CRUDE OIL ASSAY

PROJECT NO. :	201403106	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 25, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 19, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	TANK BATTERY @ 14:55 CASTOR 7-36-9-59		EMPACT
FIELD DATA		SAMPLE TEMP. :	87
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; TK# 43602		

SPECIFICATION		TEST METHOD	UNITS	RESULTS
API GRAVITY			API 60/60	31.9
RVP @100 DEG F		D323	PSIG	4.6
TOTAL SULFUR		D2622	WT %	0.445
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, THICK
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.
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80601

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201403106	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 22, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 19, 2014
PRODUCER :		CYLINDER NO. :	37169
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 13:50 CASTOR 7-36-9-59		EMPACT
FIELD DATA		SAMPLE TEMP. :	166
SAMPLE PRES. :	35	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
NITROGEN (AIR)	0.0000	0.0000	0.0000
CARBON DIOXIDE	0.0545	0.0213	0.0195
METHANE	0.2573	0.0367	0.0915
ETHANE	0.3149	0.0842	0.1767
PROPANE	0.8246	0.3234	0.4770
I-BUTANE	0.2070	0.1070	0.1421
N-BUTANE	1.0847	0.5606	0.7178
I-PENTANE	0.5400	0.3464	0.4146
N-PENTANE	0.9845	0.6316	0.7483
HEXANES PLUS	95.7325	97.8888	97.2125
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	**MOLE%**	**MASS%**
BENZENE	1.3906	0.9659
TOLUENE	3.4121	2.7956
ETHYLBENZENE	0.9312	0.8791
XYLENE	2.2515	2.1255
TOTAL BTEX	7.9854	6.7661

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

	TOTAL SAMPLE	**C6+ FRACTION**	
Specific Gravity (H2O=1) =	0.7478	0.7531	60/60
API Gravity =	57.72	56.39	60/60
Molecular Weight =	112.46	115.548	
Absolute Density =	6.23	6.28	LBS/GAL
Heating Value Liq. Idl Gas=	127151	127888	BTU/GAL
Vapor/Liquid =	21.15	20.72	CUFT/GAL
Vapor Pressure =	19.41	1.55	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. :	201403106	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 22, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 19, 2014
PRODUCER :		CYLINDER NO. :	37169
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 13:50		EMPACT
	CASTOR 7-36-9-59		
FIELD DATA		SAMPLE TEMP. :	166
SAMPLE PRES. :	35	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0545		0.0213		0.0195	
NITROGEN (AIR)	0.0000		0.0000		0.0000	
METHANE	0.2573		0.0367		0.0915	
ETHANE	0.3149		0.0842		0.1767	
PROPANE	0.8246		0.3234		0.4770	
I-BUTANE	0.2070		0.1070		0.1421	
N-BUTANE	1.0847		0.5606		0.7178	
I-PENTANE	0.5400		0.3464		0.4146	
N-PENTANE	0.9845		0.6316		0.7483	
CYCLOPENTANE (N-C5)	1.1692		0.7291		0.7171	
N-HEXANE	5.9425		4.5534		5.1285	
CYCLOHEXANE (OTHER C6)	2.6473		1.9811		1.8907	
OTHER HEXANES	9.0130		6.8338		7.2981	
OTHER HEPTANES	13.2713		11.7421		12.3411	
METHYLCYCLOHEXANE (OTHER C7)	4.0990		3.5789		3.4542	
2,2,4 TRIMETHYLPENTANE	0.7693		0.6717		0.6666	
BENZENE	1.3906		0.9659		0.8180	
TOLUENE	3.4121		2.7956		2.3910	
ETHYLBENZENE	0.9312		0.8791		0.7518	
XYLENES	2.2515		2.1255		1.8159	
OTHER OCTANES	12.7168		12.9050		13.0035	
OCTANES PLUS	----	54.7875	----	64.7089	----	63.1738
NONANES	14.4580		16.3034		16.1496	
DECANES PLUS	23.6607		31.8242		30.7864	
SUB TOTAL	100.0000		100.0000		100.0000	
TOTAL	100.0000		100.0000		100.0000	

API Gravity	=	**57.72**	60/60
Vapor Pressure	=	**19.41**	PSIA & 100 F
Average Molecular Weight of Decanes plus	=	**151.26**	
Average Specific Gravity of Decanes plus	=	**0.7710**	

