.018	0.018
2-Methylhexane	I7	0.0191	0.0790	0.009	0.009
2,3-Dimethylpentane	I7	0.0094	0.0389	0.004	0.004
1,1-Dimethylcyclopentane	N7	0.0050	0.0203	0.002	0.002
3-Methylhexane	I7	0.0221	0.0914	0.010	0.010
1c,3-Dimethylcyclopentane	N7	0.0124	0.0503	0.006	0.006
1t,3-Dimethylcyclopentane	N7	0.0111	0.0450	0.005	0.005
3-Ethylpentane	I7	0.0015	0.0062	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0225	0.0912	0.010	0.010
2,2,4-Trimethylpentane	I8	0.0002	0.0009	0.000	0.000
n-Heptane	P7	0.0455	0.1882	0.021	0.021
1c,2-Dimethylcyclopentane	N7	0.0017	0.0069	0.001	0.001
Methylcyclohexane	N7	0.0383	0.1552	0.015	0.015
1,1,3-Trimethylcyclopentane	N7	0.0027	0.0125	0.001	0.001
Ethylcyclopentane	N7	0.0053	0.0215	0.002	0.002

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

2,5-Dimethylhexane	I8	0.0008	0.0038	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0002	0.0009	0.000	0.000
2,4-Dimethylhexane	I8	0.0015	0.0071	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0030	0.0139	0.001	0.001
3,3-Dimethylhexane	I8	0.0001	0.0004	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0034	0.0158	0.002	0.002
2,3,4-Trimethylpentane	I8	0.0006	0.0028	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0004	0.000	0.000
Toluene	A7	0.0181	0.0688	0.006	0.006
2,3-Dimethylhexane	I8	0.0012	0.0056	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0008	0.0038	0.000	0.000
2-Methylheptane	I8	0.0067	0.0316	0.003	0.003
4-Methylheptane	I8	0.0019	0.0090	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0002	0.0009	0.000	0.000
3,4-Dimethylhexane	I8	0.0002	0.0009	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0002	0.0009	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0001	0.0004	0.000	0.000
3-Methylheptane	I8	0.0031	0.0146	0.002	0.002
1c,2t,3-Trimethylcyclopentane	N8	0.0044	0.0204	0.002	0.002
3-Ethylhexane	I8	0.0005	0.0023	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0016	0.0074	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0006	0.0028	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0010	0.0046	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0008	0.0037	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0027	0.0125	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0002	0.0011	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0023	0.0106	0.001	0.001
n-Octane	P8	0.0093	0.0438	0.005	0.005
1c,4-Dimethylcyclohexane	N8	0.0008	0.0037	0.000	0.000
i-Propylcyclopentane	I8	0.0002	0.0009	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0005	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	0.0005	0.0023	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0026	0.0135	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0009	0.0047	0.000	0.000
2,4-Dimethylheptane	I9	0.0003	0.0016	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
Ethylcyclohexane	N8	0.0013	0.0060	0.001	0.001
n-Propylcyclopentane	N8	0.0005	0.0023	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	0.0002	0.0011	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
2,6-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0005	0.0026	0.000	0.000
Ethylbenzene	I8	0.0014	0.0061	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0004	0.0021	0.000	0.000
2,3-Dimethylheptane	I9	0.0011	0.0058	0.001	0.001
1,3-Dimethylbenzene (m-Xylene)	A8	0.0017	0.0074	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0005	0.0022	0.000	0.000
3,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0003	0.0016	0.000	0.000
4-Methyloctane	I9	0.0004	0.0021	0.000	0.000
2-Methyloctane	I9	0.0005	0.0026	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
3-Ethylheptane	I9	0.0002	0.0011	0.000	0.000
3-Methyloctane	I9	0.0006	0.0032	0.000	0.000
1,1,2-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0009	0.0040	0.000	0.000
i-Butylcyclopentane	N9	0.0004	0.0021	0.000	0.000
n-Nonane	P9	0.0016	0.0085	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0002	0.0010	0.000	0.000
i-Propylbenzene	A9	0.0003	0.0015	0.000	0.000
i-Propylcyclohexane	N9	0.0001	0.0005	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	0.0003	0.0016	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Propylbenzene	A9	0.0002	0.0010	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0004	0.0023	0.000	0.000
1,3-Methylethylbenzene	A9	0.0002	0.0010	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0005	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	0.0001	0.0006	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0005	0.000	0.000
2-Methylnonane	I10	0.0001	0.0006	0.000	0.000
3-Methylnonane	I10	0.0001	0.0006	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0005	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0015	0.0079	0.001	0.001
n-Decane	P10	0.0003	0.0018	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0001	0.0005	0.000	0.000
Sec-Butylcyclohexane	A10	0.0001	0.0006	0.000	0.000
UnknownC10s	U10	0.0007	0.0041	0.000	0.000
n-Undecane	P11	0.0001	0.0007	0.000	0.000
TOTAL		100.00000	100.00000	7.7308	7.7729

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0324	0.1045
TOLUENE	0.0181	0.0688
ETHYLBENZENE	0.0014	0.0061
XYLENES	0.0031	0.0136
TOTAL BTEX	0.0550	0.1930

	BTU @	14.650		14.730	
LOW	NET DRY REAL :	1245.2	**/scf**	1252.0	**/scf**
	NET WET REAL :	1223.4	**/scf**	1230.3	**/scf**
HIGH	GROSS DRY REAL :	1368.1	**/scf**	1375.6	**/scf**
	GROSS WET REAL :	1344.2	**/scf**	1351.6	**/scf**
	NET DRY REAL :	19522.1	**/lb**	19628.7	**/lb**
	GROSS DRY REAL :	21454.3	**/lb**	21571.4	**/lb**
	RELATIVE DENSITY (AIR=1):			0.8361	
	COMPRESSIBILITY FACTOR :			0.99557	

(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