EMPACT ANALYTICAL SYSTEMS INC.
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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

BY CARBON NUMBER

PROJECT NO. :	201403106	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 22, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 19, 2014
PRODUCER :		CYLINDER NO. :	37169
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 13:50		EMPACT
	CASTOR 7-36-9-59		
FIELD DATA		SAMPLE TEMP. :	166
SAMPLE PRES. :	35	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
NITROGEN		0.0000	0.0000	0.0000
CARBON DIOXIDE		0.0545	0.0213	0.0195
	C1	0.2573	0.0367	0.0915
	C2	0.3149	0.0842	0.1767
	C3	0.8246	0.3234	0.4770
	C4	1.2917	0.6676	0.8599
	C5	2.6937	1.7071	1.8800
	C6	18.9934	14.3342	15.1353
	C7	20.7824	18.1166	18.1863
	C8	16.6688	16.5813	16.2378
	C9	14.4580	16.3034	16.1496
	C10	11.9619	14.6438	14.2309
	C11	5.3533	7.1275	6.8033
	C12	2.8794	4.1010	3.9581
	C13	1.7559	2.8141	2.7393
	C14	0.9460	1.6688	1.6347
	C15	0.5868	1.1084	1.0733
	C16	0.1562	0.3145	0.3026
	C17	0.0147	0.0314	0.0301
	C18	0.0065	0.0147	0.0141
	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.
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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201403106	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 22, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 19, 2014
PRODUCER :		CYLINDER NO. :	37169
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 13:50		EMPACT
	CASTOR 7-36-9-59		
FIELD DATA		SAMPLE TEMP. :	166
SAMPLE PRES. :	35	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0000	0.0000	0.0000
Carbon Dioxide	NHC	0.0545	0.0213	0.0195
Methane	P1	0.2573	0.0367	0.0915
Ethane	P2	0.3149	0.0842	0.1767
Propane	P3	0.8246	0.3234	0.4770
i-Butane	I4	0.2070	0.1070	0.1421
n-Butane	P4	1.0847	0.5606	0.7178
i-Pentane	I5	0.5400	0.3464	0.4146
n-Pentane	P5	0.9845	0.6316	0.7483
2,2-Dimethylbutane	I6	0.0368	0.0282	0.0322
Cyclopentane	N5	1.1692	0.7291	0.7171
2,3-Dimethylbutane	I6	0.2949	0.2260	0.2534
2-Methylpentane	I6	2.8818	2.2084	2.5104
3-Methylpentane	I6	1.7286	1.3247	1.4808
n-Hexane	P6	5.9425	4.5534	5.1285
2,2-Dimethylpentane	I7	0.0126	0.0112	0.0123
Methylcyclopentane	N6	4.0709	3.0465	3.0213
2,4-Dimethylpentane	I7	0.2765	0.2464	0.2724
2,2,3-Trimethylbutane	I7	0.0182	0.0162	0.0174
Benzene	A6	1.3906	0.9659	0.8180
3,3-Dimethylpentane	I7	0.0153	0.0136	0.0146
Cyclohexane	N6	2.6473	1.9811	1.8907
2-Methylhexane	I7	1.0120	0.9017	0.9881
2,3-Dimethylpentane	I7	0.7389	0.6584	0.7009
1,1-Dimethylcyclopentane	N7	0.3328	0.2906	0.2862
3-Methylhexane	I7	1.6432	1.4641	1.5802
1c,3-Dimethylcyclopentane	N7	0.8400	0.7334	0.7316
1t,3-Dimethylcyclopentane	N7	0.7693	0.6717	0.6666
3-Ethylpentane	I7	0.0828	0.0738	0.0784
1t,2-Dimethylcyclopentane	N7	1.7521	1.5298	1.5128
2,2,4-Trimethylpentane	I8	0.1507	0.1531	0.1637
n-Heptane	P7	4.8527	4.3237	4.6975
1c,2-Dimethylcyclopentane	N7	0.1394	0.1217	0.1171
Methylcyclohexane	N7	4.0990	3.5789	3.4542
2,2-Dimethylhexane	I8	0.4470	0.4540	0.4849
Ethylcyclopentane	N7	0.7855	0.6858	0.6650
2,5-Dimethylhexane	I8	0.1215	0.1234	0.1321
2,2,3-Trimethylpentane	I8	0.0322	0.0327	0.0339
2,4-Dimethylhexane	I8	0.2492	0.2531	0.2697
1c,2t,4-Trimethylcyclopentane	N8	0.4085	0.4076	0.3968
3,3-Dimethylhexane	I8	0.0616	0.0626	0.0655
2,3,4-Trimethylpentane	I8	0.1137	0.1155	0.1193

2,3,3-Trimethylpentane	I8	0.0062	0.0063	0.0065
Toluene	A7	3.4121	2.7956	2.3910
2,3-Dimethylhexane	I8	0.2003	0.2035	0.2125
2-Methyl-3-ethylpentane	I8	0.1907	0.1937	0.2001
1,1,2-Trimethylcyclopentane	N8	0.0621	0.0620	0.0597
2-Methylheptane	I8	1.3298	1.3507	1.4354
4-Methylheptane	I8	0.4868	0.4945	0.5128
3-Methyl-3-ethylpentane	I8	0.1157	0.1175	0.1201
3,4-Dimethylhexane	I8	0.1488	0.1511	0.1560
1c,2c,4-Trimethylcyclopentane	N8	0.0614	0.0613	0.0591
1c,3-Dimethylcyclohexane	N8	0.0402	0.0401	0.0389
3-Methylheptane	I8	0.4435	0.4505	0.4746
1c,2t,3-Trimethylcyclopentane	N8	1.1413	1.1388	1.0988
3-Ethylhexane	I8	0.1988	0.2019	0.2105
1t,4-Dimethylcyclohexane	N8	0.6681	0.6666	0.6498
1,1-Dimethylcyclohexane	N8	0.1720	0.1716	0.1634
3t-Ethylmethylcyclopentane	N8	0.2764	0.2758	0.2674
2t-Ethylmethylcyclopentane	N8	0.2176	0.2171	0.2099
1,1-Methylethylcyclopentane	N8	0.8158	0.8140	0.7750
2,2,4-Trimethylhexane	I9	0.0825	0.0941	0.0978
1t,2-Dimethylcyclohexane	N8	0.6900	0.6885	0.6598
1t,3-Dimethylcyclohexane	N8	0.0157	0.0157	0.0149
n-Octane	P8	2.3774	2.4148	2.5541
1c,4-Dimethylcyclohexane	N8	0.9496	0.9475	0.8999
i-Propylcyclopentane	I8	0.0982	0.0980	0.0938
2,4,4-Trimethylhexane	I9	0.0249	0.0284	0.0292
2,2,3,4-Tetramethylpentane	I9	0.0209	0.0238	0.0246
2,3,4-Trimethylhexane	I9	0.0234	0.0267	0.0275
1c,2-Dimethylcyclohexane	N8	0.2096	0.2091	0.1953
2,3,5-Trimethylhexane	I9	0.0647	0.0738	0.0760
2,2-Dimethylheptane	I9	0.0197	0.0225	0.0235
1,1,4-Trimethylcyclohexane	N9	1.2070	1.3549	1.3051
2,2,3-Trimethylhexane	I9	0.4806	0.5481	0.5587
2,4-Dimethylheptane	I9	0.0423	0.0482	0.0501
4,4-Dimethylheptane	I9	0.1316	0.1501	0.1560
Ethylcyclohexane	N8	0.7268	0.7252	0.6846
n-Propylcyclopentane	N8	0.2256	0.2251	0.2155
1c,3c,5-Trimethylcyclohexane	N9	0.0694	0.0779	0.0750
2,5-Dimethylheptane	I9	0.1171	0.1336	0.1386
3,3-Dimethylheptane	I9	0.1234	0.1407	0.1459
3,5-Dimethylheptane	I9	0.0980	0.1118	0.1160
2,6-Dimethylheptane	I9	0.0698	0.0796	0.0835
1,1,3-Trimethylcyclohexane	N9	0.0786	0.0882	0.0850
Ethylbenzene	A8	0.9312	0.8791	0.7518
1c,2t,4t-Trimethylcyclohexane	N9	0.4853	0.5448	0.5148
2,3-Dimethylheptane	I9	0.6491	0.7403	0.7581
1,3-Dimethylbenzene (m-Xylene)	A8	0.8021	0.7572	0.6513
1,4-Dimethylbenzene (p-Xylene)	A8	0.4964	0.4686	0.4043
3,4-Dimethylheptane	I9	0.2213	0.2524	0.2566
3,4-Dimethylheptane (2)	I9	0.2487	0.2836	0.2883
4-Ethylheptane	I9	0.1206	0.1375	0.1429
4-Methyloctane	I9	0.3185	0.3633	0.3748
2-Methyloctane	I9	0.4835	0.5514	0.5744
1c,2t,4c-Trimethylcyclohexane	I9	0.1436	0.1638	0.1678
3-Ethylheptane	I9	0.0954	0.1088	0.1113
3-Methyloctane	I9	0.4804	0.5479	0.5651
3,3-Diethylpentane	I9	0.0845	0.0964	0.0950
1c,2t,3-Trimethylcyclohexane	N9	0.1620	0.1819	0.1719
1,1,2-Trimethylcyclohexane	N9	0.0842	0.0945	0.0893
1,2-Dimethylbenzene (o-Xylene)	A8	0.9530	0.8997	0.7603
i-Butylcyclopentane	N9	0.3347	0.3757	0.3577
UnknownC8s	U8	0.0333	0.0338	0.0358
n-Nonane	P9	1.7389	1.9832	2.0544
1,1-Methylethylcyclohexane	N9	0.9689	1.1050	1.1481
i-Propylbenzene	A9	0.4611	0.4928	0.4243
i-Propylcyclohexane	N9	0.1568	0.1760	0.1632
2,2-Dimethyloctane	I10	0.0536	0.0678	0.0682
2,4-Dimethyloctane	I10	0.1005	0.1272	0.1279
2,6-Dimethyloctane	I10	0.0106	0.0134	0.0139
2,5-Dimethyloctane	I10	0.0452	0.0572	0.0575
n-Butylcyclopentane	N9	0.2230	0.2781	0.2588
3,3-Dimethyloctane	I10	0.1838	0.2325	0.2339
n-Propylbenzene	A9	0.4065	0.4344	0.3741
3,6-Dimethyloctane	I10	0.2779	0.3516	0.3535

3-Methyl-5-ethylheptane	I10	0.5650	0.6444	0.6602
1,3-Methylethylbenzene	A9	0.4767	0.5095	0.4351
1,4-Methylethylbenzene	A9	0.1441	0.1540	0.1315
1,3,5-Trimethylbenzene	A9	0.1630	0.1742	0.1498
2,3-Dimethyloctane	I10	0.1019	0.1289	0.1296
5-Methylnonane	I10	0.2508	0.3173	0.3221
1,2-Methylethylbenzene	A9	0.3403	0.3637	0.3090
2-Methylnonane	I10	0.1677	0.2122	0.2172
3-Ethyloctane	I10	0.0826	0.1045	0.1051
3-Methylnonane	I10	0.2358	0.2983	0.3024
1,2,4-Trimethylbenzene	A9	0.0400	0.0428	0.0364
t-Butylbenzene	A10	0.2188	0.2611	0.2242
i-Butylcyclohexane	N10	0.2884	0.3597	0.3296
1t-Methyl-2-n-propylcyclohexane	I10	0.1645	0.1876	0.1922
i-Butylbenzene	A10	0.0954	0.1139	0.0993
sec-Butylbenzene	A10	0.1496	0.1785	0.1541
UnknownC9s	U9	2.5273	2.8824	2.9859
n-Decane	P10	1.5727	1.9897	2.0264
1,2,3-Trimethylbenzene	A9	0.2457	0.2626	0.2185
1,3-Methyl-i-propylbenzene	A10	0.1314	0.1404	0.1193
1,4-Methyl-i-propylbenzene	A10	0.1264	0.1351	0.1148
Sec-Butylcyclohexane	N10	0.4317	0.5385	0.4927
1,2-Methyl-i-propylbenzene	A10	0.1686	0.2012	0.1708
3-Ethylnonane	I10	0.0254	0.0321	0.0329
1,3-Diethylbenzene	A10	0.1565	0.1868	0.1609
1,3-Methyl-n-propylbenzene	A10	0.0803	0.0958	0.0828
1,4-Diethylbenzene	A10	0.1403	0.1674	0.1445
1,4-Methyl-n-propylbenzene	A10	0.1251	0.1493	0.1294
n-Butylbenzene	A10	0.1566	0.1869	0.1614
1,3-Dimethyl-5-ethylbenzene	A10	0.0716	0.0855	0.0735
1,2-Diethylbenzene	A10	0.1448	0.1728	0.1462
1,2-Methyl-n-propylbenzene	A10	0.1250	0.1492	0.1271
1,4-Dimethyl-2-ethylbenzene	A10	0.1634	0.1950	0.1654
1,3-Dimethyl-4-ethylbenzene	A10	0.0795	0.0949	0.0806
1,2-Dimethyl-4-ethylbenzene	A10	0.2996	0.3576	0.3043
1,3-Dimethyl-2-ethylbenzene	A10	0.0744	0.0888	0.0742
1t,2c,4-Trimethylcyclopentane	A10	0.5224	0.5212	0.5184
1,2-Dimethyl-3-ethylbenzene	A10	0.0859	0.1025	0.0855
1,2-Ethyl-i-propylbenzene	A10	0.0732	0.0874	0.0742
1,4-Methyl-t-butylbenzene	A11	0.2090	0.2494	0.2117
UnknownC10s	U10	3.9504	4.9979	5.0902
n-Undecane	P11	1.0699	1.4871	1.4936
1,4-Ethyl-i-propylbenzene	A11	0.1415	0.1689	0.1433
1,2,4,5-Tetramethylbenzene	A11	0.1497	0.1787	0.1501
1,2-Methyl-n-butylbenzene	A11	0.0648	0.0773	0.0656
1,2,3,5-Tetramethylbenzene	A11	0.1187	0.1417	0.1184
1,2-Methyl-t-butylbenzene	A11	0.0697	0.0832	0.0706
5-Methylindan	A11	0.0299	0.0453	0.0450
1,2-Ethyl-n-propylbenzene	A11	0.0727	0.0868	0.0737
2-Methylindan	A11	0.0658	0.0997	0.0990
1,3-Methyl-n-butylbenzene	A11	0.0659	0.0787	0.0668
1,3-Di-i-propylbenzene	A11	0.0815	0.0973	0.0826
sec-Pentylbenzene	A11	0.1237	0.1476	0.1253
n-Pentylbenzene	A11	0.0894	0.1179	0.1022
1t-M-2-(4MP)cyclopentane	P12	0.0207	0.0314	0.0312
1,2-Di-n-propylbenzene	A11	0.0803	0.0958	0.0813
1,4-Di-i-propylbenzene	A11	0.2001	0.2388	0.2027
t-Decahydronaphthalene	A10	0.1875	0.2238	0.1899
Naphthalene	A10	0.0771	0.0879	0.0746
1-t-Butyl-3,5-dimethylbenzene	A12	0.0840	0.1003	0.0851
1,4-Ethyl-t-butylbenzene	A11	0.0889	0.1061	0.0901
UnknownC11s	U11	2.3860	3.3164	3.3308
n-Dodecane	P12	0.7173	1.0865	1.0792
1,3-Di-n-propylbenzene	A12	0.0572	0.0683	0.0580
1,3,5-Triethylbenzene	A12	0.0809	0.0865	0.0744
1,2,4-Triethylbenzene	A12	0.3365	0.3596	0.3053
1,4-Methyl-n-pentylbenzene	A12	0.0716	0.0855	0.0726
n-Hexylbenzene	A12	0.0849	0.1225	0.1063
1,2,3,4,5-Pentamethylbenzene	A13	0.1446	0.1726	0.1465
2-Methylnaphthalene	A11	0.1574	0.1990	0.1689
1-Methylnaphthalene	A11	0.0884	0.1118	0.0816
UnknownC12s	U12	1.4263	2.1604	2.1460
n-Tridecane	P13	0.4591	0.7526	0.7387
UnknownC13s	U13	1.1522	1.8889	1.8541

n-Tetradecane	P14	0.2262	0.3990	0.3908
UnknownC14s	U14	0.7198	1.2698	1.2439
n-Pentadecane	P15	0.1223	0.2310	0.2237
UnknownC15s	U15	0.4645	0.8774	0.8496
n-Hexadecane	P16	0.0444	0.0894	0.0860
UnknownC16s	U16	0.1118	0.2251	0.2166
n-Heptadecane	P17	0.0147	0.0314	0.0301
n-Octadecane	P18	0.0065	0.0147	0.0141
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. :	201403106	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 28, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 19, 2014
PRODUCER :		CYLINDER NO. :	1060
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 14:30 CASTOR 7-36-9-59		
FIELD DATA		SAMPLE TEMP. :	115
SAMPLE PRES. :	62	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 4.5PPM (1-7PPM) @ 14:35		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0003	0.0009		
HELIUM	0.02	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.01	0.01	---	---
NITROGEN	1.09	1.22	---	---
CARBON DIOXIDE	2.34	4.12	---	---
METHANE	68.59240	43.98250	---	---
ETHANE	10.8159	12.9995	2.8894	2.9052
PROPANE	9.0655	15.9783	2.4948	2.5085
I-BUTANE	0.9937	2.3086	0.3245	0.3263
N-BUTANE	3.6367	8.4488	1.1458	1.1520
I-PENTANE	0.9072	2.6071	0.3235	0.3252
N-PENTANE	1.1257	3.2464	0.4076	0.4099
HEXANES PLUS	1.3926	5.0779	0.5626	0.5655
TOTALS	100.00000	100.00000	8.1482	8.1926

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0601	0.1877
TOLUENE	0.0345	0.1271
ETHYLBENZENE	0.0033	0.0140
XYLENES	0.0058	0.0246
TOTAL BTEX	0.1037	0.3534

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1288.1 **/scf**	1295.1 **/scf**
	NET WET REAL :	1265.6 **/scf**	1272.6 **/scf**
HIGH	GROSS DRY REAL :	1413.9 **/scf**	1421.6 **/scf**
	GROSS WET REAL :	1389.2 **/scf**	1396.9 **/scf**
	NET DRY REAL :	19564.2 **/lb**	19671.1 **/lb**
	GROSS DRY REAL :	21480.6 **/lb**	21597.9 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8630
	COMPRESSIBILITY FACTOR :		0.99534

(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

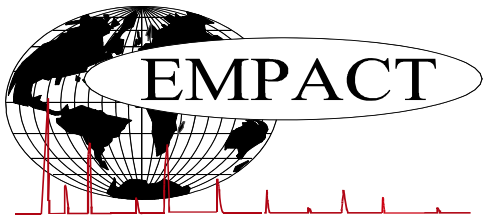
303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201403106	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 28, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 19, 2014
PRODUCER :		CYLINDER NO. :	1060
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 14:30 CASTOR 7-36-9-59		
FIELD DATA		SAMPLE TEMP. :	115
SAMPLE PRES. :	62	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 4.5PPM (1-7PPM) @ 14:35		

Componet	Mole %	Wt %
Helium	0.02	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	2.34	4.12
Nitrogen	1.09	1.22
Methane	68.59240	43.98250
Ethane	10.8159	12.9995
Propane	9.0655	15.9783
Isobutane	0.9937	2.3086
n-Butane	3.6367	8.4488
Isopentane	0.7935	2.2884
n-Pentane	1.1257	3.2464
Cyclopentane	0.1137	0.3187
n-Hexane	0.2866	0.9872
Cyclohexane	0.0810	0.2725
Other Hexanes	0.4978	1.7006
Heptanes	0.2530	1.0062
Methycyclohexane	0.0574	0.2253
2,2,4 Trimethylpentane	0.0002	0.0009
Benzene	0.0601	0.1877
Toluene	0.0345	0.1271
Ethylbenzene	0.0033	0.0140
Xylenes	0.0058	0.0246
C8+ Heavies	0.1129	0.5318
Subtotal	99.98970	99.98910
Oxygen/Argon	0.01	0.01
Alcohols	0.0003	0.0009
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201403106	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 28, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 19, 2014
PRODUCER :		CYLINDER NO. :	1060
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 14:30 CASTOR 7-36-9-59		
FIELD DATA		SAMPLE TEMP. :	115
SAMPLE PRES. :	62	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 4.5PPM (1-7PPM) @ 14:35		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.02	0.00	---	---
Hydrogen	---	0.01	0.00	---	---
Oxygen/Argon	---	0.01	0.01	---	---
Nitrogen	---	1.09	1.22	---	---
Carbon Dioxide	---	2.34	4.12	---	---
Methane	P1	68.59240	43.98250	---	---
Ethane	P2	10.8159	12.9995	2.889	2.905
Propane	P3	9.0655	15.9783	2.495	2.509
i-Butane	I4	0.9937	2.3086	0.325	0.326
n-Butane	P4	3.6367	8.4488	1.146	1.152
2,2-Dimethylpropane	I5	0.0031	0.0090	0.001	0.001
i-Pentane	I5	0.7904	2.2794	0.288	0.290
n-Pentane	P5	1.1256	3.2461	0.408	0.410
t-Butanol	X4	0.0003	0.0009	0.000	0.000
2,2-Dimethylbutane	I6	0.0027	0.0093	0.001	0.001
Cyclopentane	N5	0.1137	0.3187	0.034	0.034
2,3-Dimethylbutane	I6	0.0178	0.0613	0.007	0.007
2-Methylpentane	I6	0.1988	0.6848	0.082	0.083
3-Methylpentane	I6	0.1033	0.3558	0.042	0.042
UnknownC5s	U5	0.0001	0.0003	0.000	0.000
n-Hexane	P6	0.2866	0.9872	0.118	0.119
Methylcyclopentane	N6	0.1752	0.5894	0.062	0.062
2,4-Dimethylpentane	I7	0.0069	0.0276	0.003	0.003
2,2,3-Trimethylbutane	I7	0.0002	0.0008	0.000	0.000
Benzene	A6	0.0601	0.1877	0.017	0.017
3,3-Dimethylpentane	I7	0.0004	0.0016	0.000	0.000
Cyclohexane	N6	0.0810	0.2725	0.028	0.028
2-Methylhexane	I7	0.0303	0.1214	0.014	0.014
2,3-Dimethylpentane	I7	0.0143	0.0573	0.006	0.006
1,1-Dimethylcyclopentane	N7	0.0066	0.0259	0.003	0.003
3-Methylhexane	I7	0.0353	0.1414	0.016	0.016
1c,3-Dimethylcyclopentane	N7	0.0187	0.0734	0.009	0.009
1t,3-Dimethylcyclopentane	N7	0.0166	0.0652	0.008	0.008
3-Ethylpentane	I7	0.0026	0.0104	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0352	0.1381	0.016	0.016
2,2,4-Trimethylpentane	I8	0.0002	0.0009	0.000	0.000
n-Heptane	P7	0.0731	0.2928	0.034	0.034
1c,2-Dimethylcyclopentane	N7	0.0028	0.0110	0.001	0.001
Methylcyclohexane	N7	0.0574	0.2253	0.023	0.023
2,2-Dimethylhexane	I8	0.0036	0.0164	0.002	0.002
Ethylcyclopentane	N7	0.0100	0.0393	0.004	0.004
2,5-Dimethylhexane	I8	0.0014	0.0064	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0002	0.0009	0.000	0.000
2,4-Dimethylhexane	I8	0.0025	0.0114	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0046	0.0206	0.002	0.002
3,3-Dimethylhexane	I8	0.0003	0.0014	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0053	0.0238	0.002	0.002
2,3,4-Trimethylpentane	I8	0.0010	0.0046	0.000	0.000

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Toluene	A7	0.0345	0.1271	0.012	0.012
2,3-Dimethylhexane	I8	0.0019	0.0087	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0013	0.0059	0.001	0.001
2-Methylheptane	I8	0.0108	0.0493	0.006	0.006
4-Methylheptane	I8	0.0030	0.0137	0.002	0.002
3-Methyl-3-ethylpentane	I8	0.0002	0.0009	0.000	0.000
3,4-Dimethylhexane	I8	0.0004	0.0018	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0003	0.0014	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0001	0.0004	0.000	0.000
3-Methylheptane	I8	0.0049	0.0224	0.002	0.002
1c,2t,3-Trimethylcyclopentane	N8	0.0067	0.0301	0.003	0.003
3-Ethylhexane	I8	0.0007	0.0032	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0023	0.0103	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0008	0.0036	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0016	0.0072	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0014	0.0063	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0045	0.0202	0.002	0.002
2,2,4-Trimethylhexane	I9	0.0002	0.0010	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0033	0.0148	0.002	0.002
1t,3-Dimethylcyclohexane	N8	0.0001	0.0004	0.000	0.000
n-Octane	P8	0.0147	0.0671	0.008	0.008
1c,4-Dimethylcyclohexane	N8	0.0015	0.0067	0.001	0.001
i-Propylcyclopentane	I8	0.0004	0.0018	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0002	0.0010	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	0.0045	0.001	0.001
2,2-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0038	0.0192	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0014	0.0072	0.001	0.001
2,4-Dimethylheptane	I9	0.0007	0.0036	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
Ethylcyclohexane	N8	0.0020	0.0090	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	0.0003	0.0015	0.000	0.000
3,3-Dimethylheptane	I9	0.0003	0.0015	0.000	0.000
3,5-Dimethylheptane	I9	0.0003	0.0015	0.000	0.000
2,6-Dimethylheptane	I9	0.0002	0.0010	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0005	0.0025	0.000	0.000
Ethylbenzene	I8	0.0033	0.0140	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0006	0.0030	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0024	0.0102	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0016	0.0068	0.001	0.001
3,4-Dimethylheptane	I9	0.0012	0.0062	0.001	0.001
3,4-Dimethylheptane (2)	I9	0.0005	0.0026	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
4-Methyloctane	I9	0.0007	0.0036	0.000	0.000
2-Methyloctane	I9	0.0009	0.0046	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0002	0.0010	0.000	0.000
3-Ethylheptane	I9	0.0003	0.0015	0.000	0.000
3-Methyloctane	I9	0.0011	0.0056	0.001	0.001
1c,2t,4c-Trimethylcyclohexane	I9	0.0001	0.0005	0.000	0.000
1,1,2-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
3,3-Diethylpentane	I9	0.0001	0.0005	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0018	0.0076	0.001	0.001
i-Butylcyclopentane	N9	0.0006	0.0030	0.000	0.000
n-Nonane	P9	0.0029	0.0149	0.002	0.002
1,1-Methylethylcyclohexane	N9	0.0004	0.0020	0.000	0.000
i-Propylbenzene	A9	0.0005	0.0024	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	0.0005	0.0025	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Propylbenzene	A9	0.0005	0.0024	0.000	0.000
3,6-Dimethyloctane	I10	0.0004	0.0023	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0004	0.0023	0.000	0.000
1,3-Methylethylbenzene	A9	0.0004	0.0019	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

5-Methylnonane	I10	0.0002	0.0011	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0005	0.000	0.000
2-Methylnonane	I10	0.0003	0.0017	0.000	0.000
3-Methylnonane	I10	0.0001	0.0006	0.000	0.000
t-Butylbenzene	A10	0.0003	0.0016	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0024	0.0123	0.001	0.001
n-Decane	P10	0.0005	0.0028	0.000	0.000
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
Sec-Butylcyclohexane	A10	0.0001	0.0006	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Diethylbenzene	A10	0.0001	0.0005	0.000	0.000
UnknownC10s	U10	0.0017	0.0097	0.001	0.001
n-Undecane	P11	0.0002	0.0012	0.000	0.000
1,2,4,5-Tetramethylbenzene	A11	0.0001	0.0005	0.000	0.000
UnknownC11s	U11	0.0003	0.0019	0.000	0.000
n-Dodecane	P12	0.0002	0.0014	0.000	0.000
2-Methylnaphthalene	A11	0.0001	0.0006	0.000	0.000
n-Tridecane	P13	0.0001	0.0007	0.000	0.000
UnknownC13s	U13	0.0001	0.0007	0.000	0.000
n-Tetradecane	P14	0.0001	0.0008	0.000	0.000
TOTAL		100.00000	100.00000	8.1482	8.1926

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0601	0.1877
TOLUENE	0.0345	0.1271
ETHYLBENZENE	0.0033	0.0140
XYLENES	0.0058	0.0246
TOTAL BTEX	0.1037	0.3534

		BTU @	14.650	14.730
LOW	NET DRY REAL :		1288.1 **/scf**	1295.1 **/scf**
	NET WET REAL :		1265.6 **/scf**	1272.6 **/scf**
HIGH	GROSS DRY REAL :		1413.9 **/scf**	1421.6 **/scf**
	GROSS WET REAL :		1389.2 **/scf**	1396.9 **/scf**
	NET DRY REAL :		19564.2 **/lb**	19671.1 **/lb**
	GROSS DRY REAL :		21480.6 **/lb**	21597.9 **/lb**
	RELATIVE DENSITY (AIR=1):			0.8630
	COMPRESSIBILITY FACTOR :			0.99534

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

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993) ; ASTM D6730*

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